Ross Valley Sanitary District

Initial Study and Mitigated Negative Declaration

FY 2016/17 Gravity Sewer Improvements Project

SCHEIDEGGER & ASSOCIATES

December 2017

INITIAL STUDY AND MITIGATED NEGATIVE DECLARATION

FY 2016/17 Gravity Sewer Improvements Project

December 2017

LEAD AGENCY:

Sanitary District No. 1 of Marin County
(Ross Valley Sanitary District)
2960 Kerner Boulevard
San Rafael, CA 94901
(415) 259-2949

PREPARED BY:

Paul Scheidegger
Scheidegger & Associates
P.O. Box 331
Danville, CA 94526
(925) 210-2271

WITH ASSISTANCE FROM:

Environmental Collaborative (Biology)
Archeo-Tec (Cultural Resources)
William Popenuck (Air Quality)

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INTRODUCTION AND PROJECT DESCRIPTION

1. Project Title: FY 2016/17 Gravity Sewer Improvements Project (Project)

2. Lead Agency Name and Address: Sanitary District No. 1 of Marin County
(Ross Valley Sanitary District)
2960 Kerner Blvd.
San Rafael, CA 94901

3. Contact Person and Phone Number: Jill Barnes
(415) 905-0680
(415) 460-2149 (Fax)

Paul Scheidegger
Scheidegger & Associates
(925) 210-2271
(925) 937-9026 (Fax)

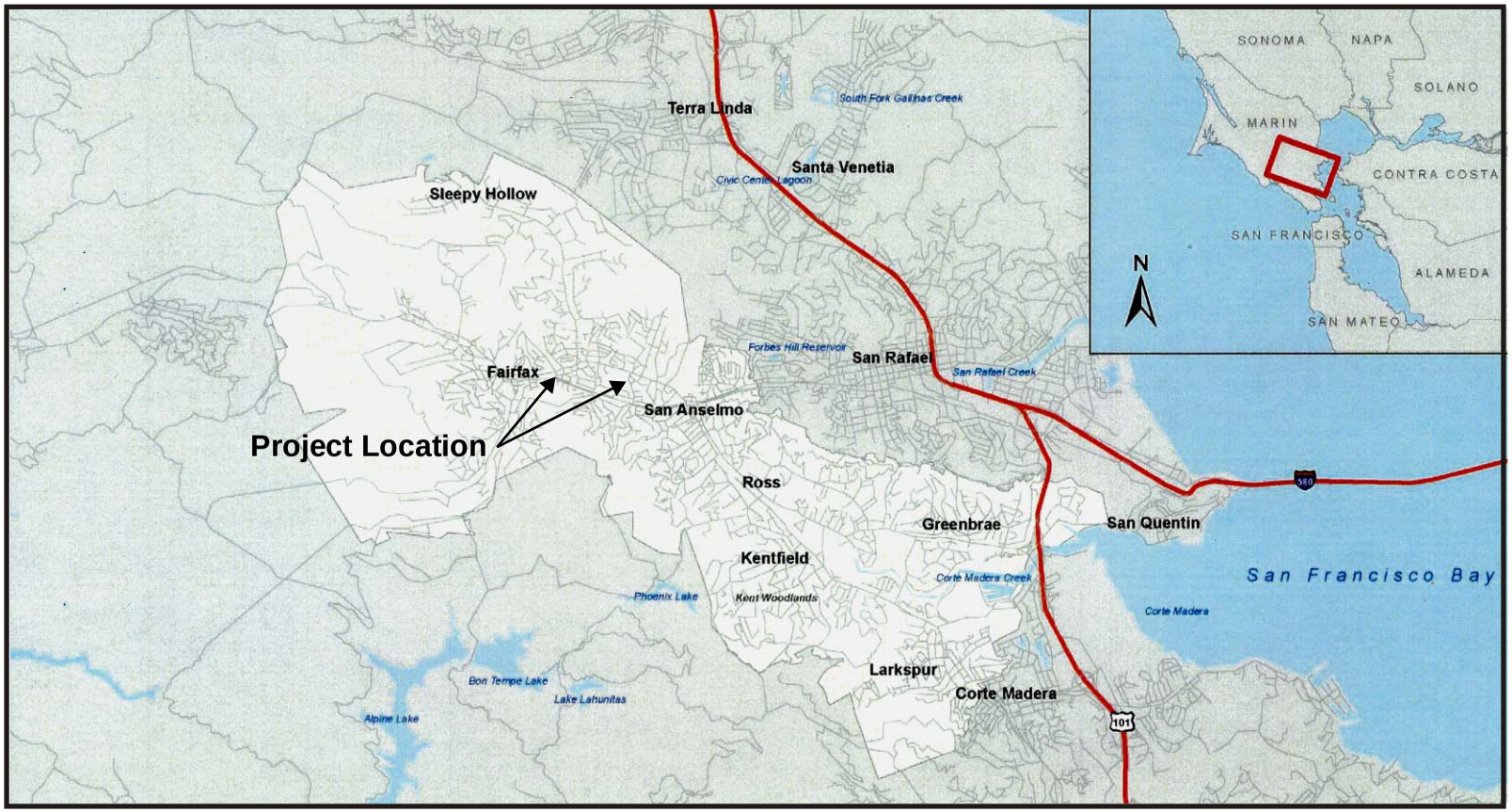
4. Project Location:

Figure 1 shows the location of the Project within the Sanitary District No. 1 of Marin County (Ross Valley Sanitary District-RVSD or the District) service area. The Project is located within the Town of San Anselmo (Town) in central Marin County. The Town has a land area of about 2.75 square miles and is situated in a series of small valleys bordered by moderate to steep hillside slopes and ridge tops. The Town is flanked by the City of San Rafael to the east, the Town of Ross to the south, the Town of Fairfax to the west, and the County of Marin unincorporated area to the north.

5. Project Sponsor's Name and Address: Sanitary District No. 1 of Marin County
(Ross Valley Sanitary District)
2960 Kerner Blvd.
San Rafael, CA 94901

6. General Plan Designation: Residential [1]

7. Zoning: Residential [2]



Source: RVSD, 2017

Figure 1. Project Location within RVSD Service Area

8. Description of Project:

Background

The RVSD was established in 1899 and is located approximately 15 miles north of San Francisco and directly south of the City of San Rafael. The service area is bounded on the east by the San Francisco Bay, and on the west by the coastal hills. The District, also known as Sanitary District No. 1 of Marin County, is one of three wastewater collection agencies that form the Central Marin Sanitation Agency (CMSA). The District serves the wastewater collection needs of approximately 56,000 customers in Fairfax, San Anselmo, Ross, Larkspur, Bon Air, Sleepy Hollow, Kentfield, Kent Woodlands, Oak Manor, Greenbrae, and Murray Park.

Planning for the proposed Project began in 2005 as part of the District's Sanitary Sewer Hydraulic Evaluation and Capacity Assurance Plan.[3] Between 2008 and 2013, the District experienced an increase in the number and severity of sewer system overflows (SSOs). On May 13, 2013, the California Regional Water Quality Control Board (RWQCB) issued a cease and desist order (CDO) No. R2-2013-0020 in response to instances where sewer system overflows reached waters of the state.[4] The CDO required the District to develop and implement an Infrastructure Asset Management Plan (IAMP).[5] The IAMP presents projects to rehabilitate and replace the District's deficient wastewater facilities through the year 2020. The proposed Project is one of those projects.

Overview of Construction Methods

The proposed Project includes the replacement of existing sewer pipes and the installation of new pipes by a variety of methods. These methods are:

- *Open Cut*: Existing sewer line would be exposed and removed by means of construction excavation equipment. A new pipe would then be installed and the trench would be backfilled.
- *Pipe Bursting*: Pipe bursting is a trenchless method where a new pipe is inserted into an existing pipe by means of a hydraulic winch. First, an insertion pit (roughly 3 feet wide by 45 feet long) and a receiving pit (roughly 4 feet wide by 8 feet long) are excavated at each end of a pipe segment. The locations of these pits are determined by the Contractor in the field based on site access. Prior to insertion of the new pipe, existing lateral connections are excavated and disconnected. A new pipe is then attached to a bursting head and pulled into the existing pipe. The bursting head breaks apart the existing pipe and creates a cavity for the new pipe. Once the new pipe is installed the existing laterals are reconnected and trenches are backfilled.
- *Pipe Reaming:* Pipe reaming is a trenchless method by which a new pipe replaces an existing pipe using a directional drill rig and reaming head. First, an insertion pit

(roughly 3 feet wide by 45 feet long) and a receiving pit (roughly 4 feet wide by 8 feet long) are excavated at each end of a pipe segment. The locations of these pits are determined by the Contractor in the field based on site access. Prior to insertion of the new pipe, existing lateral connections are excavated and disconnected. A directional drill is then used to insert a drill string through the existing pipe. A specialized reaming tool and the replacement pipe are then attached to the end of the drill string. The directional drill then back-reams through the existing pipe, enlarging the hole while grinding the existing pipe and pulling the new pipe into place. The fragments of the host pipe along with other cuttings are suspended in drilling fluid and pushed ahead of the reamer through the existing pipe to the receiving pit, where they are extracted and disposed of.

- *Cured in Place Pipe (CIPP):* This process involves a liquid thermoset resin-saturated felt tube material that is inserted into the existing pipe by hydrostatic or air inversion through a manhole. Then, the tube is expanded against the wall of the existing pipe by water, air or steam and cured by hot water or steam. For this Project, only air and steam would be allowed for expanding and only steam would be allowed for curing. Last, the new pipe is cooled and drained. This process results in a seamless, jointless pipe with a smooth, continuous inner surface. Laterals would be reinstated after the CIPP liner has cured by trenchless robotic methods.
- *Pilot Tube Guided Boring (PTGB):* PTGB is a trenchless method of pipe installation employing a pilot tube, temporary auger casing and jacking system for pushing the product pipe. First, an insertion pit (roughly 12-foot diameter) and a receiving pit (roughly 8 feet wide by 8 feet long) are excavated at each end of a pipe segment. The pipe would then be installed in three passes. In the first pass, a 4-inch diameter pilot tube sets the line and grade of the proposed pipe via a steering head and theodolite guidance system. In the second pass, a reaming head and auger tube casing are installed behind the pilot tube. In the third pass, the product pipe is connected to the auger casing and jacked into place, thereby removing the auger tube casing.

Project Summary

The Project consists of two Project areas: the Butterfield/Meadowcroft area (Butterfield alignment) and the Nokomis alignment. Both Project areas are located in the Town, one of the eleven service areas within the RVSD. The primary objective of this Project is to relieve hydraulic and structural deficiencies in the area, and to abandon an inverted siphon under Sleepy Hollow Creek at Willow Way. RVSD's engineer, Harris and Associates, has prepared several engineering documents for the Project including a Basis of Design Report, and 90% Plans and specifications.[6-8] Figures 2-4 show the location of the Project and the construction characteristics for the Nokomis and Butterfield alignments. The Project consists of the following components:

Figure 2. Key Map for Proposed Project

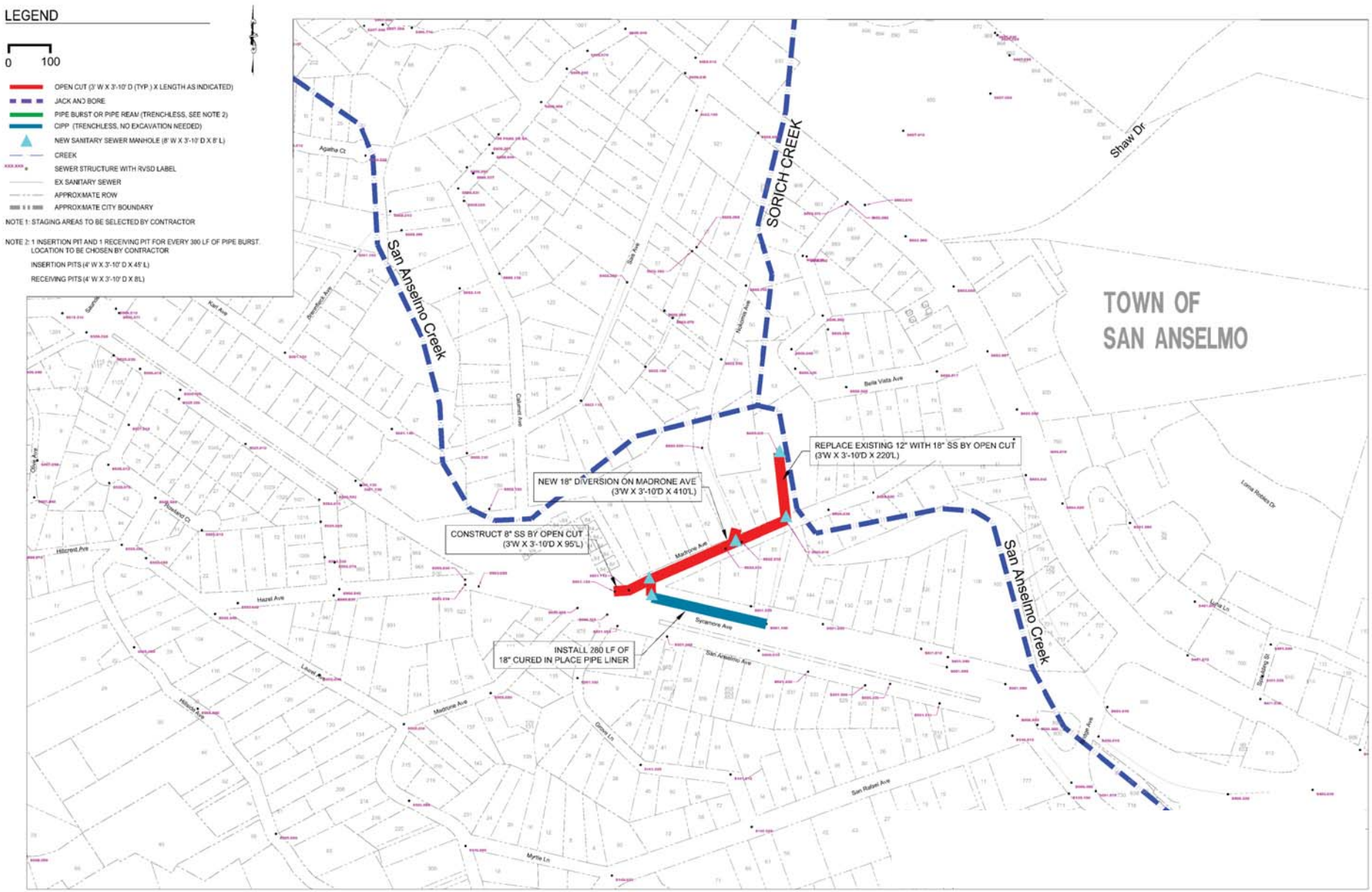


Figure 3. Construction Characteristics for the Nokomis Alignment

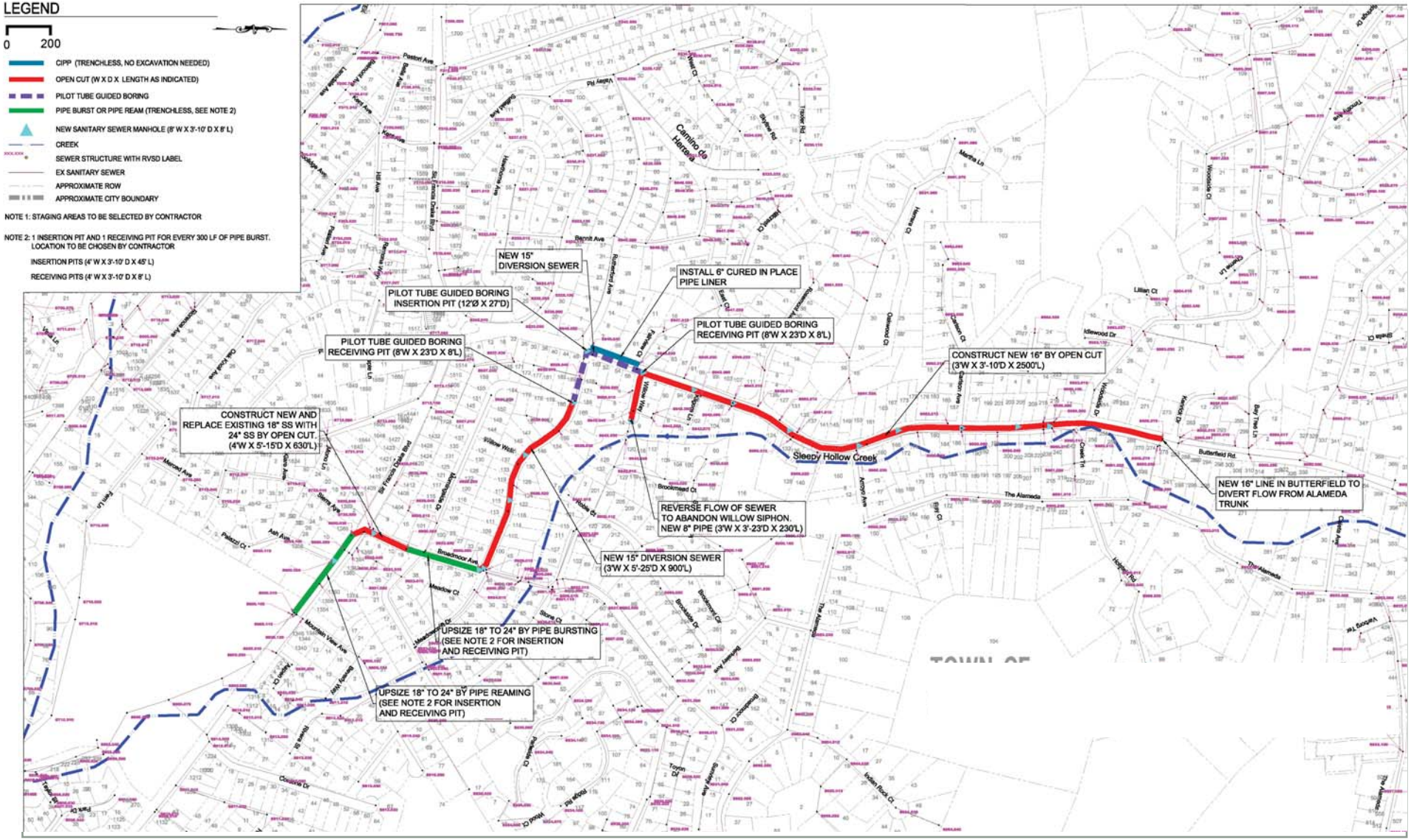


Figure 4. Construction Characteristics for the Butterfield Alignment

Nokomis

- CIPP of existing sewer on Sycamore Avenue south of Madrone Avenue.
- New diversion sewer on Madrone Avenue between Sycamore Avenue and 50 Madrone Avenue. Existing laterals would be rerouted to the new pipe.
- Upsize of existing pipe in sewer easement at 50 Madrone Avenue, adjacent to San Anselmo Creek.

Butterfield

- Installation of a new diversion pipe by open cut on Butterfield Road between Kenrick Avenue and Willow Way. Existing sewer lines would be abandoned, with flows and laterals re-routed to the new diversion sewer.
- Abandonment of existing inverted siphon at Willow Way and open cut installation of a new pipe connecting to the new diversion sewer in Butterfield Road.
- Cured in place pipe rehabilitation of existing sewer pipes along Butterfield Road.
- Installation of a new diversion sewer by PTGB on Butterfield between Willow Way and Meadowcroft Drive, and on Meadowcroft Drive between Butterfield Road and Morningside Drive.
- Installation of new diversion sewer by open cut on Meadowcroft Drive between Morningside Drive and Broadmoor Avenue.
- Installation of new and upsized sewer on Broadmoor Avenue from Meadowcroft Drive to Sir Francis Drake Boulevard and on Sir Francis Drake Boulevard from Broadmoor Avenue to Mountain View Avenue. This portion of the work would consist of open cut construction and pipe reaming.

Project pipelines would range in size from 8 inches to 24 inches of diameter. The Project includes construction of approximately 8,700 linear feet of pipe. Of this, approximately 5,000 feet would be constructed by open cut, 400 feet by pipe bursting, 400 feet by pipe reaming, 500 feet by CIPP, and 500 feet by PTGB. Additionally, approximately 1,900 linear feet of laterals would be replaced or extended by open cut. The majority of these pipelines either fall within public right-of-way or in designated easements running through private property. For work in backyard easements, portable equipment would be used due to space restrictions and to minimize impact. Approximately 30 manholes would be replaced or installed, each requiring an excavation of approximately 8 feet by 8 feet.

In general, excavated soil will be hauled away and trenches replaced with suitable material from offsite on a daily basis, minimizing the need for soil stockpiling. However, there will likely be stockpiles for a day or two at a time, both for offhaul (waiting for a truck to take it away) and for imported material (waiting for deposition to a trench).

Working Hour Limitations

Working hour limitations will be generally limited to 8 a.m. to 5 p.m. on weekdays and 9 a.m. to 6 p.m. on weekends and holidays. Work hours beyond these referenced limits must be approved by RVSD and the Town. More specific work hour limitations may be required by the Town

Construction Staging

Prior to the start of construction, the Contractor would determine appropriate staging areas. It is anticipated that the Contractor would stage in paved areas. However, the Contract Documents would require that any staging that takes place in un-paved areas would include proper stormwater control measures.

Bypass Pumping

Bypass pumping would be required. It is anticipated the Contractor would pump the sewage flow from a manhole upstream of the work area to a manhole downstream of the work area. Residents who have sewer lateral connections within the work area would be asked to minimize water use during work in their area. The Contractor would notify residents to not use washing machines or dishwashers, not to perform swimming pool discharges into the sanitary sewer system, and to limit the use of sinks, showers and toilets during the period determined by the Contractor. The Contractor would be required to submit a bypass pumping plan adequate to bypass all flows around the work site.

Cleanup and Restoration

The Contractor will, at all times, keep property on which work is in progress and the adjacent property free from the accumulation of waste material or rubbish caused by employees or by the work. Upon completion of the construction, the Contractor will remove all surplus materials, temporary structures, rubbish, and waste materials resulting from their operation.

Overview of Environmental Control Measures

Numerous control measures would be incorporated into the Project's Contract Documents by RVSD to address environmental and public health and safety issues. Control measures are procedures known to further reduce the potential for impacts based on regulatory agency requirements, standards in the industry, and construction/operating experiences of RVSD and the design engineer.

Regulatory agency requirements would be contained in the permits for the Project. The Contractor would be required to obtain encroachment permits from the Town. These permits would contain specific requirements for traffic control and parking, emergency

access, pavement restoration, noise control, allowable work hours, and provide for the safety of residents, pedestrians, and motorists. The Contractor would be required to comply with all conditions set forth in the encroachment permits and corresponding RVSD standards.

Coordination would be established and maintained with local residents and businesses along the alignment and a mechanism for monitoring construction activities and addressing any complaints would be implemented. Any damaged landscaped and/or hardscaped areas would be restored, and a series of best management practices (BMPs) would be enforced to maintain site appearance; control dust, erosion, and stormwater discharge; and provide noise attenuation if needed. Biological and cultural resources technical reports have been completed which identify measures that would be included in the Contract Documents to address potential impacts. Deep excavations would be needed in some areas to support the open cut, pipe bursting, and PTGB construction methods. A variety of geotechnical and regulatory agency control measures would be included to provide for the constructability of the Project and its environmental compatibility, and to ensure the protection of workers' and the public's health and safety.

State Revolving Fund and CEQA Approach

RSVD may secure funding for the Project from the State Water Resources Control Board (SWRCB) State Revolving Fund (SRF) Loan Program. The SRF Loan Program is partially funded by the U.S. Environmental Protection Agency (EPA) and, by agreement, is administered by the SWRCB. Because of partial federal funding, the loan program is subject to federal environmental regulations, most notably the federal Endangered Species Act, the National Historic Preservation Act, and the General Conformity Rule for the Clean Air Act, among others. Instead of the National Environmental Policy Act, EPA has chosen to use the California Environmental Quality Act (CEQA) as the compliance base for California's SRF Loan Program. To comply with applicable federal statutes and authorities, EPA established specific "CEQA-Plus" requirements in the Operating Agreement with the SWRCB for administering the SRF Loan Program. The appropriate document for CEQA compliance for the proposed Project is an Initial Study/Mitigated Negative Declaration (IS/MND) pursuant to Section 15162 of the 2015 CEQA Guidelines. CEQA-Plus requirements are addressed in this document.

Schedule

The Nokomis alignment would be constructed between April and October 2018. The Butterfield alignment would extend from May through November 2018.

9. Surrounding Land Use and Setting

   Land use characteristics near the Nokomis/Butterfield sewer alignments are shown on Figures 5 and 6. As shown, residential land use predominates in the areas. Sleepy Hollow Creek and San Anselmo Creek border the Project alignments. Sir Francis Drake Boulevard is a major east-west arterial in the area which transverses San Anselmo and provides access from U.S. 101 to West Marin. Butterfield Road is the principal vehicular access for the entire Sleepy Hollow neighborhood.

10. Other Public Agencies Whose Approval is Required:

    - Town encroachment permit
    - SWRCB, Division of Financial Assistance – funding through the SRF loan program

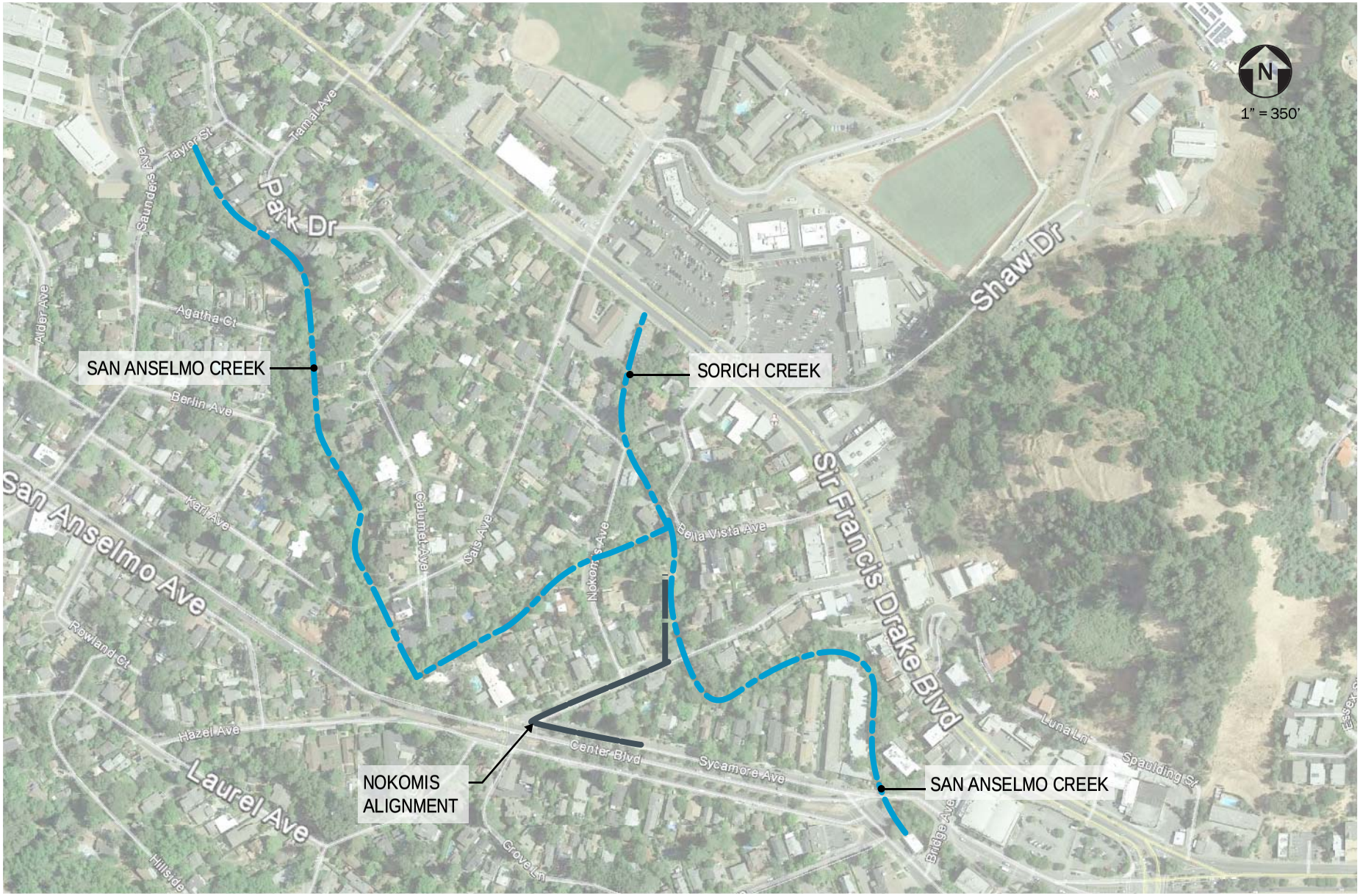
11. Consultation with Native American Tribes

    The Federated Indians of Graton Rancheria (FIGR) submitted a notification request to RVSD on December 14, 2015, in accordance with Public Resources Code Section 21080.3.1, subd. (b), for formal notice and information on projects which the District serves as Lead Agency under CEQA. For the proposed Project, RVSD sent a letter to FIGR on November 8, 2017 requesting information on tribal cultural resources within the Project area and whether FIGR would like to consult on this Project. No response was received.

12. Environmental Factors Potentially Affected:

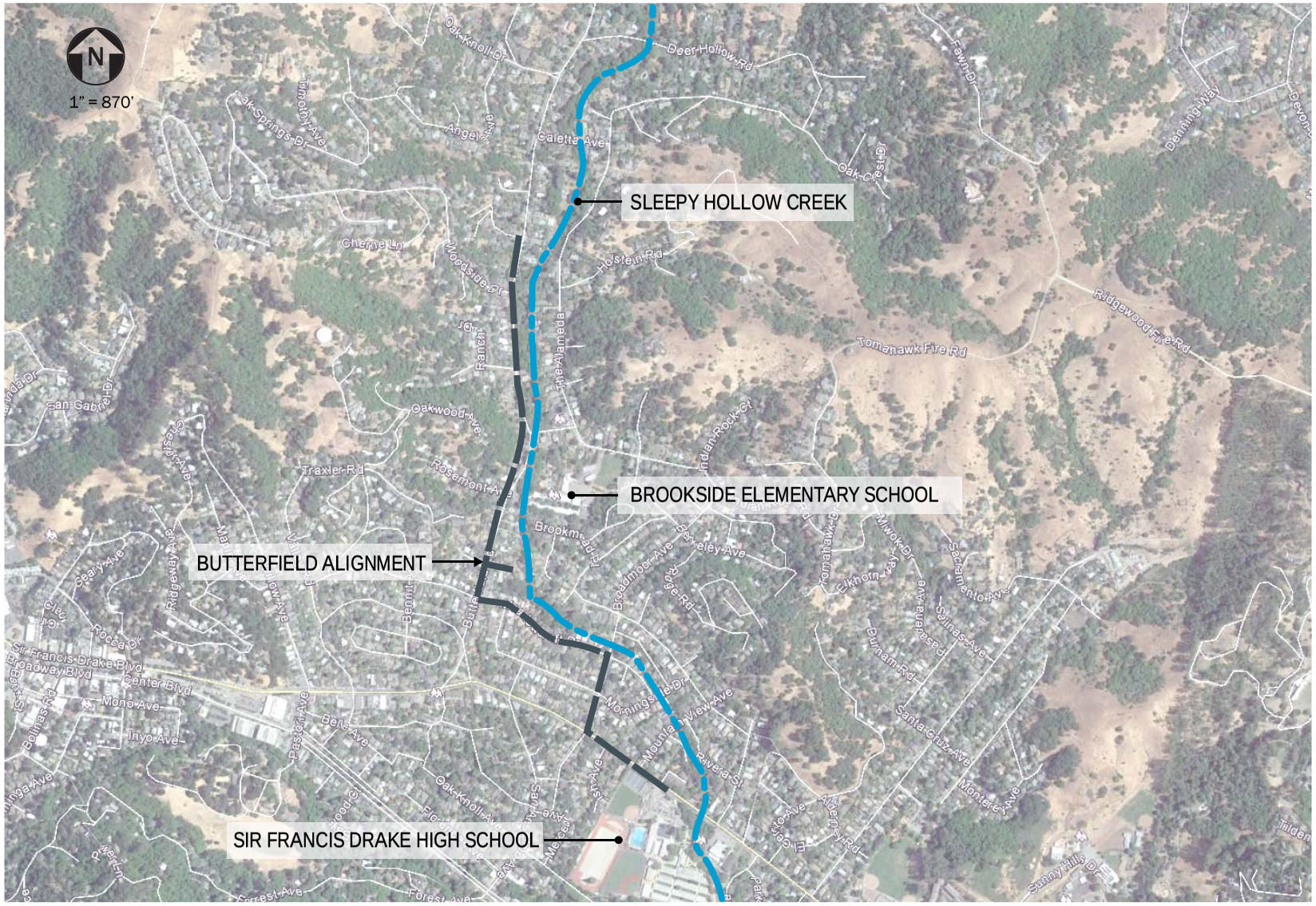
    The environmental factors checked below would be potentially affected by this Project, involving at least one impact that is "Less Than Significant with Mitigation Incorporated" as indicated by the checklist on the following pages.

☐ Aesthetics	☐ Agriculture & Forest Resources	☐ Air Quality
☐ Biological Resources	☒ Cultural Resources	☐ Geology / Soils
☐ Greenhouse Gas Emissions	☐ Hazards & Hazardous Materials	☐ Hydrology / Water Quality
☐ Land Use / Planning	☐ Mineral Resources	☐ Noise
☐ Population / Housing	☐ Public Services	☐ Recreation
☐ Transportation / Traffic	☐ Utilities / Service System	☒ Mandatory Findings of Significance



Source: Scheidegger & Associates, Ocotber 2017

Figure 5. Land Use Characteristics Near the Nokomis Alignment



Source: Scheidegger & Associates, Ocotber 2017

Figure 6. Land Use Characteristics Near the Butterfield Alignment

Chapter 2

DETERMINATION

On the basis of this initial evaluation:

☐ I find that the proposed Project **COULD NOT** have a significant effect on the environment, and a **NEGATIVE DECLARATION** will be prepared.

☒ I find that although the proposed Project could have a significant effect on the environment, there **WILL NOT** be a significant effect in this case because revisions in the Project have been made or agreed to by the Project proponent. A **MITIGATED NEGATIVE DECLARATION** will be prepared.

☐ I find that the proposed project **MAY** have a significant effect on the environment, and an **ENVIRONMENTAL IMPACT REPORT** is required.

☐ I find that the proposed Project **MAY** have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An **ENVIRONMENTAL IMPACT REPORT** is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (1) have been analyzed adequately in an earlier **EIR** or **NEGATIVE DECLARATION** pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier **EIR** or **NEGATIVE DECLARATION**, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Signature _____ Date 12/1/2017

Gregory Norby
Printed Name
Greg Norby
General Manager

Chapter 3

DISCUSSION OF ENVIRONMENTAL CHECKLIST

A discussion of the environmental checklist is included below. In general, the format followed includes a discussion of the setting and an impact analysis for each resource category. Reference and information resources for the checklist are included in Chapter 4.

The impact analyses include a summary of control measures incorporated into the FY 2016/17 Gravity Sewer Improvement Project (Project) by the Sanitary District No. 1 of Marin County (Ross Valley Sanitary District-RVSD) to minimize potential impacts, the environmental checklist significance criteria, and an analysis of potential impacts. Control measures are procedures known to further reduce the potential for impacts based on regulatory agency requirements, standards in the industry, and construction/operating experience. As appropriate, Initial Study (IS) mitigation measures are included to reduce impacts to less than significant levels. The Mitigation Monitoring and Reporting Plan is included in Appendix A.

A. AESTHETICS

SETTING

The Town of San Anselmo (Town) is primarily a residential community of older neighborhoods and subdivisions established prior to 1945. The Project includes construction of approximately 9,000 linear feet of sewer pipeline within these areas.

IMPACT ANALYSIS

Control Measures Incorporated by RVSD

A1. Remove rubbish and debris from job site daily with proper disposal in compliance with all federal, state and local regulations. Removal and transport of rubbish and debris shall be in a manner that prevents spillage on pavements, streets or adjacent areas. Clean up any spillage.

A2. Store materials that cannot be removed daily in the Contractor's approved lay down and storage areas, following all requirements established by the property owner and associated permitting jurisdiction.

A3. Conduct operations to cause as little damage to hardscape and landscape areas as possible. Any required pruning of existing trees will be completed by a certified arborist.

A4. The Contractor shall prepare a preconstruction survey of private properties adjacent to where the work will occur (including haul routes) in order to provide a basis for determining proper restoration.

A5. The Contractor shall protect all existing utilities, pavement, sidewalks, curbs, fences, landscaping, and other improvements that are not designated for removal, from damage by his operations. Any such features that are damaged or temporarily relocated by the Contractor during construction shall be repaired or restored by the Contractor to a condition equal to or better than they were prior to such damage or temporary relocation.

A6. Prevent the spread of dust and debris, and avoid the creation of a nuisance or hazard in the surrounding area. Clean adjacent areas as necessary.

A7. Sweep pavements as often as necessary to avoid the spread of debris.

A8. Upon completion of the work, and prior to final acceptance, the Contractor shall remove from the vicinity of the work all surplus material and equipment belonging to them or used under their direction during construction.

A9. Provide temporary lighting that complies with California Occupational Safety and Health Administration (Cal/OSHA) standards.

Significance Criteria

RESOURCE CATEGORY / SIGNIFICANCE CRITERIA	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Beneficial Impact	Information Sources
A. AESTHETICS						
Would the Project:						
1) Have a substantial adverse effect on a scenic vista?	☐	☐	☐	☒	☐	9
2) Substantially damage scenic resources, including, but not limited to, trees, rock, outcroppings, and historic buildings within a state or County scenic highway or County-designated scenic road?	☐	☐	☐	☒	☐	9
3) Substantially degrade the existing visual character or quality of the site and its surroundings that are open to public views?	☐	☐	☒	☐	☐	9

RESOURCE CATEGORY / SIGNIFICANCE CRITERIA	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Beneficial Impact	Information Sources
4) Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area?	☐	☐	☒	☐	☐	9

No Impacts: Criteria A1, A2

The Project is a short-term construction activity that will not affect a scenic vista or damage scenic resources within a designated scenic roadway.

Less-Than-Significant Impacts: Criteria A3, A4

Visual Degradation: Criterion A3. Criterion A3 relates to degradation of the existing visual character or quality of the area caused by a project. As discussed in Chapter 1, Project improvements will be below ground. None of these improvements and activities will result in long-term aesthetic impacts. As a construction impact, however, short-term aesthetic impacts will occur.

Construction activities can be sources of short-term aesthetic impacts through generation of rubbish and debris material storage, and damage to hardscape and landscaped areas. However, Control Measures A1-A8 will require the Contractor to use best management practices (BMPs) that address daily housekeeping and final site cleanup. As a result, the potential impact related to the short-term degradation of the existing visual character or quality of the area is less than significant.

Light or Glare: Criterion A4. Criterion A4 relates to the creation of a new source of light or glare that could affect views in the area. In general, work hours will be limited to the daytime hours so lighting would not be necessary. However, there may be instances when nighttime work will be necessary. Some lighting may also be necessary at the Contractor's staging areas. All necessary lighting would be localized to support Project activities and in compliance with Cal/OSHA standards (Control Measure A9). As a result, potential lighting or glare impacts are less than significant.

Mitigation Measures

None required.

B. AGRICULTURE AND FOREST RESOURCES

SETTING

The Project is within the Town which is largely built out with residential and some commercial uses. According to the General Plan Land Use Map, no agricultural or forest lands exist within the Town.[1] The California Department of Conservation Farmland Mapping and Monitoring Program classifies the area as Urban and Built-up Land.

IMPACT ANALYSIS

Control Measures Incorporated by RVSD

None.

Significance Criteria

RESOURCE CATEGORY / SIGNIFICANCE CRITERIA	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Beneficial Impact	Information Sources
B. AGRICULTURE AND FOREST RESOURCES						
Would the Project:						
1) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒	☐	9, 10
2) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒	☐	2, 9
3) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)) or timberland (as defined in Public Resources Code section 4526); or timberland zoned Timberland Production (as defined by Government Code Section 51104(g))?	☐	☐	☐	☒	☐	9

RESOURCE CATEGORY / SIGNIFICANCE CRITERIA	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Beneficial Impact	Information Sources
4) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒	☐	9
5) Involve other changes in the existing environment, which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☐	☒	☐	9

No Impacts: Criteria B1-B5

Criteria B1 through B5 are not relevant to the Project and no impact would occur. Accordingly, pursuant to California Environmental Quality Act (CEQA)-Plus requirements, the Project would have no impact relative to the Federal Farmland Protection Policy Act.

Mitigation Measures

None required.

C. AIR QUALITY

SETTING

The proposed Project is located in the Town in the eastern portion of Marin County, part of the nine-county San Francisco Bay Area Air Basin (Air Basin). The local air quality regulatory agency responsible for this air basin is the Bay Area Air Quality Management District (BAAQMD).

Local Climate and Air Quality

The air quality in a given area depends on the sources of air pollution in the area, transport of pollutants to and from surrounding areas, local and regional meteorological conditions, as well as the surrounding topography of the air basin. Air quality is described by the concentration of various pollutants in the atmosphere. Units of concentration are generally expressed in parts per million (ppm) or micrograms per cubic meter ($\mu g/m^3$). The significance of a pollutant concentration is determined by comparing the concentration to an appropriate ambient air quality standard. The standards represent the allowable pollutant concentrations designed to ensure that the public health and welfare are protected, while including a reasonable margin of safety to protect the more sensitive individuals in the population.

Marin County is bounded on the west by the Pacific Ocean, on the east by San Pablo Bay, on the south by the Golden Gate and on the north by the Petaluma Gap. Most of Marin's population lives in the eastern part of the county, in small, sheltered valleys. Because of the wedge shape of the county, northeast Marin County is further from the ocean than is the southeastern section. This extra distance from the ocean allows the marine air to be moderated by bayside conditions as it travels to northeastern Marin County. In southern Marin the distance from the ocean is short and elevations are lower, resulting in higher incidence of maritime air in that area.

In the summer months, areas along the coast are usually subject to onshore movement of cool marine air. In the winter, proximity to the ocean keeps the coastal regions relatively warm, with temperatures varying little throughout the year. Coastal temperatures are usually in the high 50s in the winter and the low 60s in the summer. The warmest months are September and October. The eastern side of Marin County has warmer weather than the western side because of its distance from the ocean and because the hills that separate eastern Marin from western Marin occasionally block the flow of the marine air. The temperatures of cities next to the Bay are moderated by the cooling effect of the Bay in the summer and the warming effect of the Bay in the winter. For example, San Rafael experiences average maximum summer temperatures in the low 80s and average minimum winter temperatures in the low 40s. Inland towns such as Greenbrae experience average maximum temperatures that are two degrees cooler in the winter and two degrees warmer in the summer.

Air pollution potential is highest in eastern Marin County, where most of population is located in semi-sheltered valleys. In the southeast, the influence of marine air keeps pollution levels low. As development moves further north, there is greater potential for air pollution to build up because the valleys are more sheltered from the sea breeze. While Marin County does not have many polluting industries, the air quality on its eastern side - especially along the U.S. 101 corridor - may be affected by emissions from increasing motor vehicle use within and through the county.[11]

Criteria Air Pollutants. The Federal and California Clean Air Acts (CAAs) have established ambient air quality standards for common pollutants. The ambient air quality standards are intended to protect human health and welfare. At the federal level, national ambient air quality standards have been established for criteria pollutants. These criteria pollutants include carbon monoxide (CO), ozone (O_3), nitrogen dioxide (NO_2), respirable particulate matter with a diameter less than 10 microns (PM_{10}), fine particulate matter with a diameter less than 2.5 microns ($PM_{2.5}$), sulfur dioxide (SO_2), and lead.

California has adopted ambient air quality standards which are, in general, more stringent than the national ambient air quality standards, and include other pollutants not regulated at the federal level (sulfates, hydrogen sulfide, and vinyl chloride). National and state ambient air quality standards are shown in Table 1. Both the National and California ambient air quality standards have been adopted by the BAAQMD.

Table 1 – State and National Air Quality Standards and Summary of Measured Air Quality Exceedances in the Project Area (2014 – 2016)

Pollutant/ Averaging Period	Primary Standard		Year	Maximum Concentration [a]	Days Exceeding State/National Standard
	State	National			
Ozone 1-hour	0.09 ppm	none	2014	0.088	0/0
			2015	0.081	0/0
			2016	0.088	0/0
Ozone 8-hour	0.70 ppm	0.70 ppm	2014	0.068	0/0
			2015	0.070	0/0
			2016	0.067	0/0
Carbon Monoxide 1-hour	20 ppm	35 ppm	2014	1.9	0/0
			2015	1.4	0/0
			2016	1.4	0/0
Carbon Monoxide 8-hour	9.0 ppm	9 ppm	2014	1.1	0/0
			2015	0.9	0/0
			2016	1.0	0/0
Nitrogen Dioxide 1-hour	0.18 ppm	0.100 ppm	2014	0.062	0/0
			2015	0.044	0/0
			2016	0.046	0/0
Nitrogen Dioxide Annual	0.030 ppm	0.053 ppm	2014	0.011	0/0
			2015	0.011	0/0
			2016	0.009	0/0
Sulfur Dioxide 1-hour	None	0.075 ppm	2014	ND	0/0
			2015	ND	0/0
			2016	ND	0/0
Sulfur Dioxide 24-hour	0.04 ppm	none	2014	ND	0/0
			2015	ND	0/0
			2016	ND	0/0
Respirable Particulate Matter (PM_{10}) 24-hour	50 $\mu g/m^3$	150 $\mu g/m^3$	2014	41	0/0
			2015	42	0/0
			2016	27	0/0
Respirable Particulate Matter (PM_{10}) Annual	20 $\mu g/m^3$	none	2014	14.1	0/0
			2015	16.1	0/0
			2016	13.8	0/0
Fine Particulate Matter ($PM_{2.5}$) [a] 24-hour	None	35 $\mu g/m^3$	2014	38.1	0/1
			2015	36.3	0/2
			2016	15.6	0/0
Fine Particulate Matter ($PM_{2.5}$) Annual	12 $\mu g/m^3$	12.0 $\mu g/m^3$	2014	10.8	0/0
			2015	8.6	0/0
			2016	6.4	0/0

Source: BAAQMD, see http://www.baaqmd.gov/about-air-quality/air-quality-summaries

Notes: ppm = parts per million, $\mu g/m^3$ = micrograms per cubic meter, ND = No data available, NA = Not applicable

[a] All pollutant concentrations were measured at the San Rafael monitoring station

Ambient concentrations of criteria pollutants are monitored in the Air Basin by the BAAQMD. The San Rafael station is the closest to the Project site and the only station in Marin County. Table 1 includes a summary of the monitored maximum concentrations and the number of occurrences of exceedances of the state/national ambient air quality standards for the three-year period from 2014 through 2016.

Table 1 shows that over the last 3 years the state 1-hour and 8-hour O_3 standards and the state 24-hour PM_{10} standard were not exceeded, and the 24-hour national $PM_{2.5}$ standard was exceeded 3 times.

Toxic Air Contaminants. In addition to "criteria" air pollutants, there is another group of substances found in ambient air referred to as Toxic Air Contaminants (TACs). These contaminants tend to be localized and are found in relatively low concentrations in ambient air. However, they can result in adverse chronic health effects including cancer. Sources of TACs include industrial processes such as petroleum refining and manufacturing, commercial operations such as gasoline stations and dry cleaners, and motor vehicle exhaust. One of the TACs of greatest concern in California is diesel particulate matter, which is classified as a carcinogen (causes cancer). TACs are regulated at the local, state, and federal level.

Regulatory and Planning Framework

Federal, state, and regional agencies regulate air quality in the Air Basin. At the federal level, the U.S. Environmental Protection Agency (EPA) is responsible for overseeing implementation of the Federal CAA. The California Air Resources Board (CARB) is the State agency that regulates mobile sources throughout the state and oversees implementation of the state air quality laws and regulations, including the California CAA. The primary agency that regulates air quality in the Project area is the BAAQMD. The BAAQMD has permit authority over stationary sources, acts as the primary reviewing agency for environmental documents, and develops regulations that must be consistent with or more stringent than, federal and state air quality laws and regulations.

Federal Air Quality Regulations. The Federal CAA requires CARB, based on air quality monitoring data, to designate portions of the state where the national ambient air quality standards are not met as “nonattainment areas”. Because of the differences between the national and state ambient air quality standards, the designation of nonattainment areas is different under the federal and state legislation. Areas that meet the air quality standards are considered to be in attainment of the standards. Areas where there is no monitoring data available or insufficient data to classify and area are considered unclassified, which for regulatory purposes is treated as an attainment area.

The Bay Area as a whole does not meet national ambient air quality standards for O_3 and $PM_{2.5}$. The EPA has classified the region as marginal nonattainment for 8-hour O_3. In October 2009 the EPA designated the Bay Area as nonattainment for 24-hour $PM_{2.5}$ standard.

The Bay Area is considered as attainment or unclassifiable with respect to the national air quality standards for all other pollutants. The EPA requires states that have areas that are not in compliance with the national standards to prepare and submit air quality plans showing how the standards would be met. If the states cannot show how the standards would be met, then they must show progress toward meeting the standards. These plans are referred to as the State Implementation Plan (SIP). On January 9, 2013, the EPA issued a final rule to determine that the San Francisco Bay Area has attained the national 24-hour $PM_{2.5}$ air quality standard. This action suspends federal SIP planning requirements for the Bay Area.

Projects seeking federal funding must comply with the Federal CAA conformity requirements. As part of the SIP, California has incorporated the federal General Conformity Rule. The EPA's Conformity Rule, as promulgated in 40 CFR Part 93 Subpart B, and 40 CFR Part 51, Subpart W, implements the conformity requirements of Section 176(c) of the 1990 Amendments to the Federal CAA. Conformity to the SIP is defined in the CAA as requiring all federal agencies to ensure that any agency activity conforms with an approved SIP in nonattainment or maintenance areas. Compliance with the SIP assists in eliminating or reducing the number of violations of the national ambient air quality standards, which expedites attainment of the standards. The General Conformity Rule requires that the total of direct and indirect emissions of nonattainment or maintenance area criteria pollutants, including ozone precursors (reactive organic gases and nitrogen oxides) and $PM_{2.5}$ precursors (sulfur dioxide, nitrogen dioxide, and reactive organic compounds or ammonia) be considered in determining conformity.

If a federal action, such as State Revolving Fund (SRF)-funded projects, is to take place in a nonattainment or maintenance area, it is subject to a General Conformity evaluation. This determination can take one of three forms: (1) If the action meets certain criteria, it may be specifically exempted, regardless of whether the action would emit pollutants of concern; (2) if the action is determined to emit pollutants below specified de minimis thresholds and the potential emission levels are not regionally significant (less than 10 percent of the region's emissions for a particular pollutant), the action can be assumed to conform with the SIP; and (3) for actions that do not fall under either of these two categories, a complete conformity determination must be made. Specifics of this process are listed in 40 CFR 93, Subpart B.

For SRF-funded projects, a General Conformity analysis applies only to projects in a federal nonattainment area or an attainment area subject to a maintenance plan and applies to those pollutants that the area has been designated as nonattainment or maintenance. As described above, the Bay Area has been designated nonattainment for O_3 and $PM_{2.5}$.

California Air Quality Regulations. The California CAA outlines a program for areas in the state to attain the California ambient air quality standards by the earliest practical date. The California CAA set more stringent air quality standards for most of the pollutants covered under national standards, and additionally regulates other pollutants. If an area does not meet the California ambient air quality standards, the CARB designates the area as a nonattainment

area. With respect to the state air quality standards, the Bay Area is a nonattainment area for ozone and particulate matter (PM_{10} and $PM_{2.5}$), and either attainment or unclassified for other pollutants. The California CAA requires local air pollution control districts to prepare air quality attainment plans for pollutants, except for particulate matter, that are not in attainment with the state standards. These plans must provide for district-wide emission reductions of five percent per year averaged over consecutive three-year periods or if not, provide for adoption of "all feasible measures on an expeditious schedule".

Regional Air Quality Regulations and Planning. Air quality in the Project region is regulated by the BAAQMD. The BAAQMD regulates stationary sources (with respect to federal, state, and local regulations), monitors regional air pollutant levels (including measurement of toxic air contaminants), develops air quality control strategies and conducts public awareness programs

The most recent air quality air plan is the 2017 Clean Air Plan that was adopted by BAAQMD in April 2017.[12] The 2017 Plan provides a regional strategy to protect public health and protect the climate. To protect public health, the plan describes how the Air District will continue making progress toward attaining all state and federal air quality standards and eliminating health risk disparities from exposure to air pollution among Bay Area communities. The 2017 Plan includes a wide range of control measures designed to decrease emissions of the air pollutants that are most harmful, such as particulate matter, ozone, and toxic air contaminants; and to decrease emissions of carbon dioxide by reducing fossil fuel combustion. The 2017 Plan represents the Bay Area's most recent assessment of the region's strategy to attain the State and national ozone and $PM_{2.5}$ standards.

The BAAQMD has also developed CEQA Air Quality Guidelines that establish significance thresholds for evaluating new projects and plans and provide guidance for evaluating air quality impacts of projects and plans.[11] The Air Quality Guidelines provide procedures and significance thresholds for evaluating potential construction-related impacts during the environmental review process consistent with CEQA requirements. The Air Quality Guidelines also address operation-related impacts, but the proposed Project is a construction activity with no substantial additional operational component as compared to existing operations.

In June 2010, BAAQMD adopted thresholds of significance to assist in the review of projects under CEQA. These thresholds were designed to establish the level at which BAAQMD believed air pollution emissions would cause significant environmental impacts under CEQA and were included in the Air District's most recent CEQA Air Quality Guidelines (updated May 2017).

IMPACT ANALYSIS

Control Measures Incorporated by RVSD

C1. Water all exposed unpaved surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered up to two times per day, if conditions warrant.

C2. Cover all haul trucks transporting soil, sand, or other loose material off-site.

C3. Remove all visible mud or dirt track-out from adjacent public roads using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.

C4 Restore pavement in all roadways, driveways, and sidewalks.

C5. Minimize idling times 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.

C6. Maintain and properly tune all construction equipment 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.

C7. Post a publicly visible sign with the telephone number and person to contact at RVSD regarding dust complaints. This person shall respond and take corrective action within 48 hours.

C8. Priority shall be given to obtaining power from PG&E to reduce air pollutant emissions; if not practicable, then electrical generators and, if necessary, diesel generators shall be used subject to the noise attenuation measures in Section K.

C9: All excavations shall be adequately ventilated and air monitoring of the shafts or pits will be done continuously, pursuant to the Contract Documents.

C10. To minimize the dispersal of sewer odors above ground during sewage bypass pumping, the Contractor shall:

a. Seal all open sanitary manholes or access openings in the sewers when his operations have been suspended for a period of two hours or more.

b. During construction operations when open manholes or access openings cannot be sealed, vent and filter hydrogen sulfide gases upstream of the openings in the sewer.

C11. Odor related to construction shall be controlled through the use of filters, chemical addition to the wastewater, and masking agents as needed to limit the levels of hydrogen sulfide gas to 5 parts per million (by volume) 25 feet from the source or at the outside wall of any habitable structure.

C12. If odor complaints are received, identify the source, evaluate and implement available abatement measures, and notify the complainant(s) of the results.

Significance Criteria

RESOURCE CATEGORY / SIGNIFICANCE CRITERIA	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Beneficial Impact	Information Sources
C. AIR QUALITY Would the Project:						
1) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☐	☒	☐	11-13
2) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☐	☐	☒	☐	☐	9, 11-15
3) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions, which exceed quantitative thresholds for ozone precursors)?	☐	☐	☒	☐	☐	9, 11-15
4) Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☒	☐	☐	9, 11
5) Create objectionable odors affecting a substantial number of people?	☐	☐	☒	☐	☐	9

No Impacts: Criterion C1

The Project is in an area currently designated nonattainment for the state 1-hour and 8-hour O_3 standards, nonattainment for the state 24-hour and annual PM_{10} standards, and nonattainment for the state annual $PM_{2.5}$ standard. It is also designated as nonattainment for

the national 8-hour O_3 standard. To meet planning requirements related to these standards the BAAQMD has developed a regional air quality plan, the Bay Area 2017 Clean Air Plan. A significant impact would occur if a project conflicted with the plan by not being consistent with the population-growth and vehicle miles traveled assumptions of the plan. As discussed in the Project Description, the proposed Project involves the rehabilitation and replacement of deficient wastewater facilities, and would not be considered growth-inducing. Since construction activities associated with the Project would be short term and temporary and there would be no long term operational component to the Project that would generate new vehicle trips in the air basin that would conflict with the Plan. As a result, the Project would not conflict with or obstruct with implementation of the Plan, and there would be no impact.

Less-Than-Significant Impacts: Criteria C2-C5

Criteria C2,C3. The proposed Project would involve construction activities associated with the repair and replacement of sewer system components that would result in temporary increases in air pollutant emissions. These emissions would be generated primarily from construction equipment exhaust, earth disturbance, and construction worker and other construction-related vehicle trips to and from the Project construction areas. The overall Project activities would occur for about 8 months.

The BAAQMD's approach to the CEQA analysis of construction impacts is two-fold. The BAAQMD has identified thresholds of significance for exhaust emissions from construction related activities. These thresholds are average daily emissions of 54 pounds per day for reactive organic gases (ROG), NOx, and $PM_{2.5}$, and 82 pounds per day for PM_{10}. For fugitive dust emissions of PM_{10} and $PM_{2.5}$ the BAAQMD requires the use of BMPs to minimize dust emissions. The Air Quality Guidelines provide recommended BMPs for fugitive dust. If appropriate construction controls are implemented, fugitive dust emissions from construction activities would be considered less than significant. Control Measures C1 through C7 for the Project are consistent with BAAQMD recommended control methods for particulate emissions.

Projects seeking SWRCB funding must comply with the Federal CAA conformity requirements. Under EPA's conformity rule, construction emissions are included when comparing a project's emissions to the conformity de minimis emission thresholds. Emissions for the Project would be considered significant and require a formal conformity determination if annual emissions exceed the EPA's General Conformity thresholds (40 CFR Part 93 Subpart B, Section 93.153). The conformity de minimis thresholds that are applicable to the Bay Area are 100 tons per year for NOx, ROG, $PM_{2.5}$, and SO_2.

Construction Emissions. Construction activities associated with the Project include the replacement of existing sewer pipes and installation of new pipes, construction of new manholes, and some spot repairs on existing sewer lines. Construction methods used for sewer line repair and installation of new pipes would include Open Cut, Pipe Bursting, Pipe Reaming, Cured in Place Pipe (CIPP), and Pilot Tube Guided Boring (PTGB). Of the 9,000 liner feet (LF) of

sewer pipeline to be rehabilitated about 5,000 LF would be constructed using open cut, 700 LF using pipe bursting, 400 LF by pipe reaming, 300 LF by CIPP, and 500 LF using PTGB. Additionally, approximately 1,900 LF of laterals would be replaced or extended by open cut. About 26 manholes would be replaced or installed.

Air pollutant emissions would be generated from equipment used for construction activities, heavy duty trucks used for transporting materials and supplies to and from the work areas, and from worker and other vehicles traveling to the construction sites. Construction equipment expected to be used for the various construction activities include loaders, excavators, concrete saws, pumps, a boring machine, drill rigs, rollers, sweepers, and other construction equipment. Depending on the construction method used there would be 5 to 10 daily heavy duty diesel truck trips to the construction sites. Additionally, it is assumed that on average daily basis there would be total of 16 people at the construction sites, which includes two crews with 14 people and 2 additional people to account for county/RVSD personnel visiting the sites. Details on the number and types of construction equipment, hours of use, duration of construction activity, and the number of trucks needed for each type of construction method are summarized in Appendix B.

Emissions from construction activities were estimated with the Roadway Construction Emissions Model version 8.1.0 (RoadMod) developed by the Sacramento Metropolitan Air Quality Management District.[14] The RoadMod model was developed to calculate emissions from road related construction and linear projects. The BAAQMD recommends using RoadMod for linear projects such as, new roadways, road widening, or pipeline installation.[11] Projected sewer line construction information, including the size of disturbed areas, number and types of construction equipment and vehicles, along with the anticipated length of their use for the different sewer construction methods were used with RoadMod to calculate project exhaust and fugitive dust emissions. Construction scenarios for each type of sewer rehabilitation method were developed based on information provided by the Project Engineer, including Project activities and scheduling, off-road equipment use, and projected haul truck and vendor truck trips.[15] Details of the emission calculations are included in Appendix B.

Table 2 provides a summary of the average daily and annual criteria pollutant emissions from Project construction activities, along with a comparison to the BAAQMD significance thresholds and Conformity de minimis emission thresholds. Emissions of all pollutants are well below the BAAQMD and Conformity significance thresholds. Thus, from a CEQA perspective, construction activities associated with the proposed Project would result in a less than significant impact. With respect to the General Conformity requirements, emissions at these levels would less than the applicable General Conformity de minimis thresholds and further Conformity evaluation is not required; thus, the Project is compliant with the Federal CAA.

Operational Emissions. The Project is for rehabilitation and replacement of sewer lines. Once the Project is completed the sewer lines would not emit criteria pollutants or generate additional vehicle traffic from normal maintenance activities.

Table 2. Annual and Average Daily Emissions from Sewer Construction Activities

Construction Activity	Annual Emissions (tons/year)					
	ROG	**NOx**	**CO**	**SO2**	**PM10**	**PM2.5**
Open Cut	0.02	0.23	0.21	-[a]	0.021	0.010
Cured in Place process (CIPP)	0.00	0.00	0.00	-[a]	0.000	0.000
Pipe Bursting	0.00	0.02	0.02	-	0.004	0.001
Pilot Tube Guided Boring (PTGB)	0.01	0.10	0.08	-[a]	0.013	0.005
Pipe Reaming	0.00	0.02	0.02	-[a]	0.003	0.001
Manhole Replace/Repair	0.01	0.05	0.05	-[a]	0.007	0.002
Total	**0.04**	**0.43**	**0.38**	**-[a]**	**0.05**	**0.02**
Federal Conformity Threshold	*100*	*100*	*-*	*100*	*-*	*100*
Exceed Threshold?	***No***	***No***	***No***	***No***	***No***	***No***
Construction Activity	**Average Daily Emissions (pounds/day)[b]**					
	ROG	**NOx**	**CO**	**SO2**	**PM_{10}**	**$PM_{2.5}$**
Open Cut	0.26	2.52	2.26	-[a]	0.23	0.11
Cured in Place process (CIPP)	0.00	0.02	0.03	-[a]	0.00	0.00
Pipe Bursting	0.03	0.25	0.24	-[a]	0.04	0.01
Pilot Tube Guided Boring (PTGB)	0.11	1.09	0.90	-[a]	0.14	0.05
Pipe Reaming	0.02	0.22	0.21	-[a]	0.03	0.01
Manhole Replace/Repair	0.05	0.52	0.49	-[a]	0.08	0.03
Total	**0.5**	**4.6**	**4.1**	-[a]	**0.5**	**0.2**
BAAQMD Threshold	*54*	*54*	*-*	*-*	*82*	*54*
Exceed Threshold?	***No***	***No***	***No***	***No***	***No***	***No***

[a] SO_2 emissions are expected to be negligible due to use of ultra low sulfur diesel fuel.

[b] Average daily emissions calculated from annual emissions and 184 working days for construction activities.

Source: William Popenuck, October 2017

Due to the very low level of annual emissions from the Project, less than one ton per year, the Project's annual emissions would be well below 10 percent of the San Francisco Bay Area Air Basin's annual emissions. Therefore, the Project emissions would be below the de minimis level and less than 10 percent of the emissions inventory for nonattainment pollutants in the Air Basin, and further general conformity analysis is not required. Accordingly, pursuant to CEQA-Plus requirements, the Project is in compliance with the Federal CAA.

Exposure of Sensitive Receptors: Criterion C4. Sensitive receptors are locations where an identifiable subset of the general population (children, asthmatics, the elderly, and the chronically ill) that is at greater risk than the general population to the effects of air pollutants are likely to be exposed. These locations include residences, schools, playgrounds, childcare centers, retirement homes, hospitals, and medical clinics. The Project is mostly within

residential areas and there are several schools along Butterfield Road, which would include sensitive receptors and would expose these sensitive receptors to short-term emissions of toxic air contaminants while construction takes place.

The primary concern for nearby sensitive receptors would be exposure to diesel emissions from diesel-powered construction equipment associated with Project construction activities and diesel trucks while at the sites. Diesel particulate matter (DPM) is designated as a TAC by CARB for the cancer risk associated with long-term (i.e., 30 years) exposure to DPM. Given that construction would occur for a limited amount of time (less than one year) and the Project will only be utilizing a limited number of diesel fueled equipment and trucks, DPM emissions will be very low and localized exposure to DPM would be minimal. As a result, the cancer risks from the Project associated diesel emissions over a 30-year exposure period would be very small. Therefore, the impacts related to DPM would be less than significant.

Odor: Criterion C5. During construction there are sources of odor from the proposed Project. During sewage bypass pumping, odors can disperse from open manholes or access openings in the sewers. However, Control Measures C10 and C11 will serve to minimize dispersal of odor and provide for control. Control Measure C12 provides for a procedure to address odor complaints if received.

Mitigation Measures

None Required.

D. BIOLOGICAL RESOURCES

SETTING

A Biological Resource Assessment (BRA) for the proposed Project was prepared by Environmental Collaborative and is included in Appendix C.[16] The reader is referred to this report for a detailed discussion of the setting and impact analysis.

Existing Conditions

The area of potential effects (APE) consists largely of road rights-of-ways that have been developed with roadways, roadside ditches, planted street trees and adjacent landscaping, with no remaining natural habitat. The one exception to this is the approximately 150-foot segment of the Nokomis open cut off upgrade off Madrone Avenue near the top of bank to San Anselmo Creek. San Anselmo Creek remains a natural channel where it passes along the edge of the APE. The existing sewer line occurs just at or outside the top of bank to the creek channel, and riprap has installed along portions of the upper bank along a portion of this segment. Vegetation along the creek banks is dominated by invasive groundcover species such as English ivy (*Hedera helix*) and Algerian ivy (*Hedera canariensis* var. *algeriensis*), and a large clump of

invasive giant reed (*Arundo donax*). A number of native California bay (*Umbellularia californica*) and coast live oak (*Quercus agrifolia*) trees grow along the 150-foot segment. These consist of a coast live oak with an estimated 18-inch diameter at breast height (DBH), a 32-inch California bay, and a multi-trunk (24/28/32-inch) California bay.

Most of the APE generally provides very little in terms of wildlife habitat given its developed condition as roadway and adjacent residential frontages. The limited vegetative cover, intensity of human disturbance and activity, and risk of vehicle strikes limits its importance as foraging and dispersal habitat.

The San Anselmo and Sleepy Hollow Creek channels do provide for movement of terrestrial and aquatic species along the edge of the APE. Perennial and seasonal flows in San Anselmo and Sleepy Hollow Creeks does allow for movement of the federally-threatened steelhead trout (*Oncorhynchus mykiss*), both of which are designated as critical habitat for this species by the U.S. Fish and Wildlife Service. Surface water was present within both creek channels at the time of the site visits, although deep pools were absent along the San Anselmo Creek segment near the APE. The creek corridors may serve as a movement corridor for other fish species, and possibly western pond turtle (*Actinemys marmorata*), aquatic garter snake (*Thamnophis atratus*), amphibians such as Pacific chorus frog (*Pseudacris regilla*) and western toad (*Anaxyrus boreas*), and a number of aquatic invertebrates when surface water is present.

A record search conducted by the California Natural Diversity Data Base (CNDDB), together with review of lists from the U.S. Fish and Wildlife Service (USFWS) and California Native Plant Society (CNPS) included in Appendix C indicates that occurrences of numerous plant and animal species with special-status have been recorded from or are suspected to occur in the Ross area of Marin County. The attached lists from the CNDDB, USFWS, and CNPS (see Appendix B). The broad list of special-status plants and animals are known from a wide range of habitat types found in Marin County, however, none contain suitable habitat any longer within in the APE due to the extent of past and on-going development and disturbance.

No evidence of any bird nesting was observed during the field reconnaissance survey. The intensity of human activity and absence of suitable habitat limits the likelihood that any special-status bird species nest in or near the APE, including northern spotted owl. But there is a possibility that new nests of more common bird species could be established in the future in advance of Project construction. Nests in active use of both special-status and more common bird species are protected under the federal Migratory Bird Treaty Act and State Fish and Game code.

Jurisdictional Waters

Based on a review of the National Wetland Inventory mapping and the observations made during the field reconnaissance survey, the San Anselmo and Sleepy Hollow Creek corridors are the only potential jurisdictional wetlands or regulated unvegetated “other waters

of the U.S." in the vicinity of the APE. San Anselmo Creek passes within 50 feet of the APE where the sewer line replacement would occur north of Madrone Avenue for the Nokomis alignment. Construction, however, would be restricted at or beyond the top of bank, and no disturbance to the active channel of San Anselmo Creek is anticipated. The existing sewer line would be abandoned in place to avoid disturbance to the bank of San Anselmo Creek. Based on input received from regulatory agency representatives during the Marin Project Coordinator's meeting on November 2, 2017 (which was attended by the IS biologist), the Project will require review by and possibly authorization from the California Department of Fish and Wildlife (CDFW) but would not affect waters regulated by the U.S. Army Corps of Engineers (Corps) or Regional Water Quality Control Board (RWQCB) under the Clean Water Act.

Improvements along the Butterfield alignment would not disturb the Sleepy Hollow Creek corridor and no impacts to this feature are anticipated. BMPs would be used to prevent any construction-generated sediment or other debris from entering the storm drain systems in the roadways and eventually entering either creek. This would include temporary installation of filter fabric over storm drain inlets, use of fiber rolls, and other methods to contain and control construction-generated sediments.

Regulatory Overview

Special-status species are plants and animals that are legally protected under federal and state laws. The USFWS is responsible for administering the federal Endangered Species Act (ESA) and the Migratory Bird Treaty Act. The California Department of Fish and Wildlife (CDFW) administers the California ESA. See Appendix D for more information on the regulatory framework affecting sensitive biological reserves. The compliance of the Project with these and other federal regulations is addressed later in this section.

IMPACT ANALYSIS

Control Measures Incorporated by RVSD

D1. Adequate measures shall be taken to avoid inadvertent take of bird nests protected under the federal Migratory Bird Treaty Act and State Fish and Game Code when in active use. This shall be accomplished by taking the following steps.

- If initial construction is proposed during the nesting season (February 1 to August 31), a focused survey for nesting raptors and other migratory birds shall be conducted by a qualified biologist within 7 days prior to the onset of construction in order to determine whether any active nests are present in the APE and surrounding area within 100 feet of proposed construction. The survey shall be reconducted any time construction has been delayed or curtailed for more than 7 days during the nesting season.

- If no active nests are identified during the construction survey period, or development is initiated during the non-breeding season (September 1 to January 31), construction may proceed with no restrictions.
- If bird nests are found, an adequate setback shall be established around the nest location and construction activities restricted within this no-disturbance zone until the qualified biologist has confirmed that any young birds have fledged and are able to function outside the nest location. Required setback distances for the no-disturbance zone shall be based on input received from the CDFW, and may vary depending on species and sensitivity to disturbance. As necessary, the no-disturbance zone shall be fenced with temporary orange construction fencing if construction is to be initiated elsewhere in the APE.
- A report of findings shall be prepared by the qualified biologist and submitted to the RVSD for review and approval prior to initiation of construction during the nesting season (February 1 to August 31). The report shall either confirm absence of any active nests or should confirm that any young are located within a designated no-disturbance zone and construction can proceed. No report of findings is required if construction is initiated during the non-nesting season (September 1 to January 31) and continues uninterrupted according to the above criteria.

D2. The RVSD shall secure any required authorizations from regulatory agencies, conform to any conditions included in these authorizations, and comply with all applicable State and federal laws related to biological and wetland resources. This shall include submittal of a Notification to the CDFW for the open cut segment of the Nokomis component of the Project near San Anselmo Creek, which would most likely avoid disturbance to the bed or bank of the channel, but involves construction near the top of bank.

D3. A Water Pollution Control Plan (WPCP) will be prepared. Provisions shall be incorporated into the WPCP to prevent any construction debris from entering San Anselmo and Sleepy Hollow Creek corridors. This shall include use of BMPs such as filter fabric over storm drain culvert inlets, fiber-rolls around culvert inlets, and other practices.

D4. Trees and other landscaping removed during construction shall be replaced by Contractor on-site. If required, RVSD shall obtain a permit from the Town for the removal of street trees in conformance with Chapter 9 of the Town.

D5. The Contractor shall exercise due diligence and implement necessary precautions to avoid needlessly damaging or destroying trees, shrubs or other landscaping in the Project limits. Of particular concern are the three mature native coast live oak and California bay trees along the open cut segment of the Nokomis alignment near San Anselmo Creek. Temporary orange construction fencing shall be installed around the perimeter of trunks of these three trees and other vegetation that could be damaged and is to be protected from construction equipment operation, and shall remain in place

for the duration of construction. All construction equipment operators shall be trained that trees and other vegetation to be avoided must be protected, and that the orange construction fencing is to remain in place for the duration of construction.

Significance Criteria

RESOURCE CATEGORY / SIGNIFICANCE CRITERIA	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Information Sources
D. <u>BIOLOGICAL RESOURCES</u>					
Would the Project:					
1) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies or regulations, or by the California Department of Fish & Game or U.S. Fish and Wildlife Services?	☐	☐	☒	☐	9, 16
2) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☐	☐	☒	9, 16
3) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☒	☐	9, 16
4) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☐	☒	☐	9, 16
5) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☒	☐	9, 16
6) Conflict with provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒	9, 16

No Impact: Criteria D2, D6

Riparian Habitat: Criterion D2: The APE does not contain any riparian habitat or other sensitive natural community types, and no impacts are anticipated. The segments of San Anselmo and Sleepy Hollow Creek corridors near the projects do contain native species, including willows and other riparian tree and shrub species. But no construction is proposed within the bed or bank of these creeks, and no adverse impacts on sensitive natural communities is anticipated.

Habitat Conservation Phase: Criterion D6. No habitat conservation plans have been prepared addressing the APE, and the Project would therefore not conflict with any adopted habitat conservation plans. As indicated in Figure 3, San Anselmo Creek and Sleepy Hollow Creek have been identified as Critical Habitat for steelhead and other species. However, as discussed above, no disturbance near Sleepy Hollow Creek is anticipated and the open cut segment of the Nokomis alignment of the Project near San Anselmo Creek would be constructed outside the active channel with adequate controls taken to prevent any excavated materials from rolling down the bank and into the active creek channel. As a result, the Project would not result in any direct or indirect impacts to the creek corridors with suitable habitat for steelhead or other special-status species. RVSD has also committed to securing all authorizations required under state or federal laws related to biological and wetland resources, as called for in Control Measure D1. As a result, no impact would occur.

Less than Significant Impacts: Criteria D1, D3-D5

Special-Status Species: Criterion D1. Due to the extent of past development and absence of suitable habitat, no special-status species are believed to occur within the construction area in the APE, and no adverse effects are anticipated. Most of the APE is located in developed upland, composed of existing roadways and landscaped frontages, unsuitable for special-status species known from the San Anselmo vicinity and east Marin County. The open cut segment of the Nokomis alignment of the Project near San Anselmo Creek would be constructed outside the active channel in the yard area of the existing residence. Adequate controls would be taken to prevent any excavated materials from rolling down the bank and into the active creek channel. No disturbance to the bed or banks of either San Anselmo or Sleepy Hollow Creeks is anticipated, and no disturbance to the habitat it provides steelhead, other fish species, western pond turtle, and other aquatic-dependent species would occur as a result of project implementation. Suitable habitat for other federally-listed or candidate species such as northern spotted owl, California red-legged frog, San Bruno elfin butterfly (*Callophyrys mossil bayensis*), Mission blue butterfly (*Plebujus icarioides missionensis*), and Myrtle's silverspot butterfly (*Speyeria zerene myrtleae*), among others, is absent from the APE. Thus pursuant to CEQA-Plus requirements, no federally-listed species would be affected and there would be no impact relative to the Federal ESA as a result of Project implementation.

There was no evidence of any bird nesting within the APE observed during the field reconnaissance survey. Although the limited habitat values and extent of on-going disturbance generally precludes the potential for nesting birds in the APE, there remains a remote possibility that new bird nests could be established in the trees and other vegetation in and near the APE. If construction were initiated during the bird nesting season (March 1 – August 31) construction-related disturbance could result in abandonment of the nests if any are present in the immediate vicinity. If construction-related noise and disturbance resulted in destruction or abandonment of a nest in active use and loss of any eggs or young in the nest, this would be a significant adverse impact and violation of the federal Migratory Bird Treaty Act and State Fish and Game Code sections. Control Measure D1, however, has been incorporated into the Project by RVSD which would serve to avoid this potential for violation of federal and state regulations by conducting a preconstruction survey and implementing appropriate construction restrictions if any active nests are encountered until any young birds have successfully fledged. Thus, impacts on special-status species would be less than significant.

Wetlands: Criterion D3: The San Anselmo and Sleepy Hollow Creek channels are the only federally protected waters near the APE. All improvements near the Sleepy Hollow Creek corridor would be contained within Butterfield Road, with no disturbance within the creek channel. The open cut segment of the Nokomis alignment of the Project near San Anselmo Creek would be constructed outside the active channel in the yard area of the existing residence, and adequate controls would be taken to prevent any excavated materials from rolling down the bank and into the active creek channel. Appropriate controls would be implemented during construction to prevent any materials from entering the San Anselmo and Sleepy Hollow Creek corridors, and BMPs would be followed to prevent sediments and other construction-generated pollutants from reaching downstream waters, as called for in Control Measure D3.

Given that disturbance to the waters of San Anselmo and Sleepy Hollow Creeks (within or outside the ordinary high water mark (OHWM)) is not anticipated, authorization from the Corps or RWQCB under the provisions of the Clean Water Act do not appear necessary. The CDFW typically requires notification any time modifications are proposed near a regulated drainage, such as San Anselmo Creek. This was confirmed during the Marin Project Coordinator's meeting on November 2, 2017. Control Measure D2 requires that the RVSD secure any required authorizations from regulatory agencies and conform to any conditions included in these authorizations. This includes submittal of a Notification to the CDFW for the portion of the open cut construction work north of Madrone Avenue along San Anselmo Creek for the Nokomis alignment of the Project, even though disturbance to the bed or bank are not anticipated.

Thus, pursuant to CEQA-Plus requirements, the Project is consistent with Executive Order 11990 – Protection of Wetlands. Because California does not have a Coastal Barriers Resources System, no impacts relative to the Coastal Barriers Resources Act will occur.

Fish and Wildlife: Criterion D4. The proposed Project would not have any significant adverse impacts on wildlife movement opportunities or adversely impact native wildlife nursery sites. Wildlife in the vicinity of the APE are already acclimated to human activity, and construction-related disturbance would not cause any significant impacts on wildlife movement in the surrounding area. Species common to the area would continue to utilize the surrounding area, even during construction.

Pursuant to CEQA-Plus requirements, no essential fish habitat would be affected and the Project is consistent with the Magnuson-Stevens Fishery Conservation and Management Act. The proposed open cut segment of the Nokomis alignment near San Anselmo Creek would be constructed outside the active channel in the yard area of the existing residence. Adequate controls would be taken to prevent any excavated materials from rolling down the bank and into the active creek channel, and no impacts to fish habitat would occur as a result of project implementation.

Local Policies: Criterion D5. Policies in the Conservation Element of the *Town General Plan* address the protection of sensitive biological and wetland resources, including creeks, significant habitat for fish, wildlife and flora, and natural features.[13] With the exception of San Anselmo and Sleepy Hollow Creek corridors, and street trees that grow along the roadways in the APE, there are no other sensitive biological resources in the vicinity of the proposed Project. As discussed above, no direct impacts to San Anselmo or Sleepy Hollow Creeks is anticipated as a result of Project implementation. Appropriate controls would be implemented during construction to prevent any construction-generated materials from entering the San Anselmo and Sleepy Hollow Creek corridors, and BMPs would be followed to prevent sediments and other construction-generated pollutants from reaching downstream waters, as called for in Control Measure D3. Tree removal and damage would be minimized, and replacement provided where avoidance was infeasible, as called for in Control Measures D4 and D5. No conflicts with the Town's General Plan are anticipated as a result of Project implementation.

The Town Code includes provisions related to the protection and management of street trees (Chapter 9 of Title 5). Section 4-9.06 requires a permit before any street tree can be removed or altered. Some of the Project improvements could affect a number of trees along the APE, including both non-native ornamentals and remnant native oaks and California bay trees. Damage to the tree root zones, limbs, and trunk could occur as a result of trenching and other construction activities. And in some locations tree removal may be required to accommodate replacement facilities, where avoidance is infeasible. As discussed above, trees and other landscaping removed to accommodate improvements associated with the Project would be replaced by the Contractor. And any inadvertent damage to the trees in the vicinity of construction would be addressed by the Contractor, as required under Control Measure D5. No major conflicts with local plans and policies are anticipated, and potential impact would be less than significant.

Mitigation Measures

None required.

E. CULTURAL RESOURCES

SETTING

A Phase I Cultural Resources Evaluation for the proposed Project was prepared by Archeo-Tec, Consulting Archaeologists.[17] Because the report contains confidential information about the locations and characteristics of archaeological sites, the full report is not included in Appendix D for public review, but rather, an executive summary is provided. The full report will be made available to the State Water Resources Control Board (SWRCB) and other professionals for review.

IMPACT ANALYSIS

Control Measures Incorporated by RVSD

E1. The Contractor shall conform to the applicable requirements of the National Historic Preservation Act of 1966 as it relates to the preservation of cultural resources and as detailed in the Project's Phase 1 Cultural Resources Study.

E2. Previously undetected prehistoric or historic period cultural resources may be encountered during the course of construction in instances when an archaeologist may not be present at the work site. Construction crews shall be trained in "basic archaeological identification" and have access to an Alert Sheet. The Alert Sheet shall photographically depict shell midden and associated indicators of prehistoric archaeological sites, and clearly outline the procedures in the event of new archaeological discovery. These procedures include temporary work stoppage (Stop Work Order) of all ground disturbance, short-term physical protection of artifacts and their context and immediate advisement of the archaeological team and RVSD representatives. Any Stop Work Order will contain a description of the work to be stopped, special instructions or requests for the contractor, suggestions for efficient mitigation and a time estimate for the work stoppage. The archaeologist shall notify the FIGR, examine the findings, assess their significance and offer recommendations for any procedures deemed appropriate to further investigate and/or mitigate adverse impacts to those cultural resources that have been encountered.

E3. If human remains are encountered, the following procedures will be implemented:

a. Per the stipulations of the California Health and Safety Code Section 7050.5(b), the Marin County Coroner's Office will be contacted immediately; this will occur whether or not a Most Likely Descendant has already been appointed.

b. The Coroner's Office has two working days in which to examine the identified remains. If the Coroner determines that the remains are Native American, then—if

a Most Likely Descendant has not yet been appointed—the Office will notify the Native American Heritage Commission (NAHC) within 24 hours.

c. Following receipt of the Coroner's Office notice, the NAHC will contact a Most Likely Descendant. The Most Likely Descendant then has 48 hours in which they can make recommendations to the project sponsor and consulting archaeologist regarding the treatment and/or re-interment of the human remains and any associated grave goods.

d. Appropriate treatment and disposition of Native American human remains and associated grave goods will be collaboratively determined in consultation between the appointed Most Likely Descendant, the consulting archaeologist, and the landowner or authorized representative. The treatment of human remains may potentially include the preservation, excavation, analysis, and/or reburial of those remains and any associated artifacts.

e. If the remains are determined not to be Native American, the Coroner, archaeological research team, and RVSD will collaboratively develop a procedure for the appropriate study, documentation, and ultimate disposition of the historic human remains.

Significance Criteria

RESOURCE CATEGORY / SIGNIFICANCE CRITERIA	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Beneficial Impact	Information Sources
E. <u>CULTURAL RESOURCES</u>						
Would the Project:						
1) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?	☐	☒	☐	☐	☐	17
2) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	☐	☒	☐	☐	☐	17
3) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature of paleontological or cultural value?	☐	☐	☐	☒	☐	9
4) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☐	☒	☐	☐	17

No Impacts: Criterion E3

The Geotechnical Studies discuss the subsurface conditions for the Nokomis and Butterfield alignments. The project APE lies upon alluvial deposits that have formed atop the Franciscan Formation, thus suitable subsurface deposits do not exist that might contain paleontological resources or unique geologic features of paleontological or cultural value. The Project involves limited excavation within the public right-of-way or in designated easements running through private property which in general have been previously disturbed. No impact would occur.

Less-Than-Significant Impacts: Criterion E4

Criterion E4 addresses accidental discovery of human remains. Such a discovery during construction activities is regulated by the California Health and Safety Code. Control Measure E3 addresses this issue. The impact is less than significant.

Less-Than-Significant Impacts with Mitigation Incorporated: Criteria E1, E2

The Cultural Resources Study provides a finding of "No Effect to Historic Properties" and thus the Project is in compliance with Section 106 of the National Historic Preservation Act (NHPA). While the Phase 1 survey and limited subsurface testing revealed nothing of archaeological significance within the Project APE, the close proximity of the APE to known archaeological sites and perennial water resources indicate the Project alignments are located in high sensitivity areas. Control Measures E1 and E2 provide partial coverage of this issue but the sensitivity of the APE requires additional mitigation to reduce this potential impact to less than significant levels.

Mitigation Measures

The following mitigation measures shall be implemented to reduce the impact to less than significant levels:

ARCH 1. The archaeologist shall review the 100% Project design and meet with RVSD and the Engineer to review Project construction features. A monitoring program shall then be developed for RVSD and Engineer's review and approval. It is anticipated that the monitoring program will provide for full-time monitoring of ground disturbance associated with the Nokomis alignment and focused monitoring of the Butterfield alignment. Full-time monitoring in selected areas may be reduced to spot monitoring at the field director's discretion. If resources are encountered, ARCH 2 shall be implemented.

ARCH 2. If resources are encountered, their potential significance will be evaluated and data can be recovered accordingly. Areas in proximity to shellmounds often have redeposited pockets or sparse shell midden resulting from removal/transport of shell materials. If such shell

is found in the absence of any other cultural materials or human remains, or other cultural materials are present but deemed not historically significant, such materials shall be photographed and recorded. If the archaeologist identifies an intact and potentially significant archaeological resource, he or she shall develop a treatment plan in consultation with the RVSD, the SWRCB, the FIGR (in the event of a prehistoric site) and the State Historic Preservation Officer (SHPO). This plan would likely entail a program of systematic data recovery in which cultural materials are documented and removed.

F. TRIBAL CULTURAL RESOURCES

IMPACT ANALYSIS

Control Measures Incorporated by RVSD

F1. Implement Control Measures E1 and E2.

Significance Criteria

RESOURCE CATEGORY / SIGNIFICANCE CRITERIA	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Beneficial Impact	Information Sources
F. <u>TRIBAL CULTURAL RESOURCES</u> Would the Project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe and that is:						
1) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or	☐	☐	☐	☒	☐	9, 12

RESOURCE CATEGORY / SIGNIFICANCE CRITERIA	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Beneficial Impact	Information Sources
2) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resource Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	☐	☐	☐	☒	☐	9, 12

No Impacts: Criteria F1, F2.

A letter has been sent to FIGR on November 8, 2017, requesting information on the presence of tribal cultural resources within or adjacent to the Project area. A response was not received from FIGR. However, based on the Phase I Cultural Resources Evaluation discussed in Section E, no tribal cultural resources are known to exist within the Project area. Construction activities will generally occur in disturbed areas within existing easements and right-of-ways. Control Measure E2 provides protocol for accidental discovery of cultural resources during construction. Mitigation measures (ARCH 1 and ARCH 2) provide for monitoring of all excavation activities by a qualified archaeologist with development of an appropriate treatment plan in consultation with FIGR and other entities in which cultural materials are documented and removed.

G. GEOLOGY AND SOILS

SETTING

Geotechnical studies have been prepared for the Project by Miller Pacific Engineering.[18, 19] Relevant information is summarized below.

Site Geology and Seismicity

The Project site is in the Coast Ranges Geomorphic/Geologic province of California and is located at the southern end of the Northern Coast Ranges. The regional bedrock geology consists of sedimentary, igneous, and metamorphic rock of the Franciscan Complex. The Project sites are generally underlain by colluvial and alluvial soils and by Franciscan bedrock consisting of sandstone and shale.

The Project site is located in the seismically active San Francisco Bay Area. The site is not located within an Alquist-Priolo Earthquake Fault Zone and no active faults are known to pass through the Project sites. The closest active faults to the site are the San Andreas and San Gregorio located about 6.2 to 7.5 miles to the west.

The primary geologic hazards relevant to the proposed Project include strong seismic ground shaking and liquefaction. Liquefaction refers to the sudden, temporary loss of soil strength during strong ground shaking. Project alignments are in areas of generally moderate liquefaction potential but localized areas have a high potential. The Geotechnical Studies concluded that construction of the Project is feasible from a geotechnical standpoint provided appropriate controls are utilized.

Within the Project areas, surface conditions generally consist of asphalt-paved roadways. The sites are located within relatively densely-populated suburban areas with neighboring properties generally consisting of residential land use. There are overhead power lines along the shoulder of some of the streets and numerous underground utilities exist and are often located within several feet of the proposed alignments.

Groundwater

The Project includes deep excavations for construction of the various improvements as shown in Figures 4 and 5. Based on data from boreholes advance for the Geotechnical Studies, it is likely that groundwater will be encountered during construction. Groundwater elevations are influenced by a variety of factors but depths to groundwater in the area generally ranged from 5 feet to as much as 20 feet.

IMPACT ANALYSIS

Control Measures Incorporated by RVSD

G1. Incorporate the recommendations of the Project Geotechnical Studies for design, construction, and long-term performance into the Contract Documents for the Project.

G2. Have a geotechnical engineer review the final Project plans and specifications prior to construction to verify that geotechnical aspects of the Project are consistent with the intent of the recommendations included in the Project Geotechnical Studies.

G3. Have a geotechnical engineer review geotechnical-related Contractor submittals during construction (e.g., shoring, dewatering, ground improvement, backfill materials, etc.).

G4. Have a geotechnical engineer perform periodic site inspections during the construction to observe and document subsurface conditions encountered by the Contractor with respect to the subsurface conditions described in the Project Geotechnical Studies.

G5. The Contractor will submit to RVSD, if applicable, a copy of their annual trench and/or excavation permit issued by Cal/OSHA.

G6. In accordance with the provisions in Section 6705 of the Labor Code, the Contractor shall submit in advance of excavation of any trench or trenches 5 feet or more in depth, a detailed plan in conformance with the Project Geotechnical Studies showing the design of shoring, bracing, sloping, or other provisions to be made for worker protection from the hazard of caving ground during the excavation of such trench or trenches. The use of water-tight shoring in excavations or dewatering will be options available to the Contractor. All trenches in streets shall have vertical trench walls. If such plans vary from the shoring system standards set forth in the Construction Safety Orders of the Division of Industrial Safety in Title 8, Subchapter 4, Article 6, CCR, the plans shall be prepared and signed by a California registered civil or structural engineer.

G7. The Contractor shall prepare a Movement Monitoring Plan, with geotechnical review, for RVSD review and approval. The plan shall include the location identification and placement of survey monuments at regular intervals along the alignment above existing subsurface utilities and on surface structures identified by RVSD or its appointed representative that may be affected by the excavation. The plan shall include generalized plans of action to be implemented in the event settlement occurs.

G8. The Contractor shall prepare a vibration-monitoring program for RVSD review and approval. The purpose of the program is to protect buildings, structures, and utilities from extensive vibration during construction activities. The Contractor shall implement required remedial and precautionary measures based on the vibration-monitoring data.

G9. The Contractor shall develop a ground stabilization program for RVSD review and approval. The purpose of the program is to stabilize soils where ground stabilization is required or identified in the Project Drawings. Ground stabilization systems may include displacement grouting, permeation grouting, in-site mixing, or a combination. The program shall be completed no less than seven days prior to excavation in those areas.

G10. All material excavated shall be removed immediately and transported off site. No stockpiling of excavated materials will be allowed at any time in the public right-of-way except for limited stockpiling of soil or imported fill at the work site to help facilitate daily operations.

G11. Comply with the Town's Permit Coverage as a Small Municipal Separate Storm Sewer Systems (MS4s) under Phase II National Pollutant Discharge Elimination System (NPDES) General Permit, and existing District storm water regulations.

G12. Contractor shall prepare a WPCP for RVSD approval. The WPCP shall describe measures to be implemented to prevent the discharge of contaminated stormwater runoff from

the job site. Erosion control measures shall be in accordance with the requirements of Marin County Stormwater Pollution Prevention Program, and RVSD's Field Management Practices for protection of water quality. The temporary construction site BMPs to be included in the WPCP shall address, but not be limited to the following:

a. Providing all excavated areas with temporary erosion control measures where natural ground cover is disturbed, all temporary excavation stockpiles, including structures and trench excavations.

b. Control of equipment fueling and maintenance, concrete mixing and washout, and hauling and storage of materials.

c. Inspection and maintenance of protected areas regularly during the course of the work.

d. Placing all excavations, spills, and waste materials in areas not subject to washout, flooding, or natural drainage. No sand, mud, rocks, or other construction debris shall be disposed of in the sanitary sewers, storm sewers, or waterways. The Contractor shall comply with all water discharge requirements to local sanitary and storm sewers.

e. Placement of filter fabric at local storm drains and use of other appropriate BMPs.

G13. Imported soil shall comply with Project specifications which define the minimum geotechnical properties and analytical quality characteristics that must be met for use of fill material from off-site borrow sources. The analytical quality specifications will reflect California Department of Toxic Substances Control (DTSC) and RWQCB requirements and will contain numerical limitations for different types of use for the protection of surface and groundwater quality and public health.

Significance Criteria

RESOURCE CATEGORY / SIGNIFICANCE CRITERIA	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Beneficial Impact	Information Sources
G. GEOLOGY AND SOILS Would the Project: 1) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:						

RESOURCE CATEGORY / SIGNIFICANCE CRITERIA	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Beneficial Impact	Information Sources
a) 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? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☐	☒	☐	18, 19
b) Strong seismic ground shaking?	☐	☐	☒	☐	☐	18, 19
c) Seismic-related ground failure, including liquefaction?	☐	☐	☒	☐	☐	18, 19
d) Landslides?	☐	☐	☐	☒	☐	18, 19
2) Result in substantial soil erosion, siltation, changes in topography and the loss of topsoil or unstable soil conditions from excavation, grading or fill?	☐	☐	☒	☐	☐	18, 19
3) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☐	☒	☐	☐	18, 19
4) Be located on expansive soil, as defined in Table 16-I of the Uniform Building Code (2001), creating substantial risks to life or property?	☐	☐	☐	☒	☐	18, 19
5) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	☐	☐	☐	☒	☐	9
6) Result in substantial soil degradation or contamination?	☐	☐	☒	☐	☐	9

No Impacts: Criteria G1(a), G1(d), G4, G5

The Project alignments are not within an Alquist-Priolo Earthquake Fault Special Studies Zone (Criterion F1(a)) and are mostly within local streets with no potential for landslides (Criterion F1(d)). Expansive soils are not an issue with the Project (Criterion F4) and Criterion F5 relating to soils and alternative wastewater disposal systems is not relevant to the Project.

Less-Than-Significant Impacts: Criteria G1(b), G1(c), G2, G3, G6

Physical Hazards: Criteria G1(b), G1(c), and G3. These criteria relate to physical hazards the Project may cause or be exposed to during construction and operation. Previous discussion in this section indicated that the Project area has the potential for strong seismic ground shaking and moderate to high liquefaction potential. Additionally, Project construction will involve excavation to depth. For the Nokomis alignment, excavation depths will approach 13 feet while depths for portions of the Butterfield alignment will be up to 25 feet. Strong seismic ground shaking can result in damage to the pipelines and related improvements. Liquefaction can result in flood failure, lateral spreading, ground movement, settlement, and other related effects. Buried pipelines and manholes embedded within liquefied soils may also experience uplift due to buoyancy.

Control measures, however, have been included in the Project to address these issues. Control Measures G1 through G4 provide for the ongoing involvement of a geotechnical engineer with incorporation of their recommendations into the Project plans and specifications. Controls necessary to address the primary geotechnical considerations for the Project include providing appropriate temporary support for excavations, temporary seismic and structural design for any new structures, and providing for proper bedding and trench backfill. Control Measures G5 and G6 address the Project's excavation activities; compliance with the Labor Code and the need to have an acceptable plan for shoring, bracing, sloping or other provisions necessary to address the hazards of caving of any trench 5 feet or more in depth; and other safeguards necessary to minimize the risk of caving. Control Measures G7 and G8 provide for the preparation of a movement monitoring plan and a vibration monitoring program to protect buildings, structures, and utilities from extensive movement or vibration during construction activities. A ground stabilization program (Control Measure G9) provides the strengthening of soils in selected areas along the alignments for protection of new pipelines. The Geotechnical Studies concluded that construction of the proposed Project is feasible from a geotechnical standpoint provided necessary controls are implemented. Thus, potential impacts related to ground shaking, ground failure, and associated physical hazards are less than significant.

Criterion G2. Criterion G2 addresses the potential for soil erosion. Project construction will involve soil excavation, primarily for areas of open cut excavation and for the insertion and receiving pits. Although the construction activities are limited in extent and duration, these activities could still cause sediment and other pollutants to leave the sites and enter local drainage systems, and possibly nearby streams, Control Measure G10 requires all excavated soil material to be removed immediately and transported off site with no stockpiling allowed in the public right-of-way except for limited stockpiling of excavated soil or imported fill at the work site to help facilitate daily operations. Control Measures G11 and G12 address compliance with regulatory requirements for storm water control and preparation of a WPCP by the Contractor which will contain the necessary temporary construction site BMPs for control of erosion and other sources of pollutants. BMPs will include but not limited to:

- Placement of excavations and waste materials in areas not subject to washout, flooding, or natural drainage;
- Use of filter fabric fences or hay bales as necessary and placement of filter fabric at local storm drains;
- Placement of slope stabilization materials; and
- Inspection and maintenance of protected areas regularly during the course of work.

As a result, potential impacts associated with discharge of contaminated stormwater runoff are less than significant.

Criterion G6. Criterion G6 addresses whether the Project will result in substantial soil degradation or contamination. Soil will need to be imported to the job site to provide suitable fill and, if not regulated, could be contaminated, resulting in on-site impacts. To provide for the protection of surface and groundwater quality and public health, Control Measure G13 will require the use of fill material from off-site borrow sources to comply with analytical quality characteristics, as well as minimum geotechnical properties that will reflect DTSC and RWQCB requirements. The impact is less than significant.

Mitigation Measures

None required.

H. GREENHOUSE GAS EMISSIONS

IMPACT ANALYSIS

Control Measures Incorporated by RVSD

H1. Implement Control Measures C5 and C6 for controlling exhaust emissions.

Significance Criteria

RESOURCE CATEGORY / SIGNIFICANCE CRITERIA	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Beneficial Impact	Information Sources
H. GREENHOUSE GAS EMISSIONS						
Would the Project:						
1) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☒	☐	☐	9
2) Conflict with any applicable plan, policy or regulation of an agency adopted for the purposes of reducing the emissions of greenhouse gases?	☐	☐	☒	☐	☐	20, 21

Less-Than-Significant Impacts: Criteria H1, H2

Sources of greenhouse gas (GHG) emissions include exhaust with such chemicals as carbon dioxide, methane, and nitrous oxide. As discussed in the Project Description in Chapter 1, construction activities for the proposed Project will be minimal and quite limited in duration. Control Measure H1 will be implemented to control exhaust emissions to the extent feasible during construction. Short-term construction projects are not recognized in Table 3-1 of the Air Quality Guidelines which provide land use type screening level sizes for criteria air pollutants, precursors, and GHG. The California Global Warming Solutions Act of 2006 (AB 32) requires statewide GHG emissions be reduced to 1990 levels by the year 2020, but the proposed Project will be completed in only several months and have no contribution to the 2020 emission cap. Best management practices identified in the Air Quality Guidelines for reducing GHG emissions during construction include the following:

1. Use alternative fueled (e.g. biodiesel, electric) construction vehicles/equipment of at least 15 percent of the fleet. (The proposed Project is a small-scale construction project with limited vehicle and equipment needs. While the chosen Contractor may have alternative-fueled vehicles and equipment, requiring 15 percent of the fleet to be alternative-fueled would have an unnecessary cost burden with no measurable benefit.)

2. Use local building materials of at least 10 percent. (Construction materials use such as aggregate base and asphalt, will be limited for the Project but all will be obtained locally.)

3. Recycle or reuse at least 50 percent of construction waste or demolition materials. (The generation of construction waste will also be limited.

The proposed Project's impact related to GHG emissions is less than significant. Additionally, the Project would be consistent with the Marin County Climate Action Plan and the Town's Climate Action Plan. [20, 21]

I. HAZARDS AND HAZARDOUS MATERIALS

SETTING

This resource category addresses health and safety issues related to construction of the Project. Health and safety issues apply to construction workers and members of the public who would be exposed to hazardous materials and physical conditions associated with the presence of construction equipment and excavations in an area of sensitive land uses. As discussed in Chapter 1, the Project involves construction generally within local roadways and the surrounding areas are predominantly residential. There are a variety of state and federal regulations that apply to construction projects for protection of health and safety. RVSD also

has standard specifications to address these issues based on other successfully completed projects.

Several regulatory agency databases were consulted regarding the presence of hazardous materials release sites within the Project area, including the SWRCB Geotracker website and the DTSC Cortese List.[22, 23] No sites on the Cortese List are in the Project area. Several permitted underground storage tanks exist just to the east of the Sir Francis Drake Boulevard and Butterfield Road intersection but no evidence of site environmental problems are documented.

IMPACT ANALYSIS

Control Measures Incorporated by RVSD

I1. Store and handle all hazardous materials in strict accordance with the Material Safety Data Sheets for the products. The storage and handling of potential pollution causing and hazardous materials, including but not necessarily limited to gasoline, oil, and paint, will be in accordance with all local, state, and federal requirements.

I2. When sandblasting, spray painting, spraying insulation or other activities inconveniencing or dangerous to property or the health of employees or the public are in progress, the area of activity shall be enclosed adequately to contain the dust, overspray, or other hazards. In the event there are no permanent enclosures at the area, or such enclosures are incomplete or inadequate, the Contractor shall provide suitable temporary enclosures.

I3. Employ safety provisions conforming to the U.S. Department of Labor (OSHA), Cal/OSHA, and all other applicable federal, state, county and local laws, ordinances, and codes**.** The completed work shall include all necessary permanent safety devices, such as machinery guards and similar ordinary safety items, required by the state and federal industrial authorities and applicable local and national codes. Develop and submit to RVSD for approval a Health and Safety Plan that defines proposed site safety measures.

I4. Appoint an employee as safety supervisor who is qualified and authorized to supervise and enforce compliance with the Safety Program. The Safety Program will include an operation plan with emergency contacts.

I5. The Contractor shall construct appropriate safety barriers such as temporary fencing, berms, or similar facilities where required or directed by RVSD. To minimize disturbance of existing roads and facilities, safety barriers shall allow for normal maintenance and operation of existing facilities and roads as determined by RVSD or its appointed Representative. The Contractor shall conduct his work so as to ensure the least possible

obstruction to traffic and inconvenience to the general public and the residents in the vicinity of the work and to ensure the protection of persons and property.

I6. Establish, implement, and maintain a written injury prevention program as required by Labor Code Section 6401.7.

I7. In case of an emergency, make all necessary repairs and promptly execute such work when required by the Construction Manager.

I8. Complete Project construction along Butterfield Road near Brookside Elementary School between mid-June and mid-August of 2018. Contractor to verify school schedules prior to start of construction.

I9. Develop and implement an approved TCP (see Control Measure Q2).

I10. Submit for RVSD review, in accordance with the provisions of Section 6705 of the Labor Code, in advance of excavation of any trench or trenches 5 feet or more in depth, a detailed plan showing the design of shoring, bracing, sloping or other provisions to be made for worker protection from the hazard of ground caving. See Control Measure G6.

I11. Manhole entry and/or entry to any excavation greater than 5 feet deep shall be in full compliance with the confined space entry requirements of OSHA, Cal/OSHA and RVSD. The District shall have the authority to require the removal from the project of the foreman and/or superintendent in responsible charge of the work where safety violations occur.

I12. During non-working hours, all trenches in public streets shall either be backfilled and temporarily paved or shall be shored and covered with steel plates in compliance with the requirements of local jurisdictions. The maximum length of trench excavation in advance of the pipe laying operation and the maximum amount of trench remaining open without backfill during the course of the daily pipe installations shall be in accordance with local jurisdictional agencies encroachment and excavation permit requirements or a maximum of 200 feet, whichever is more restrictive.

I13. Provide written notice to all private property owners along the alignment three times before work commences in the vicinity of said property. The notices will be provided 7 days before planned construction, 24 hours prior to start of work, and day of construction, and will provide information on Project activities, the construction schedule, protocol for providing complaints relative to hazardous conditions and noise, and vehicle access needs.

I14. If complaints are received relative to unsafe conditions, identify the source, evaluate and implement appropriate corrective measures, and notify the complainant(s) of the results.

I15. If contaminated materials are encountered during excavation, then all work shall comply with the following codes:

a. Code of Federal Regulations – Title 40 – Protection of the Environment, Part 761 (40 CFR 761).

b. California Code of Regulations, Title 22, Social Security, Division 4, Environmental Health, Chapter 30 – Minimum Standards for Management of Hazardous and Extremely Hazardous Wastes.

I16. Pursuant to the Contract Documents, relative to contaminated materials, the Contractor shall submit the following to the RVSD for review:

a. The contract shall prepare and submit to the RVSD or its appointed Representative, for review, a detailed Job Plan describing the proposed methods and procedures for excavating, segregating, testing, and disposing of petroliferous soil or groundwater. The Job Plan shall be submitted to the District or its appointed Representative no less than fourteen (14) days prior to the start of any excavation work at locations where contaminated soils and groundwater is anticipated.

b. The Job Plan shall include step-by-step procedures for the actions to be taken in identifying, handling, removing, and disposing of any contaminated soil or groundwater encountered during excavation.

c. At least 14 days before the start of any excavation at locations where contaminated soils and groundwater are anticipated, the Contractor shall prepare and submit to the RVSD or its appointed Representative, for review, a supplemental Health and Safety Plan. The supplemental Health and Safety Plan shall be prepared by an industrial hygienist certified by the American Board of Industrial Hygiene and shall include, but not limited to, training of the Contractor's personnel, protective equipment, air monitoring, sampling, and emergency procedures.

d. No excavation will be allowed to commence until the Health and Safety Plan has been returned by the District to the Contractor with the notation: "Resubmittal not required."

e. The Contractor shall provide copies of hazardous waste transporter licenses, permits, or registrations for all states in which the shipment shall travel.

f. The Contractor shall obtain all permits and licenses, pay all charges and fees, and give all notices necessary and incident to the due and lawful prosecution of the work, including certification of transport vehicles carrying hazardous material.

I17. Pursuant to the Contract Documents relative to contaminated materials, the Contractor shall implement the following monitoring requirements:

a. Contractor shall furnish a properly calibrated, fully functional organic vapor analyzer (OVA) for use at the site of every excavation or open trench to continually sample and monitor the ambient atmosphere.
b. The preliminary mode of examination for petroliferous soil and/or groundwater shall be through visual and olfactory means. Upon the first observation of soil or water that may contain petroliferous products, the Contractor shall stop excavation work and immediately notify the RVSD or its appointed Representative. No excavation of petroliferous soil, nor pumping of petroliferous water, shall proceed without the approval of RVSD or its appointed Representative.

c. Following sensory observation of petroliferous products, the OVA equipment shall be brought to the excavation site and the atmosphere shall be tested. The Contractor's Job Plan and Health and Safety Plan shall be immediately placed into effect.

d. Potentially contaminated soil or water shall be segregated and tested by the Contractor, at a certified laboratory approved by RVSD or its appointed Representative, to determine the consistency and quantity of petroliferous products. The soil or water shall then be disposed of in accordance with applicable local, state and federal law, following the procedures described in the Contractor's Job Plan and Health and Safety Plan.

I18. Pursuant to the Contract Documents, contaminated materials will be handled and disposed of in the following manner:

a. The Contractor shall avoid or minimize excavation in contaminated areas whenever possible.

b. Excavated trench material that, in the opinion of RVSD or its appointed Representative, exhibits evidence of petroleum contamination shall be removed from the site and temporarily stockpiled by the Contractor. The location of the temporary stockpile area must be reviewed by RVSD. The contaminated trench materials shall be placed on a 10 mil polyethylene sheeting to prevent contamination of uncontaminated soils and shall be separated from all uncontaminated trench materials. The temporary stockpiles of contaminated trench materials shall be covered securely with 10 mil polyethylene sheeting to limit

emissions and prevent rainfall from entering the stockpile. Runoff or drainage from the temporary stockpile shall be prevented from leaving the area and all materials shall be surrounded with 6-foot high temporary chainlink fence.

c. The temporary stockpiles of contaminated trench materials shall be sampled and analyzed by a certified testing laboratory, approved by RVSD or its appointed Representative. Results of the laboratory analysis shall be provided by RVSD or its appointed Representative within 7 calendar days from the date that the material is stockpiled.

d. Disposal of the contaminated trench materials will depend on the results of the testing program. The Contractor shall dispose of the contaminated material with the approval of RVSD or its appointed Representative, at either a licensed thermal remediation plant or by disposal at a Class II landfill, following required procedures.

e. All handling, storing, transporting, treatment, and disposal of contaminated soil and groundwater shall conform with the federal and state environmental regulations, including those of the RWQCB, DTSC, Integrated Waste Management Board, CARB, and the BAAQMD. Transport of contaminated material and groundwater shall be performed by appropriately certified and/or licensed personnel.

f. Upon Completion of excavation within the contaminated area and the hauling and disposal of contaminated materials, the Contractor shall clean up the site, including proper removal and disposal of all plastic sheetings, containers, and other materials used.

g. Any groundwater from trenching activities within the contaminated soil area, as shown on the plan shall be stored in temporary Baker-type storage tanks. The Contractor shall sample and analyze groundwater, then dispose of the stored groundwater as directed by RVSD or its appointed Representative. Depending on the quality of the groundwater, disposal may be to the sewer system or a suitable off-site disposal facility.

I19. Imported soil shall comply with Project specifications which define the minimum geotechnical properties and analytical quality characteristics that must be met for use of fill material off off-site borrow sources. The analytical quality specifications will reflect DTSC and RWQCB requirements and will contain numerical limitations for different types of use for the protection of surface and groundwater quality and public health.

Significance Criteria

RESOURCE CATEGORY / SIGNIFICANCE CRITERIA	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Beneficial Impact	Information Sources
I. <u>HAZARDS AND HAZARDOUS MATERIALS</u>						
Would the Project:						
1) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☒	☐	☐	9
2) Create a significant hazard to the public, or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment or risk explosion?	☐	☐	☐	☐	☒	9
3) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☒	☐	☐	9
4) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	☒	☐	22, 23
5) For a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport, would the Project result in a safety hazard for people residing or working in the Project area?	☐	☐	☐	☒	☐	9
6) For a project within the vicinity of a private airstrip, would the Project result in a safety hazard for people residing or working in the Project area?	☐	☐	☐	☒	☐	9
7) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☒	☐	☐	9

RESOURCE CATEGORY / SIGNIFICANCE CRITERIA	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Beneficial Impact	Information Sources
8) Expose 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?	☐	☐	☐	☒	☐	9
9) Expose people to existing or potential hazards and health hazards other than those set forth above?	☐	☐	☒	☐	☐	9

Beneficial Impacts: Criterion I2

The primary objective of the Project is to relieve hydraulic and structural deficiencies in the Project area. These improvements help address the problem of sewer system overflows (SSOs) in the RVSD service area. SSOs can expose the public to raw sewage and overflows can reach local streams with adverse water quality impacts. Thus, the impact related to public health and environmental hazards is beneficial.

No Impacts: Criteria I4-I6, I8

The Project is not on a site included on a list of hazardous material sites (Criterion I4); is not located near a public airport or private airstrip (Criteria I5 and I6); and would not expose people or structures to significant risk of loss, injury, or death involving wildland fires (Criterion I8).

Less-Than-Significant Impacts: Criteria I1, I3, I7, I9

Hazardous Materials: Criterion I1. The use of hazardous materials would be limited during construction activities and would include such traditional materials as gasoline, diesel, oil, paint, resin, and epoxy concrete. Control Measure I1 requires the storage and handling of these materials to be in strict accordance with the Material Safety Data Sheets for the products and adherence to all local, state, and federal requirements. Control Measure I2 addresses sandblasting, spray painting and other similar activities with risk to employees or the public.

Control Measures (I3 through I7) have also been included in the Project to address routine health and safety concerns. These include use of safety provisions conforming to local, state, and federal standards (Control Measure I3), use of a Safety Program and enforcement by a safety supervisor (Control Measure I4), use of safety barriers (Control Measure I5), a written

injury presentation program (Control Measure I6), and prompt emergency repairs (Control Measure I7). The impact is less than significant.

Hazardous Substances Near Schools: Criterion I3. There are several schools along Butterfield Road, one of which (Brookside Elementary) is directly adjacent to the Project alignment (Figure 6). RVSD and Harris and Associates have met with Town staff to discuss this issue. Avoidance of the school year (mid-August through mid-June) is preferable with a construction window of mid-June through mid-August being preferable. Accordingly, Control Measure I8 provides for completion of Project construction near Brookside Elementary in this time frame in 2018. The Contractor will verify school schedules prior to construction.

As discussed in this section, the Project involves use of only hazardous materials typically associated with construction projects. In addition to Control Measure I8, a variety of controls will otherwise be used to address hazards and hazardous materials. The impact is less than significant.

Emergency Response Plan: Criterion I7. Criterion I7 addresses a project's interference with an adopted emergency response or evacuation plan. The issue of emergency access is embodied in a traffic control plan (TCP) that complies with the requirements of the Town (Control Measure I-9). A TCP addresses an extensive array of traffic flow, safety, and parking issues which are discussed in Section Q, Transportation/Traffic. Emergency access would be provided at all times. Thus, the impact associated with interference with emergency access is less than significant.

Safety and Health Hazards: Criterion I9. Criterion I9 relates to other hazards not addressed by Criteria I1 through I8 and is primarily related to the health and safety of workers and the public. The Project involves the use of heavy equipment and excavations of up to 25 feet in depth as described on Figures 3 and 4, where access by pedestrians and bicyclists is possible. Hydrocarbon contamination of soil and/or groundwater is a possibility the Contractor may encounter during construction. Without suitable controls, the potential for health and safety hazards would exist.

A variety of control measures, however, have been included in the Project to address safety and health hazards. Measures include compliance with the requirements of OSHA and with all applicable local, state, and federal requirements (Control Measure I10 and I11); development and implementation of a safety program (Control Measure I3); controls over open trenches and entry pits to provide for site security and public safety (Control Measure I12); use of an approved TCP, as discussed above, to provide for safe traffic flow and maintenance of emergency response and emergency access (Control Measure I9); and coordination with local property owners adjacent to the Project area on Project activities and procedures for receiving and responding to unsafe working conditions should any develop (Control Measures I13 and I14). In addition, a series of control measures will be included in the Contract Documents to address contaminated soil and groundwater if encountered during excavation and to regulate

the quality of imported fill (Control Measures I15-I8). Thus, potential safety and health impacts are less than significant.

Mitigation Measures

None required.

J. HYDROLOGY AND WATER QUALITY

SETTING

This section addresses hydrology and water quality. Pertinent information on existing surface and groundwater is provided below.

Regional Hydrology

The Project area is located within the Corte Madera Creek Watershed, a 28-square-mile area of eastern Marin County. San Anselmo Creek borders a portion of the Nokomis alignment while Sleepy Hollow Creek borders the Butterfield alignment (Figures 5 and 6. Sleepy Hollow Creek is tributary to San Anselmo Creek. Further downstream at its confluence with Ross Creek, San Anselmo Creek becomes Corte Madera Creek which drains into a tidal salt marsh at Kentfield and then into San Francisco Bay near Corte Madera.

Flood Hazard

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map for Marin County provides coverage for the Project area.[24] Most of the Nokomis alignment is within Zone X, the 500-year (0.2% annual chance) San Anselmo Creek floodplain. A portion of the Nokomis alignment near San Anselmo Creek is within the 100-year (Zone AE) floodplain. Most of the Butterfield alignment is outside the Sleepy Hollow Creek floodplain. Only a small portion of the alignment near Sir Francis Drake Boulevard is within Zone AE, the 100-year (1% annual chance) floodplain with base flood elevation is determined.

Groundwater

The Project area is within the Central Basin of San Francisco Bay. This basin is not used for municipal drinking water or for major agricultural use. As discussed in Section G, the Geotechnical Studies found that shallow groundwater occurs in the Project area and that this groundwater will be likely be encountered during the deeper excavation activities along the Project alignments. This is important information because the Contractor will need to design and install dewatering systems for construction of some Project improvements.

IMPACT ANALYSIS

Control Measures Incorporated by RSVD

J1. Contractor shall submit a plan for all excavation dewatering procedures to RVSD for approval prior to performing dewatering operations as specified in the Contract Documents. The dewatering plan shall provide for:

a. Use of appropriate equipment and means to accomplish dewatering and may include use of wells, well points, sump pumps, storage tanks, settling tanks, filters, temporary pipelines for water disposal, rock or gravel placement, standby pumps and/or generators, and other means.

b. Compliance with any permitting requirements of RVSD, Central Marin Sanitation Agency, RWQCB and the Town.

c. A dry excavation and preservation of the final lines and grades of the bottoms of excavation with drawdown of groundwater level a minimum of 2 feet below the trench bottom and beyond excavation sidewalls where shoring is not designed to resist hydrostatic pressures.

d. Control of the rate and effect of dewatering so as to avoid settlement, subsidence, or damage to the structures or facilities adjacent to areas of proposed dewatering with repair, restoration or replacement of facilities or structures damaged. Contractor shall establish reference points daily to quickly detect any settlement, subsidence, or damage that may develop during or following dewatering operations. See Control Measures G7.

e. Demonstrated compliance with the Contractor – designed shoring and bracing method.

f. Disposal of collected groundwater. Discharge options include the sanitary sewer system or the storm drain system. Pretreatment may be required.

g. Minimal interference with vehicle or pedestrian traffic.

J2. Implement Control Measures I15-I18 for handling and disposal of contaminated soil and groundwater, if encountered.

J3. Comply with the requirements of the approved WPCP (see Control Measure G12).

Significance Criteria

RESOURCE CATEGORY / SIGNIFICANCE CRITERIA	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Beneficial Impact	Information Sources
J. <u>HYDROLOGY AND WATER QUALITY</u>						
Would the Project:						
1) Violate any water quality standards or waste discharge requirements?	☐	☐	☐	☐	☒	9
2) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of preexisting nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☒	☐	☐	9, 18, 19
3) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation on or off site?	☐	☐	☒	☐	☐	9
4) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on or off site?	☐	☐	☒	☐	☐	9
5) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☐	☐	☒	☐	☐	9
6) Otherwise substantially degrade water quality?	☐	☐	☒	☐	☐	9

RESOURCE CATEGORY / SIGNIFICANCE CRITERIA	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Beneficial Impact	Information Sources
7) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	☒	☐	9
8) Place within a 100-year flood hazard area structures that would impede or redirect flood flows?	☐	☐	☐	☒	☐	9
9) Expose people or structures to a significant risk of loss, injury or death involving flooding as a result of the failure of a levee or dam, or inundation by seiche, tsunami, or mudflow?	☐	☐	☐	☒	☐	9

Beneficial Impacts: Criterion J1

The proposed Project is one of a series of RVSD projects that are included in their Infrastructure Asset Management Plan (IAMP).[5] The IAMP includes projects to rehabilitate and replace the District's deficient wastewater facilities through the year 2020. The IAMP is in response to RWQCB CDO No. R2-2013-0020.[4] Construction of the Project helps assure compliance with the RWQCB order and is a beneficial impact.

No Impacts: Criteria J7-J9

The Project does not involve placement of housing within a 100-year flood hazard area (Criterion J7). Only small portions of the Project alignment are within the 100-year floodplain as discussed above. Work in these areas would be temporary and there would not be any permanent above-ground structures that would impede or redirect flood flows (Criterion J8). Relative to CEQA-Plus requirements, the Project is compliant with Executive Order 11988 (Floodplain Management). Criterion J9 is not relevant to the proposed Project.

Less-Than-Significant Impacts: Criteria J2-J6

Groundwater: Criterion J2. Criterion J2 relates to groundwater depletion or interference with groundwater recharge. The Contractor will likely encounter shallow groundwater during excavation which must be removed. Control Measure J1 requires the Contractor to have approved plans for the proposed dewatering system. The Project is a short-term construction activity which would have a less than significant impact relative to groundwater depletion.

Drainage Patterns: Criteria J3, J4. These criteria relate to the alteration of the existing drainage patterns in a manner that would result in substantial erosion or flooding on or off site. The Project involves rehabilitation and replacement of sewer lines within existing easement areas of the RVSD without altering the existing drainage pattern of the area. Work areas will be returned to pre-Project conditions. Existing drainage patterns will not be significantly affected.

Runoff and Water Quality: Criteria J5, J6. These criteria address runoff and water quality. Water from the dewatering activities must be properly disposed of by the Contractor. As indicated in Control Measure J1, pretreatment may be required prior to disposal to RVSD's sewer collection system or storm drain system. Potentially contaminated soil and groundwater will be handled and disposed of pursuant to Control Measure J2. Control Measure J3 provides for complying with the requirements of an approved WPCP. Thus, the impact relative to Criteria J5 and J6 is less than significant.

Mitigation Measures

None required.

K. LAND USE AND PLANNING

IMPACT ANALYSIS

Control Measures Incorporated by RVSD

None.

Significance Criteria

RESOURCE CATEGORY / IGNIFICANCE CRITERIA	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Beneficial Impact	Information Sources
K. LAND USE AND PLANNING						
Would the Project:						
1) Physically divide an established community?	☐	☐	☐	☒	☐	9
2) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the Project (including, but not limited to, the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☒	☐	9
3) Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	☒	☐	9

No Impacts: Criteria K1-K3

The proposed Project is a high priority wastewater collection system improvement consistent with RVSD's responsibility to provide high quality wastewater collection and disposal service for the local community which is protective of public health and the environment. The Project will not divide an established community (Criterion K1), and is consistent with local general plans and zoning designations (Criterion K2). Criterion K3 is not relevant as there is no habitat or natural community plan governing the Project area. Pursuant to CEQA-Plus requirements, the Project is not within the Coastal Zone, nor subject to the requirements of the Bay Conservation and Development Commission, and thus, provisions of the Coastal Zone Management Act do not apply.

Mitigation Measures

None required.

L. MINERAL RESOURCES

SETTING

There are currently no significant mineral deposits or active mining operations within the Town.

IMPACT ANALYSIS

Control Measures Incorporated by RVSD

None.

Significance Criteria

RESOURCE CATEGORY / SIGNIFICANCE CRITERIA	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Beneficial Impact	Information Sources
L. MINERAL RESOURCES						
Would the Project:						
1) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☒	☐	9
2) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☐	☒	☐	9

No Impacts: Criteria L1, L2

The proposed Project includes excavation activities within existing easements and right-of-ways and would not impact known mineral resources.

Mitigation Measures

None required.

M. NOISE

SETTING

As shown on Figure 5 and 6, residential areas and Brookside Elementary School are the primary noise sensitive land uses which border the Project alignments. The existing noise environment of the Project area is dominated by traffic using local roadways. The Project is within the Town and subject to noise regulations of this jurisdiction. As discussed in Chapter 1, the Project is a short-term construction activity that will replace and upgrade sewer lines with no new significant operational noise sources.

Town of San Anselmo Noise Control Regulations

Noise control regulations of the Town are contained in Title 4, Chapter 7, Article 2 of the Town Code.[25] Those requirements that apply to construction and demolition activities are summarized below:

a. It shall be unlawful to operate any powered equipment if the operation of such equipment emits a noise level 80 decibels (dBA) when measured at the loudest point 50 feet from the equipment.

b. Impact tools and equipment shall be excluded from the provisions of the above requirement provided, additionally, such impact tools and equipment have intake and exhaust mufflers recommended by the manufacturers. In lieu of or in the absence of manufacturers' recommendations, the Director of Public Works shall have the authority to prescribe such means of accomplishing maximum noise attenuation as he deems to be in the public interest, considering the available technology and economic feasibility.

c. Construction or demolition work may occur during the following times: Monday through Friday from 7:00 a.m. to 7:00 p.m.; Saturdays from 9:00 a.m. to 5:00 p.m.; and Sundays from 12:00 p.m. to 5:00 p.m.

   Construction or demolition work shall be allowed at any time provided the noise level does not exceed 5 dBA above the ambient of the nearest property line with allowance for construction factors per subsection (b) of Section 4.7.104 of Article 1 of Chapter 7.

d. Emergency work is excluded from these requirements.

Appropriate requirements would be contained in encroachment permits issued by the Town.

IMPACT ANALYSIS

Control Measures Incorporated by RSVD

M1. Comply with all applicable provisions of Section 7-1.01I, "Sound Control Requirements," of Caltrans Standard Specifications and Contract Documents.

M2. Comply with the Town Code that regulates noise levels.

M3. During the encroachment permit process, the Contractor will coordinate with the Town and RVSD on allowable work hour limitations which are consistent with the Town's noise ordinance. Working hour limitations included in the Project Contract Documents will be generally limited to 8 a.m. to 5 p.m. on weekdays and 9 a.m. to 6 p.m. on weekends and holidays. Work hours beyond these referenced limits must be approved by RVSD and the Town. More specific work hour limitations may be required by the Town.

M4. Avoid the use of loud sound signals in favor of light warnings except those required by safety laws for the protection of personnel.

M5. Equip internal combustion engines with a muffler of a type recommended by the manufacturer. No internal combustion engine shall be operated without said muffler.

M6. To minimize noise levels, attempt to obtain electrical power from PG&E in lieu of providing power by portable generator. If use of utility power is not practicable, generator power may be provided by sound-attenuated and enclosed electric generators. Diesel generators shall not be utilized unless they are provided with sound enclosures, as necessary to comply with local ordinances.

M7. Use of radio or other music amplification devices will not be permitted in the work area.

M8. Implement a vibration monitoring and correction program to protect buildings, structures, and utilities from extensive vibration during construction (Control Measure G8).

M9. Provide written notice to all private property owners along the alignment three times before work commences in the vicinity of said property. The notices will be provided 7 days before planned construction, 24 hours prior to start of work, and day of construction, and will provide information on Project activities, the construction schedule, protocol for providing complaints relative to hazardous conditions and noise, and vehicle access needs.

M10. If noise complaints are received, identify the source, evaluate and implement available abatement.

Significance Criteria

RESOURCE CATEGORY / SIGNIFICANCE CRITERIA	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Beneficial Impact	Information Sources
M. <u>NOISE</u>						
Would the Project result in:						
1) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☒	☐	☐	25
2) Exposure of persons to, or generation of, excessive groundborne vibration or groundborne noise levels?	☐	☐	☒	☐	☐	9
3) A substantial permanent increase in ambient noise levels in the Project vicinity above levels existing without the Project?	☐	☐	☒	☐	☐	9
4) A substantial temporary or periodic increase in ambient noise levels in the Project vicinity above levels existing without the Project?	☐	☐	☒	☐	☐	9
5) For a project located within 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, would the Project expose people residing or working in the Project area to excessive noise levels?	☐	☐	☐	☒	☐	9
6) For a project within the vicinity of a private airstrip, would the Project expose people residing or working in the Project area to excessive noise levels?	☐	☐	☐	☒	☐	9

No Impacts: Criteria M5,M6

The Project is not within the vicinity of an airport or private airstrip.

Less-Than-Significant Impacts: Criteria M1-M4

These criteria relate to substantial or excessive increases in noise or vibration levels. As discussed in Chapter 1, the Project is a short-term construction activity using traditional standard construction and engineering soils practices and equipment. Figures 3 and 4 illustrate the construction characteristics along the Nokomis and Butterfield alignments. Excavation activities are limited in extent. Noise levels will increase due to construction activities as will vibration levels at the point of excavation, but these levels should not be excessive or permanent.

Control measures have been included in the Project to further minimize the potential for excessive noise or vibration levels. In addition to complying with requirements of Caltrans and the Town (Control Measures M1 and M2), work hours would be limited to the extent possible (Control Measure M3), though it is recognized that construction activities may also need to occur outside traditional work hour periods. Control Measures M4 through M7 include additional site controls to minimize noise generation. Control Measure M8 requires the Contractor to implement a vibration monitoring and correction program to protect buildings, structures, and utilities from extensive vibration during construction. Control Measures M8 and M9 provide for ongoing coordination with local residents and businesses regarding construction activities and protocol for providing complaints, addressing the issue, and notifying the complainant(s) of the results. With incorporation of these control measures, impacts related to increased noise levels are less than significant.

Mitigation Measures

None required.

N. POPULATION AND HOUSING

IMPACT ANALYSIS

Control Measures Incorporated by RVSD

None.

Significance Criteria

RESOURCE CATEGORY / SIGNIFICANCE CRITERIA	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Beneficial Impact	Information Sources
N. POPULATION AND HOUSING						
Would the Project:						
1) Induce substantial population growth in an area, either directly (for example, by proposing new homes and business) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☐	☒	☐	9
2) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒	☐	9
3) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒	☐	9

No Impacts: Criteria N1-N3

The primary objective of the Project is to relieve hydraulic and structural deficiencies in this portion of RVSD's collection system. Improvements will be made within existing easements and public right-of-ways. As shown on Figures 3 and 4, both the Nokomis and Butterfield alignments include new upsized diversion sewers which will replace existing pipelines. Benefits include avoiding unnecessary improvement costs otherwise needed for the abandoned lines, reduced maintenance costs, reduced surcharging, and eliminating some sewers which are difficult to access. Some pipe upsizing is needed to meet RVSD minimum pipe size standards. The Project has no impacts related to population growth and demographics (Criterion N1). The Project will also not displace existing housing or substantial numbers of people (Criteria N2 and N3). Pursuant to CEQA-Plus requirements, the Project will have no effect on minority and low-income populations (Executive Order 12989 – Environmental Justice).

Mitigation Measures

None required.

O. PUBLIC SERVICES

IMPACT ANALYSIS

Control Measures Incorporated by RVSD

None.

Significance Criteria

RESOURCE CATEGORY / SIGNIFICANCE CRITERIA	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Beneficial Impact	Information Sources
O. PUBLIC SERVICES						
Would the Project:						
1) Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, the construction of which would cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the public services:						
a) Fire protection?	☐	☐	☐	☒	☐	9
b) Police protection?	☐	☐	☐	☒	☐	9
c) Schools?	☐	☐	☐	☒	☐	9
d) Parks?	☐	☐	☐	☒	☐	9
e) Electrical power or natural gas?	☐	☐	☐	☒	☐	9
f) Communication?	☐	☐	☐	☒	☐	9
g) Other public facilities?	☐	☐	☐	☒	☐	9

No Impacts: Criteria O1a-O1g

The proposed Project will have no public service impacts.

Mitigation Measures

None required.

P. RECREATION

IMPACT ANALYSIS

Control Measures Incorporated by RVSD

None.

Significance Criteria

RESOURCE CATEGORY / SIGNIFICANCE CRITERIA	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Beneficial Impact	Information Sources
P. <u>RECREATION</u>						
Would the Project:						
1) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☒	☐	9
2) Include recreational facilities or require the construction of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☐	☒	☐	9

No Impacts: Criteria P1, P2

The proposed Project will not increase the use of local parks nor will it involve construction of new facilities.

Mitigation Measures

None required.

Q. TRANSPORTATION/TRAFFIC

SETTING

Figures 3-6 show the streets that will be affected by the Project. The Nokomis alignment will affect Madrone Avenue and Sycamore Avenue. The Butterfield alignment will affect Butterfield Road, Willow Way, Meadowcroft Way, Broadmoor Avenue, and Sir Francis Drake Boulevard.

According to San Anselmo's General Plan, the Town's roadway network is comprised of arterial, collector, and local residential streets.[13] There are no freeways or expressways within the Town limits. However, due to the Town's location in the upper Ross Valley, the major arterial streets serve as thoroughfares for regional traffic moving to and from Fairfax, Sleepy Hollow, and central and west Mann. The traffic on the Town's arterials is not only weekday traffic, but includes weekend recreational traffic to state and national parks located in central and west Marin. Project-affected major arterial streets in San Anselmo include:

- Butterfield Road – a two-lane arterial which connects the unincorporated community of Sleepy Hollow with Sir Francis Drake Boulevard.

- Sir Francis Drake Boulevard – a four-lane arterial which traverses the community between the Towns of Fairfax and Ross.

Broadmoor Avenue is classified as a residential collective street in the Town's General Plan, while the remaining Project-affected streets are classified as local residential streets.

IMPACT ANALYSIS

Control Measures Incorporated by RVSD

Q1. Obtain an encroachment permit from the Town and comply with permit conditions.

Q2. Prepare a TCP and submit it to RVSD and the Town for review and approval at least three weeks prior to start of construction. The TCP shall include, at a minimum, the following provisions:

a. Limit construction work as stipulated in Control Measure M3 or as otherwise required by the Town.

b. Conduct operations to reduce obstruction and inconvenience to public traffic and have under construction no greater length or amount of work than can be properly undertaken with due regard to the rights of the public.

c. Avoid blocking driveways or private roads without notifying the property owner, and access must be restored during all non-working hours.

d. Maintain safe access for pedestrian and bicyclist traffic throughout the work area at all times.

e. To the extent possible, maintain at least one lane of traffic in each direction open at all times. Traffic shall be permitted to use shoulders and the side of the roadbed opposite the one under construction. When sufficient width is available, a passageway wide enough to accommodate one lane of traffic shall be kept open at locations where construction operations are in active progress and it is safe to do so.

f. The Contractor shall be responsible for notifying police and fire departments, the school district, ambulance services, and local transit districts as to the hours and dates of closure and routes of detour at least 48 hours in advance of their occurrence, and again to notify them when they are discontinued.

g. The Contractor shall call local emergency services dispatcher(s) daily with the location of the work and road status.

h. Avoid blocking or obstructing fire lanes at all times. Fire hydrants on or adjacent to the work will be kept accessible to firefighting equipment at all times.

i. Utilize certified flagmen to direct vehicular traffic through the construction area and to guard all obstructions to traffic, and illuminate at night. Traffic control will include signs, warning lights, reflectors, barriers, and other necessary safety devices and measures. These measures shall conform to the requirements set forth in the current "Manual of Traffic Controls for Construction and Maintenance Work Zones," issued by the State Department of Transportation, latest edition.

j. Install and maintain temporary bridges of approved construction (ADA compliant) across the trench at all crosswalks, intersections, and at such other points where traffic conditions make it advisable.

k. Repair excavated areas to the requirements of the Town.

l. Use only approved haul routes for all construction traffic on the Project as may be stipulated by the Town.

m. A maximum delay of 10 minutes shall be allowed on a roadway if it does not create a significant or dangerous area of traffic congestion away from the traffic control area. The Town has the right to reduce the 10-minute traffic-related delay if traffic conditions require it in their opinion. The maximum delay for access to a residence

or business is 10 minutes. The Contractor shall have materials on site to provide safe passage across the work zone and shall install said material when a person in a vehicle requests access to the residence or business.

n. Avoid storing or parking material or equipment where it would interfere with the free and safe passage of public traffic, and at the end of each day's work, and at all times when construction operations are suspended for any reason.

o. Immediately remove any spillage on local roadways resulting from hauling operations.

p. The Contractor may organize parking and staging independently. However, no sidewalks or private property adjacent to the site shall be used for storage of equipment and supplies unless prior written approval is obtained from the legal owner and submitted to the Construction Manager a minimum of 14 days before use of the site. Otherwise, parking and staging may be allowed only within the public right-of-way, if any, designated for such use by the Project Manager. Minimize the removal of curb parking but, if necessary removal shall be in accordance with the approved TCP.

q. Coordinate with the Central Marin Police Authority and the Town's Public Works Department for the location of "No Stopping" and "No Parking" signs.

r. Where construction work will disrupt the traffic signal loops at an intersection, the Contractor shall install and have operational a temporary detection system that is compatible with the traffic signal controller at that location as approved by the Town. The temporary detection system for the Project will be dependent on the Contractor's work sequence. The temporary detection system is a temporary traffic control device that shall not be removed/relocated until the permanent traffic signal loops are reinstalled and accepted by local jurisdictions.

s. In the event of a declared emergency by the Central Marin Police Authority Chief of Police, the local Captain of the Highway Patrol, or the Marin County Fire Department Fire Marshal, or their representative, the Contractor shall comply with verbal demands and immediately stop all work and reopen through traffic where work is occurring.

t. Provide, install, and maintain for the duration of the Project up to four Project signs pursuant to the requirements of local jurisdictions.

Q3. Contact the Marin Transit District, inform them of the construction schedule, and coordinate work in areas that may affect access to bus stops.

Significance Criteria

RESOURCE CATEGORY / SIGNIFICANCE CRITERIA	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Beneficial Impact	Information Sources
Q. <u>TRANSPORTATION/TRAFFIC</u>						
Would the Project:						
1) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?	☐	☐	☒	☐	☐	9
2) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?	☐	☐	☒	☐	☐	9
3) 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?	☐	☐	☐	☒	☐	9
4) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g. farm equipment)?	☐	☐	☒	☐	☐	9
5) Result in inadequate emergency access?	☐	☐	☒	☐	☐	9
6) Conflict with adoptive policies, plans or programs regarding public transit, bicycle or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?	☐	☐	☒	☐	☐	9

No Impacts: Criterion Q3

The Project has no issues associated with changes to air-, rail-, or water-borne traffic patterns.

Less-Than-Significant Impacts: Criteria Q1, Q2, Q4-Q6

These criteria relate to effects on the circulation system, safety, and emergency access. There are no new long-term operational traffic issues as the Project is a short-term construction activity.

As discussed in Chapter 1, the Project includes construction of about 8,700 linear feet of pipe. Of this, about 5,000 feet would be constructed by open cut, 400 feet by pipe bursting, 400 feet by pipe reaming, 500 feet by CIPP, and 500 feet by PTGB. Additionally, about 1,900 linear feet of laterals would be extended or replaced by open cut and about 30 manholes would be replaced or installed. Insertion and receiving pits would also be needed for pipe bursting. For example, from 50-150 linear feet per day of sewer lines can be constructed by open cut construction depending on pipe size, and about 100 feet per day can be replaced by pipe bursting.[15]

The Project is a standard construction activity requiring equipment, materials, removal and off-site transport of construction debris and workers, and import of clean fill. The added number of vehicle trips would be minimal and by themselves not overload traffic flow. However, the intrusion of construction equipment and vehicles into the local street system of this residential area, especially Sir Francis Drake Boulevard and Butterfield Road, can result in traffic circulation and safety impacts.

RVSD and Harris and Associates have met with Town staff on several occasions regarding the Project.[6] It was discussed that Butterfield Road provides significant challenges in traffic control and phasing. Major schedule constraints on Butterfield Road include:

- Full closure of Butterfield Road is not an option with the exception of very short time periods.

- The ideal construction window near Butterfield Elementary School in a given year would be between mid-June and mid-August.

Given the constraints above, work on Butterfield Road would require detours. These detours are being coordinated with the Town. A summary of detour information, as well as school and bus schedules, can be found on the Summary of Butterfield Construction Constraints included as Appendix E.

Construction activity will be highly regulated, governed by the Contract Documents and an encroachment permit the Contractor will need to obtain from Town (Control Measure Q1). A TCP (Control Measure Q2) is a key component of construction activity regulation, which must be prepared by the Contractor and approved by the Town. As indicated earlier, the TCP will address a variety of issues related to work hour limitations, property accessibility, traffic flow, pedestrian access and safety, road closures, pavement and hardscape restoration, emergency access, traffic safety controls, haul routes, staging areas, and coordination with local police and fire district authorities as necessary. Control Measure Q3 requires coordination with Marin Transit District regarding the Project and access to bus stops.

RVSD and Harris & Associates have been working with the Town on the encroachment permit process and development of a TCP (Control Measures Q1 and Q2). Parisi Transportation consulting has been retained by RVSD to analyze the Project's proposed construction phasing and traffic detour plan. Their report is included as Appendix F. Ongoing consultation with the Town may result in refinements to the analysis, though the bulk of the report is expected to remain unchanged. The main issue being addressed relates to construction phasing.

As with any construction project in an urban environment, local residents, motorists, pedestrians, and bicyclists will experience some inconvenience due to the short-term Project construction activities. However, control measures will be implemented to reduce impacts to traffic flow and safety, emergency access, parking, and to roadways to less than significant levels.

Mitigation Measures

None required.

R. UTILITIES AND SERVICE SYSTEMS

IMPACT ANALYSIS

Control Measures Incorporated by RVSD

None.

Significance Criteria

RESOURCE CATEGORY / SIGNIFICANCE CRITERIA	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Beneficial Impact	Information Sources
R. <u>UTILITIES AND SERVICE SYSTEMS</u>						
Would the Project:						
1) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☐	☒	☐	9
2) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒	☐	9
3) Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒	☐	9
4) Have sufficient water supplies available to serve the Project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☐	☒	☐	9
5) Result in a determination by the wastewater treatment provider which serves or may serve the Project that it has adequate capacity to serve the Project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	☒	☐	9
6) Be served by a landfill with sufficient permitted capacity to accommodate the Project's solid waste disposal needs?	☐	☐	☒	☐	☐	9

RESOURCE CATEGORY / SIGNIFICANCE CRITERIA	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Beneficial Impact	Information Sources
7) Comply with federal, state, and local statues and regulations related to solid waste?	☐	☐	☒	☐	☐	9

No Impacts: Criteria R1-R5

As a wastewater collection system improvement project, the proposed Project has no issues related to wastewater treatment requirements of the RWQCB (Criterion R1), construction of new water or wastewater treatment facilities or stormwater drainage facilities (Criteria R2 and R3), or wastewater treatment capacity (Criterion R5). Any water use during construction would be negligible, would be available from an on-site source, with no impact to local water supplies (Criterion R4).

Less-Than-Significant Impacts: Criteria R6, R7

These criteria address the waste disposal needs of the Project and compliance with solid waste regulations. Various solid waste materials will be generated by the Project, such as clearing and grubbing materials, roadway asphalt, concrete, soil and miscellaneous debris. Standard measures in the construction industry are to have the materials recycled to the extent possible and to dispose the remainder at a permitted landfill facility. The impact is less than significant.

Mitigation Measures

None required.

S. MANDATORY FINDINGS OF SIGNIFICANCE

IMPACT ANALYSIS

Significance Criteria

RESOURCE CATEGORY / SIGNIFICANCE CRITERIA	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Beneficial Impact	Information Sources
S. <u>MANDATORY FINDINGS OF SIGNIFICANCE</u>						
1) Does the Project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☒	☐	☐	☐	9, 15, 17
2) Does the Project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of current projects, and the effects of probable future projects)?	☐	☐	☒	☐	☐	9
3) Does the Project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☒	☐	☐	9

Criterion R1. Criterion R1 addresses whether construction of the proposed Project would have significant biological or cultural resource impacts. Based on the analysis in this IS, this impact is less than significant with mitigation incorporated relative to cultural resources.

Biological impacts are less than significant as discussed in the BRA, due to the extent of past development and absence of suitable habitat. Control measures have been incorporated into the Project by RVSD to provide for preconstruction surveys of the APE, securing of any required authorizations from regulatory agencies and compliance with conditions, compliance with the requirements of a WPCP and a tree removal permit from the Town if required, and following necessary precautions to avoid damaging other landscaping during construction.

The Project APE is in an area of high cultural resource sensitivity due to close proximity of recorded sites and perennial water resources. The Phase I Cultural Resources Evaluation concludes no historic properties will be affected and the Project would be in compliance with Section 106 of the NHPA. Control measures have been included in the Contract Documents to address cultural resources and a mitigation strategy is summarized in Section E to reduce potential impacts to less than significant levels.

Criterion R2. Cumulative impacts are less than significant. The Project is a short-term construction activity so the impacts that do occur as discussed in this IS will be both temporary and spatially limited. Discussions have been held by Harris Associates and RVSD with the Town and Marin Municipal Water District to coordinate Project construction with roadway and utility projects of these entities.

Criterion R3. Criterion R3 addresses adverse effects on human beings. Worker and public health and safety were discussed in various sections of this IS, including air quality, geology and soils, hazards and hazardous materials, noise and vibration, transportation/traffic, and utilities and service systems. In all instances, specific control measures have been included as necessary in the Project to reduce impacts to worker and public health and safety to less than significant levels. It should be noted that the proposed Project will replace infrastructure that is past its useful life, improve maintenance operations and safety and reduce SSOs. Thus, the impact related to public health and environmental hazards is beneficial.

Chapter 4

CHECKLIST AND INFORMATION SOURCES

1. Town of San Anselmo General Plan Land Use Map.
2. Town of San Anselmo Zoning Map.
3. MWH. Sanitary District No. 1 of Marin County (Ross Valley Sanitary District). Sanitary Sewer Hydraulic Evaluation and Capacity Assurance Plan. Final Report. August 2006.
4. San Francisco Bay Regional Water Quality Control Board. Order No. R2-2013-0020. May 13, 2013.
5. V.W. Housen & Associates. Sanitary District No. 1 of Marin County. Infrastructure Asset Management Plan. October 1, 2013.
6. Harris Associates. Basis of Design Report. Lower Butterfield Relief Improvements Project. September 8, 2017.
7. Harris Associates. Plans for the Construction of the FY 2016/17 Gravity Sewer Improvement Project, 90% Submittal. October 12, 2017.
8. Harris Associates. FY 2016/17 Gravity Sewer Improvement Project Proposal. Notice to Contractors, and Specifications, 90% Submittal. May 2017.
9. Professional judgment and expertise of the environmental specialist preparing this assessment, based upon a review of the Project alignments and surrounding conditions, and a review of engineering documents.
10. http://www.conservation.ca.gov
11. BAAQMD. CEQA Air Quality Guidelines. May 2017.
12. BAAQMD Spare the Air Cool the Climate: A Blueprint for Clean Air and Climate Protection in the Bay Area. April 2017.
13. Town of San Anselmo General Plan. As Amended.
14. Sacramento Air Quality Management District. Roadway Construction Emissions Model Version 8.1.0 (May 2016). Available at: http://www.airquality.org/Businesses/CEQA-Land-Use-Planning/CEQA-Guidance-Tools
15. Kyle Carbert. Harris Associates. October 6, 2017.
16. Environmental Collaborative. Biological Resource Assessment for the FY2016/17 Gravity Sewer Improvement Project. October 2017.
17. Archeo-Tec. Phase 1 Cultural Resource Evaluation for the FY 2016/17 Gravity Sewer Improvement Project. October 2017.
18. Miller Pacific Engineering Group. Geotechnical Investigation FY 2016/17 Gravity Sewer Improvement Project. June 21, 2017.
19. Miller Pacific Engineering Group. Geotechnical Investigation FY 2016/17 Gravity Sewer Improvement Project. May 24, 2017.
20. Town of San Anselmo. Climate Action Plan. April 2011.
21. County of Marin. Final Climate Action Plan. Adopted November 10, 2015.
22. http://geotracker.swrcb.ca.gov
23. http://www.dtsc.ca.gov/SiteCleanup/CorteseList

24. FEMA. Flood Insurance Rate Map for Marin County. Panel 452 of 531. Map revised March 17, 2014 .
25. Town of San Anselmo. Town Code. Title 4, Chapter 7. Loud Noises.

APPENDIX A

Mitigation Monitoring and Reporting Plan

MITIGATION MONITORING AND REPORTING PLAN

The following mitigation measures shall be implemented to reduce the impact to less than significant levels:

Potential Impact	Mitigation Measure	Responsibility	Action	Completion Date
E. Cultural Resources				
ARCH 1,ARCH 2: Impact to prehistoric cultural resources.	ARCH 1. The archaeologist shall review the 100% Project design and meet with RVSD and the Engineer to review Project construction features. A monitoring program shall then be developed for RVSD and Engineer's review and approval. It is anticipated that the monitoring program will provide for full-time monitoring of ground disturbance associated with the Nokomis alignment and focused monitoring of the Butterfield alignment. Full-time monitoring in selected areas may be reduced to spot monitoring at the field director's discretion. If resources are encountered, ARCH 2 shall be implemented. ARCH 2. If resources are encountered, their potential significance will be evaluated and data can be recovered accordingly. Areas in proximity to shellmounds often have redeposited pockets or sparse shell midden resulting from removal/transport of shell materials. If such shell is found in the absence of any other cultural materials or human remains, or other cultural materials are present but deemed not historically significant, such materials shall be photographed and recorded. If the archaeologist identifies an intact and potentially significant archaeological resource, he or she shall develop a treatment plan in consultation with the RVSD, the SWRCB, the FIGR (in the event of a prehistoric site) and the State Historic Preservation Officer (SHPO). This plan would likely entail a program of systematic data recovery in which cultural materials are documented and removed.	Contractor	Condition Contract Documents, retain archeologist, RVSD to monitor compliance.	Prior to and during construction.

APPENDIX B

Air Quality Emissions Calculations

Lower Butterfield Relief Project
Open Cut Sewer Line Replacement by Open Cut

Construction Equipment Information

Construction Activity/ Schedule	Equipment Type	Quantity	Hp	Fuel Type (diesel/gas)	Daily (Hours)	Duration (days)	Daily Hrs Relative to 8 hr/day & Duration
Open Cut Sewer Replacement						**77**	
	Concrete/Industrial Saw	1	11	Gas	1	77	0.125
Total Length (ft) = 4,100	Mini Excavator	1	24	Diesel	7	37	0.420
	Medium Excavator	1	200	Diesel	7	40	0.455
	Pump	1	11	Diesel	7	32	0.364
	Other?						
Paving/Concrete Work	Rollers	1	32	Diesel	1	77	0.125
[for all open cut activities]	Sweeper	1	64	Gas	0.5	77	0.063
[for all open cut activities]	Skip Loader	1	74	Diesel	2	77	0.250
	Other?						

Construction Truck Information - Open Cut Sewer Line Replacement and Spot Repairs by Open Cut

Construction Activity	Truck Type	Average Daily (trucks/day)	Number of Days	Activity Total (days)
Open Cut Sewer Replacement	Haul Trucks			
	Material Import	1	77	77
	Material Export	1	77	77
	Cement Trucks			
	Asphalt Trucks			
	Equipment/Delivery Trucks	0.5	77	38.5
	Utility Trucks			
	Other Trucks			
Paving/Concrete Work	Haul Trucks			
[for all open cut activities]	Material Import	1	77	77
	Material Export			
	Cement Trucks			
	Asphalt Trucks	1	77	77
	Equipment/Delivery Trucks	0.5	77	38.5
	Utility Trucks			
	Other Trucks			

Lower Butterfield Relief Project

Open Cut Laterals Replacement or Extension by Open Cut

Construction Equipment Information

Construction Activity/ Schedule	Equipment Type	Quantity	Hp	Fuel Type (diesel/gas)	Daily (Hours)	Duration (days)	Daily Hrs Relative to 8 hr/day & Duration
Open Cut Lateral Replace/Extend						**11**	
	Concrete/Industrial Saw	1	11	Gas	1	11	0.125
Total Length (ft) = 1,700	Mini Excavator	1	24	Diesel	7	11	0.875
	Other?						
Paving/Concrete Work	Paving Equipment						
[for all open cut activities]	Paver						
	Rollers	1	32	Diesel	1	11	0.125
	Sweeper	1	64	Gas	0.5	11	0.0625
	Skip Loader	1	74	Diesel	2	11	0.250
	Other?						

Construction Truck Information - Open Cut Laterals Replacement or Extension by Open Cut

Construction Activity	Truck Type	Average Daily (trucks/day)	Number of Days	Activity Total (days)
Open Cut Lateral Replace/Extend	Haul Trucks			
	Material Import	1	11	11
	Material Export	1	11	11
	Cement Trucks			
	Asphalt Trucks			
	Equipment/Delivery Trucks	0.5	11	5.5
	Utility Trucks			
	Other Trucks			
Paving/Concrete Work	Haul Trucks			
[for all open cut activities]	Material Import	1	11	11
	Material Export			
	Cement Trucks			
	Asphalt Trucks	1	11	11
	Equipment/Delivery Trucks	0.5	11	5.5
	Utility Trucks			
	Other Trucks			

Lower Butterfield Relief Project
Pilot Tube Guided Boring (PTGB)

Construction Equipment Information

Construction Activity/ Schedule	Equipment Type	Quantity	Hp	Fuel Type (diesel/gas)	Daily (Hours)	Duration (days)	Daily Hrs Relative to 8 hr/day & Duration
PTGB						**42**	
	Pump	1	14	Gas	8	29	0.690
	Power Pack/Guided Boring machine	1	100	Diesel	8	29	0.690
	Mini Excavator	1	24	Diesel	2	29	0.173
	Other?						
Insertion/Receiving Pits	Skid Steer Loader	1	65	Diesel	4	13	0.155
[equipment use for all insertion	Excavator	1	200	Diesel	8	13	0.310
and receiving pits]	Drill Rig (for shoring)	1	375	Diesel	8	13	0.310
Insertion Pit = 12' diameter x 30'D							
Receiving Pit = 8'Wx8'Lx30'D	Other?						
Paving/Concrete Work	Rollers	1	32	Diesel	1	3	0.009
	Sweeper	1	64	Gas	0.5	3	0.004
	Skip Loader	1	74	Diesel	2	3	0.018
	Other?						

Construction Truck Information - Pilot Tube Guided Boring (PTGB)

Construction Activity	Truck Type	Average Daily (trucks/day)	Number of Days	Activity Total (days)
PTGB	Haul Trucks			
	Material Import	1	29	29
	Material Export	1	29	29
	Cement Trucks			
	Asphalt Trucks			
	Equipment/Delivery Trucks	1	29	29
	Utility Trucks			
	Other Trucks			
Insertion/Receiving Pits	Haul Trucks			
[for all pit construction activities]	Material Import	2	13	26
	Material Export	2	13	26
	Cement Trucks			
	Asphalt Trucks			
	Equipment/Delivery Trucks	1	13	13
	Utility Trucks			
	Other Trucks			
Paving/Concrete Work	Haul Trucks			
	Material Import	1	3	3
	Material Export			
	Cement Trucks			
	Asphalt Trucks	1	3	3
	Equipment/Delivery Trucks			
	Utility Trucks			
	Other Trucks			

Lower Butterfield Relief Project
Pipe Bursting and Lateral Disconnect/Reconnect

Construction Equipment Information

Construction Activity/ Schedule	Equipment Type	Quantity	Hp	Fuel Type (diesel/gas)	Daily (Hours)	Duration (days)	Daily Hrs Relative to 8 hr/day & Duration
Pipe Bursting						**9**	
	Pump	1	11	Diesel	7	9	0.875
	Wench	1	33	Diesel	2	9	0.25
	Other?						
Insertion/Receiving Pits	Concrete/Industrial Saw	1	11	Gas	1	9	0.125
[equipment use for all insertion and receiving pits]	Mini Excavator	1	24	Diesel	2	9	0.25
	Other?						
Laterals Disconnect/Reconnect	Concrete/Industrial Saw	1	11	Gas	1	2	0.028
[equipment use for all lateral connection work]	Mini Excavator	1	24	Diesel	2	2	0.056
	Other?						
Paving/Concrete Work	Rollers	1	32	Diesel	1	9	0.125
[for all pipe bursting activities]	Sweeper	1	64	Gas	0.5	9	0.063
	Skip Loader	1	74	Diesel	2	9	0.25
	Other?						

Construction Truck Information - Pipe Bursting and Lateral Disconnect/Reconnect

Construction Activity	Truck Type	Average Daily (trucks/day)	Number of Days	Activity Total (days)
Pipe Bursting	Haul Trucks			
	Material Import			
	Material Export			
	Cement Trucks			
	Asphalt Trucks			
	Equipment/Delivery Trucks	1	9	9
	Utility Trucks			
	Other Trucks			
Insertion/Receiving Pits	Haul Trucks			
[for all pit construction activities]	Material Import	0.5	9	4.5
	Material Export	0.5	9	4.5
	Cement Trucks			
	Asphalt Trucks			
	Equipment/Delivery Trucks	0.5	9	4.5
	Utility Trucks			
	Other Trucks			
Laterals Disconnect/Reconnect	Haul Trucks			
[for all lateral connection work]	Material Import	0.5	2	1
	Material Export	0.5	2	1
	Cement Trucks			
	Asphalt Trucks			
	Equipment/Delivery Trucks	0.5	2	1
	Utility Trucks			
	Other Trucks			
Paving/Concrete Work	Haul Trucks			
[for all pipe bursting activities]	Material Import	1	9	9
	Material Export			
	Cement Trucks			
	Asphalt Trucks	1	9	9
	Equipment/Delivery Trucks			
	Utility Trucks			
	Other Trucks			

Lower Butterfield Relief Project
Pipe Reaming and Lateral Disconnect/Reconnect

Construction Equipment Information

Construction Activity/ Schedule	Equipment Type	Quantity	Hp	Fuel Type (diesel/gas)	Daily (Hours)	Duration (days)	Daily Hrs Relative to 8 hr/day & Duration
Pipe Reaming						**8**	
	Pump	1	11	Diesel	7	8	0.875
	Boring Machine	1	66	Diesel	2	8	0.25
	Other?						
Insertion/Receiving Pits	Concrete/Industrial Saw	1	11	Gas	1	8	0.125
	Mini Excavator	1	24	Diesel	2	8	0.250
	Other?						
Laterals Disconnect/Reconnect	Concrete/Industrial Saw	1	11	Gas	1	2	0.031
	Mini Excavator	1	24	Diesel	2	2	0.063
	Other?						
Paving/Concrete Work	Rollers	1	32	Diesel	1	8	0.125
[for all pipe reaming activities]	Sweeper	1	64	Gas	0.5	8	0.063
	Skip Loader	1	74	Diesel	2	8	0.250
	Other?						

Construction Truck Information - Pipe Bursting and Lateral Disconnect/Reconnect

Construction Activity	Truck Type	Average Daily (trucks/day)	Number of Days	Activity Total (days)
Pipe Reaming	Haul Trucks			
	Material Import			
	Material Export			
	Cement Trucks			
	Asphalt Trucks			
	Equipment/Delivery Trucks	1	8	8
	Utility Trucks			
	Other Trucks			
Insertion/Receiving Pits	Haul Trucks			
[for all pit construction activities]	Material Import	0.5	8	4
	Material Export	0.5	8	4
	Cement Trucks			
	Asphalt Trucks			
	Equipment/Delivery Trucks	0.5	8	4
	Utility Trucks			
	Other Trucks			
Laterals Disconnect/Reconnect	Haul Trucks			
[for all lateral connection work]	Material Import	0.5	2	1
	Material Export	0.5	2	1
	Cement Trucks			
	Asphalt Trucks			
	Equipment/Delivery Trucks	0.5	2	1
	Utility Trucks			
	Other Trucks			
Paving/Concrete Work	Haul Trucks			
[for all pipe bursting activities]	Material Import	1	8	8
	Material Export			
	Cement Trucks			
	Asphalt Trucks	1	8	8
	Equipment/Delivery Trucks			
	Utility Trucks			
	Other Trucks			

Lower Butterfield Relief Project
Sewer Manhole Construction

Construction Equipment Information

Construction Activity/ Schedule	Equipment Type	Quantity	Hp	Fuel Type (diesel/gas)	Daily (Hours)	Duration (days)	Daily Hrs Relative to 8 hr/day & Duration
Manhole Construction						**19**	
[per manhole]	Concrete/Industrial Saw	1	11	Gas	1	19	0.125
	Excavator	1	24	Diesel	2	19	0.25
	Pump	1	11	Diesel	8	19	1.00
	Other?						
Paving/Concrete Work	Rollers	1	32	Diesel	1	19	0.125
[per manhole]	Sweeper	1	64	Gas	0.5	19	0.0625
	Skip Loader	1	74	Diesel	2	19	0.25
	Other?						

Construction Truck Information - New Sewer Manhole Construction

Construction Activity	Truck Type	Average Daily (trucks/day)	Number of Days	Activity Total (days)
Manhole Construction	Haul Trucks			
[per manhole]	Material Import	1	19	19
	Material Export	1	19	19
	Cement Trucks	1	19	19
	Asphalt Trucks			
	Equipment/Delivery Trucks	1	19	19
	Utility Trucks			
	Other Trucks			
Paving/Concrete Work	Haul Trucks			
[per manhole]	Material Import	1	19	19
	Material Export			
	Cement Trucks			
	Asphalt Trucks	1	19	19
	Equipment/Delivery Trucks			
	Utility Trucks			
	Other Trucks			

Nokomis Relief Project
Open Cut Sewer Line & Laterals Replacement

Construction Equipment Information

Construction Activity/ Schedule	Equipment Type	Quantity	Hp	Fuel Type (diesel/gas)	Daily (Hours)	Duration (days)	Daily Hrs Relative to 8 hr/day & Duration
Open Cut Sewer Replacement						**13**	
Total Length (ft) = 815	Concrete/Industrial Saw	1	11	Gas	1	13	0.125
	Mini Excavator	1	24	Diesel	4	13	0.5
	Pump	1	11	Gas	8	13	1.0
	Other?						
Paving/Concrete Work	Rollers	1	32	Diesel	1	13	0.125
[for all open cut activities]	Sweeper	1	64	Gas	0.5	13	0.0625
	Skip Loader	1	74	Diesel	2	13	0.25
	Other?						

Construction Truck Information - Open Cut Sewer & Laterals Replacement

Construction Activity	Truck Type	Average Daily (trucks/day)	Number of Days	Activity Total
Open Cut Sewer Replacement	Haul Trucks			
	Material Import	1	13	13
	Material Export	1	13	13
	Cement Trucks			
	Asphalt Trucks			
	Equipment/Delivery Trucks	0.5	13	6.5
	Utility Trucks			
	Other Trucks			
Paving/Concrete Work	Haul Trucks			
[for all open cut activities]	Material Import	1	13	13
	Material Export			
	Cement Trucks			
	Asphalt Trucks	1	13	13
	Equipment/Delivery Trucks	0.5	13	6.5
	Utility Trucks			
	Other Trucks			

Nokomis Relief Project
Cured in Place Pipe (CIPP) Process

Construction Equipment Information

Construction Activity/ Schedule	Equipment Type	Quantity	Hp	Fuel Type (diesel/gas)	Daily (Hours)	Duration (days)	Daily Hrs Relative to 8 hr/day & Duration
Cured-in-Place-Pipe (CIPP)						**1**	
	Pump	1	11	Diesel	8	1	1
	Other General Industrial Equip	1	88	Diesel	8	1	1
	Other?						
Paving/Concrete Work	Paving Equipment						
[for all CIPP activities]	Paver						
	Rollers						
	Sweeper						
	Other?						

Construction Truck Information - Cured in Place Pipe (CIPP) Process

Construction Activity	Truck Type	Average Daily (trucks/day)	Number of Days	Activity Total
Cured-in-Place-Pipe (CIPP)	CIPP Trucks	1	1	1
	Haul Trucks			
	Cement Trucks			
	Asphalt Trucks			
	Equipment/Delivery Trucks			
	Utility Trucks			
	Other Trucks			
Paving/Concrete Work	Haul Trucks			
[for all CIPP activities]	Material Import			
	Material Export			
	Cement Trucks			
	Asphalt Trucks			
	Equipment/Delivery Trucks			
	Utility Trucks			
	Other Trucks			

Nokomis Relief Project
Sewer Manhole Construction

Construction Equipment Information

Construction Activity/ Schedule	Equipment Type	Quantity	Hp	Fuel Type (diesel/gas)	Daily (Hours)	Duration (days)	Daily Hrs Relative to 8 hr/day & Duration
Manhole Construction						**4**	
	Concrete/Industrial Saw	1	11	Gas	1	4	0.125
	Mini Excavator	1	24	Diesel	2	4	0.25
	Pump	1	11	Diesel	8	4	1.0
	Other?						
Paving/Concrete Work	Rollers	1	32	Diesel	1	4	0.125
	Sweeper	1	64	Gas	0.5	4	0.0625
	Skip Loader	1	74	Diesel	2	4	0.25
	Other?						

Construction Truck Information - New Sewer Manhole Construction

Construction Activity	Truck Type	Average Daily (trucks/day)	Number of Days	Activity Total
Manhole Construction	Haul Trucks			
	Material Import	1	4	4
	Material Export	1	4	4
	Cement Trucks	1	4	4
	Asphalt Trucks			
	Equipment/Delivery Trucks	1	4	4
	Utility Trucks			
	Other Trucks			
Paving/Concrete Work	Haul Trucks			
	Material Import	1	4	4
	Material Export			
	Cement Trucks			
	Asphalt Trucks	1	4	4
	Equipment/Delivery Trucks			
	Utility Trucks			
	Other Trucks			

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Data Entry Worksheet

Note: Required data input sections have a yellow background.
Optional data input sections have a blue background. Only areas with a yellow or blue background can be modified. Program defaults have a white background.
The user is required to enter information in cells D10 through D24, E28 through G35, and D38 through D41 for all project types.
Please use "Clear Data Input & User Overrides" button first before changing the Project Type or begin a new project.

To begin a new project, click this button to clear data previously entered. This button will only work if you opted not to disable macros when loading this spreadsheet.

SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT

Input Type

Project Name	Butterfield- Open Cut Sewer	
Construction Start Year	2018	Enter a Year between 2014 and 2025 (inclusive)
Project Type For 4: Other Linear Project Type, please provide project specific off-road equipment population and vehicle trip data	4	1) New Road Construction : Project to build a roadway from bare ground, which generally requires more site preparation than widening an existing roadway 2) Road Widening : Project to add a new lane to an existing roadway 3) Bridge/Overpass Construction : Project to build an elevated roadway, which generally requires some different equipment than a new roadway, such as a crane 4) Other Linear Project Type: Non-roadway project such as a pipeline, transmission line, or levee construction
Project Construction Time	3.50	months
Working Days per Month	22.00	days (assume 22 if unknown)
Predominant Soil/Site Type: Enter 1, 2, or 3 (for project within "Sacramento County", follow soil type selection instructions in cells E18 to E20 otherwise see instructions provided in cells J18 to J22)	2	1) Sand Gravel : Use for quaternary deposits (Delta/West County) 2) Weathered Rock-Earth : Use for Laguna formation (Jackson Highway area) or the Ione formation (Scott Road, Rancho Murieta) 3) Blasted Rock : Use for Salt Springs Slate or Copper Hill Volcanics (Folsom South of Highway 50, Rancho Murieta)
Project Length	0.78	miles
Total Project Area	0.40	acres
Maximum Area Disturbed/Day	0.01	acres
Water Trucks Used?	2	1. Yes 2. No

Please note that the soil type instructions provided in cells E18 to E20 are specific to Sacramento County. Maps available from the California Geologic Survey (see weblink below) can be used to determine soil type outside Sacramento County.

http://www.conservation.ca.gov/cgs/information/geologic_mapping/Pages/googlemaps.aspx#regionalseries

Material Hauling Quantity Input

Material Type	Phase	Haul Truck Capacity (yd^3) (assume 20 if unknown)	Import Volume (yd^3/day)	Export Volume (yd^3/day)
Soil	Grubbing/Land Clearing	15.00	0.00	0.00
	Grading/Excavation	15.00	0.00	0.00
	Drainage/Utilities/Sub-Grade	15.00	30.00	15.00
	Paving	15.00	0.00	0.00
Asphalt	Grubbing/Land Clearing	15.00	0.00	0.00
	Grading/Excavation	15.00	0.00	0.00
	Drainage/Utilities/Sub-Grade	15.00	0.00	0.00
	Paving	15.00	30.00	0.00

Mitigation Options

On-road Fleet Emissions Mitigation	No Mitigation	Select "2010 and Newer On-road Vehicles Fleet" option when the on-road heavy-duty truck fleet for the project will be limited to vehicles of model year 2010 or newer
Off-road Equipment Emissions Mitigation	No Mitigation	Select "20% NOx and 45% Exhaust PM reduction" option if the project will be required to use a lower emitting off-road construction fleet. The SMAQMD Construction Mitigation Calculator can be used to confirm compliance with this mitigation measure (http://www.airquality.org/ceqa/mitigation.shtml). Select "Tier 4 Equipment" option if some or all off-road equipment used for the project meets CARB Tier 4 Standard

Road Construction Emissions Model, Version 8.1.0

Daily Emission Estimates for -> Butterfield- Open Cut Sewer

Project Phases (Pounds)	ROG (lbs/day)	CO (lbs/day)	NOx (lbs/day)	Total PM10 (lbs/day)	Exhaust PM10 (lbs/day)	Fugitive Dust PM10 (lbs/day)	Total PM2.5 (lbs/day)	Exhaust PM2.5 (lbs/day)	Fugitive Dust PM2.5 (lbs/day)	SOx (lbs/day)	CO2 (lbs/day)	CH4 (lbs/day)	N2O (lbs/day)	CO2e (lbs/day)
Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Drainage/Utilities/Sub-Grade	0.39	3.49	3.52	0.38	0.18	0.20	0.17	0.12	0.04	0.01	1,266.02	0.13	0.02	1,276.25
Paving	0.09	0.73	1.36	0.06	0.06	0.00	0.05	0.05	0.00	0.00	309.88	0.03	0.01	313.05
Maximum (pounds/day)	0.49	4.21	4.87	0.44	0.24	0.20	0.21	0.17	0.04	0.02	1,575.90	0.16	0.03	1,589.30
Total (tons/construction project)	0.02	0.16	0.19	0.02	0.01	0.01	0.01	0.01	0.00	0.00	60.67	0.01	0.00	61.19

Notes:

Project Start Year ->	2018
Project Length (months) ->	4
Total Project Area (acres) ->	0.4
Maximum Area Disturbed/Day (acres) ->	0.01
Water Truck Used? ->	No

	Total Material Imported/Exported Volume (yd^3/day)		Daily VMT (miles/day)			
Phase	Soil	Asphalt	Soil Hauling	Asphalt Hauling	Worker Commute	Water Truck
Grubbing/Land Clearing	0	0	0	0	0	0
Grading/Excavation	0	0	0	0	0	0
Drainage/Utilities/Sub-Grade	45	0	90	0	640	0
Paving	0	30	0	60	0	0

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns G and H. Total PM2.5 emissions shown in Column I are the sum of exhaust and fugitive dust emissions shown in columns J and K.

CO2e emissions are estimated by multiplying mass emissions for each GHG by its global warming potential (GWP), 1 , 25 and 298 for CO2, CH4 and N2O, respectively. Total CO2e is then estimated by summing CO2e estimates over all GHGs.

Total Emission Estimates by Phase for -> Butterfield- Open Cut Sewer

Project Phases (Tons for all except CO2e. Metric tonnes for CO2e)	ROG (tons/phase)	CO (tons/phase)	NOx (tons/phase)	Total PM10 (tons/phase)	Exhaust PM10 (tons/phase)	Fugitive Dust PM10 (tons/phase)	Total PM2.5 (tons/phase)	Exhaust PM2.5 (tons/phase)	Fugitive Dust PM2.5 (tons/phase)	SOx (tons/phase)	CO2 (tons/phase)	CH4 (tons/phase)	N2O (tons/phase)	CO2e (MT/phase)
Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Drainage/Utilities/Sub-Grade	0.02	0.13	0.14	0.01	0.01	0.01	0.01	0.00	0.00	0.00	48.74	0.00	0.00	44.58
Paving	0.00	0.03	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.93	0.00	0.00	10.93
Maximum (tons/phase)	0.015	0.134	0.135	0.015	0.007	0.008	0.006	0.005	0.002	0.00	48.74	0.00	0.00	44.58
Total (tons/construction project)	0.019	0.162	0.188	0.017	0.009	0.008	0.008	0.007	0.002	0.00	60.67	0.01	0.00	55.51

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns G and H. Total PM2.5 emissions shown in Column I are the sum of exhaust and fugitive dust emissions shown in columns J and K.

CO2e emissions are estimated by multiplying mass emissions for each GHG by its global warming potential (GWP), 1 , 25 and 298 for CO2, CH4 and N2O, respectively. Total CO2e is then estimated by summing CO2e estimates over all GHGs.

The CO2e emissions are reported as metric tons per phase.

Road Construction Emissions Model Version 8.1.0

Data Entry Worksheet

Note: Required data input sections have a yellow background.
Optional data input sections have a blue background. Only areas with a yellow or blue background can be modified. Program defaults have a white background.
The user is required to enter information in cells D10 through D24, E28 through G35, and D38 through D41 for all project types.
Please use "Clear Data Input & User Overrides" button first before changing the Project Type or begin a new project.

To begin a new project, click this button to clear data previously entered. This button will only work if you opted not to disable macros when loading this spreadsheet.

SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT

Input Type

Project Name	Butterfield- Open Cut Latrals	
Construction Start Year	2018	Enter a Year between 2014 and 2025 (inclusive)
Project Type For 4: Other Linear Project Type, please provide project specific off-road equipment population and vehicle trip data	4	1) New Road Construction : Project to build a roadway from bare ground, which generally requires more site preparation than widening an existing roadway 2) Road Widening : Project to add a new lane to an existing roadway 3) Bridge/Overpass Construction : Project to build an elevated roadway, which generally requires some different equipment than a new roadway, such as a crane 4) Other Linear Project Type: Non-roadway project such as a pipeline, transmission line, or levee construction
Project Construction Time	0.50	months
Working Days per Month	22.00	days (assume 22 if unknown)
Predominant Soil/Site Type: Enter 1, 2, or 3 (for project within "Sacramento County", follow soil type selection instructions in cells E18 to E20 otherwise see instructions provided in cells J18 to J22)	2	1) Sand Gravel : Use for quaternary deposits (Delta/West County) 2) Weathered Rock-Earth : Use for Laguna formation (Jackson Highway area) or the Ione formation (Scott Road, Rancho Murieta) 3) Blasted Rock : Use for Salt Springs Slate or Copper Hill Volcanics (Folsom South of Highway 50, Rancho Murieta)
Project Length	0.32	miles
Total Project Area	0.15	acres
Maximum Area Disturbed/Day	0.015	acres
Water Trucks Used?	2	1. Yes 2. No

Please note that the soil type instructions provided in cells E18 to E20 are specific to Sacramento County. Maps available from the California Geologic Survey (see weblink below) can be used to determine soil type outside Sacramento County.

http://www.conservation.ca.gov/cgs/information/geologic_mapping/Pages/googlemaps.aspx#regionalseries

Material Hauling Quantity Input

Material Type	Phase	Haul Truck Capacity (yd^3) (assume 20 if unknown)	Import Volume (yd^3/day)	Export Volume (yd^3/day)
Soil	Grubbing/Land Clearing	15.00	0.00	0.00
	Grading/Excavation	15.00	0.00	0.00
	Drainage/Utilities/Sub-Grade	15.00	30.00	15.00
	Paving	15.00	0.00	0.00
Asphalt	Grubbing/Land Clearing	15.00	0.00	0.00
	Grading/Excavation	15.00	0.00	0.00
	Drainage/Utilities/Sub-Grade	15.00	0.00	0.00
	Paving	15.00	30.00	0.00

Mitigation Options

On-road Fleet Emissions Mitigation	No Mitigation	Select "2010 and Newer On-road Vehicles Fleet" option when the on-road heavy-duty truck fleet for the project will be limited to vehicles of model year 2010 or newer
Off-road Equipment Emissions Mitigation	No Mitigation	Select "20% NOx and 45% Exhaust PM reduction" option if the project will be required to use a lower emitting off-road construction fleet. The SMAQMD Construction Mitigation Calculator can be used to confirm compliance with this mitigation measure (http://www.airquality.org/ceqa/mitigation.shtml). Select "Tier 4 Equipment" option if some or all off-road equipment used for the project meets CARB Tier 4 Standard

Road Construction Emissions Model, Version 8.1.0

Daily Emission Estimates for -> Butterfield- Open Cut Latrals

Project Phases (Pounds)	ROG (lbs/day)	CO (lbs/day)	NOx (lbs/day)	Total PM10 (lbs/day)	Exhaust PM10 (lbs/day)	Fugitive Dust PM10 (lbs/day)	Total PM2.5 (lbs/day)	Exhaust PM2.5 (lbs/day)	Fugitive Dust PM2.5 (lbs/day)	SOx (lbs/day)	CO2 (lbs/day)	CH4 (lbs/day)	N2O (lbs/day)	CO2e (lbs/day)
Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Drainage/Utilities/Sub-Grade	0.30	2.98	2.03	0.45	0.15	0.30	0.15	0.09	0.06	0.01	975.52	0.04	0.02	982.89
Paving	0.09	0.73	1.36	0.06	0.06	0.00	0.05	0.05	0.00	0.00	309.88	0.03	0.01	313.05
Maximum (pounds/day)	0.39	3.70	3.38	0.50	0.20	0.30	0.20	0.14	0.06	0.01	1,285.40	0.07	0.03	1,295.93
Total (tons/construction project)	0.00	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.07	0.00	0.00	7.13

Notes:

Project Start Year ->	2018
Project Length (months) ->	1
Total Project Area (acres) ->	0.2
Maximum Area Disturbed/Day (acres) ->	0.02
Water Truck Used? ->	No

	Total Material Imported/Exported Volume (yd^3/day)		Daily VMT (miles/day)			
Phase	Soil	Asphalt	Soil Hauling	Asphalt Hauling	Worker Commute	Water Truck
Grubbing/Land Clearing	0	0	0	0	0	0
Grading/Excavation	0	0	0	0	0	0
Drainage/Utilities/Sub-Grade	45	0	90	0	640	0
Paving	0	30	0	60	0	0

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns G and H. Total PM2.5 emissions shown in Column I are the sum of exhaust and fugitive dust emissions shown in columns J and K.

CO2e emissions are estimated by multiplying mass emissions for each GHG by its global warming potential (GWP), 1 , 25 and 298 for CO2, CH4 and N2O, respectively. Total CO2e is then estimated by summing CO2e estimates over all GHGs.

Total Emission Estimates by Phase for -> Butterfield- Open Cut Latrals

Project Phases (Tons for all except CO2e. Metric tonnes for CO2e)	ROG (tons/phase)	CO (tons/phase)	NOx (tons/phase)	Total PM10 (tons/phase)	Exhaust PM10 (tons/phase)	Fugitive Dust PM10 (tons/phase)	Total PM2.5 (tons/phase)	Exhaust PM2.5 (tons/phase)	Fugitive Dust PM2.5 (tons/phase)	SOx (tons/phase)	CO2 (tons/phase)	CH4 (tons/phase)	N2O (tons/phase)	CO2e (MT/phase)
Grubbing/Land Clearing	0.000	0.000	0.000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0.00	0.00
Grading/Excavation	0.000	0.000	0.000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0.00	0.00
Drainage/Utilities/Sub-Grade	0.002	0.016	0.011	0.0025	0.0008	0.0017	0.0008	0.0005	0.0003	0.00	5.37	0.00	0.00	4.90
Paving	0.001	0.004	0.007	0.0003	0.0003	0.0000	0.0003	0.0003	0.0000	0.00	1.70	0.00	0.00	1.56
Maximum (tons/phase)	0.002	0.016	0.011	0.002	0.001	0.002	0.001	0.000	0.000	0.00	5.37	0.00	0.00	4.90
Total (tons/construction project)	0.002	0.020	0.019	0.003	0.001	0.002	0.001	0.001	0.000	0.00	7.07	0.00	0.00	6.47

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns G and H. Total PM2.5 emissions shown in Column I are the sum of exhaust and fugitive dust emissions shown in columns J and K.

CO2e emissions are estimated by multiplying mass emissions for each GHG by its global warming potential (GWP), 1 , 25 and 298 for CO2, CH4 and N2O, respectively. Total CO2e is then estimated by summing CO2e estimates over all GHGs.

The CO2e emissions are reported as metric tons per phase.

Road Construction Emissions Model Version 8.1.0

Data Entry Worksheet

Note: Required data input sections have a yellow background.
Optional data input sections have a blue background. Only areas with a yellow or blue background can be modified. Program defaults have a white background.
The user is required to enter information in cells D10 through D24, E28 through G35, and D38 through D41 for all project types.
Please use "Clear Data Input & User Overrides" button first before changing the Project Type or begin a new project.

To begin a new project, click this button to clear data previously entered. This button will only work if you opted not to disable macros when loading this spreadsheet.

SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT

Input Type

Project Name	Butterfield- PTGB	
Construction Start Year	2018	Enter a Year between 2014 and 2025 (inclusive)
Project Type For 4: Other Linear Project Type, please provide project specific off-road equipment population and vehicle trip data	4	1) New Road Construction : Project to build a roadway from bare ground, which generally requires more site preparation than widening an existing roadway 2) Road Widening : Project to add a new lane to an existing roadway 3) Bridge/Overpass Construction : Project to build an elevated roadway, which generally requires some different equipment than a new roadway, such as a crane 4) Other Linear Project Type: Non-roadway project such as a pipeline, transmission line, or levee construction
Project Construction Time	1.90	months
Working Days per Month	22.00	days (assume 22 if unknown)
Predominant Soil/Site Type: Enter 1, 2, or 3 (for project within "Sacramento County", follow soil type selection instructions in cells E18 to E20 otherwise see instructions provided in cells J18 to J22)	2	1) Sand Gravel : Use for quaternary deposits (Delta/West County) 2) Weathered Rock-Earth : Use for Laguna formation (Jackson Highway area) or the Ione formation (Scott Road, Rancho Murieta) 3) Blasted Rock : Use for Salt Springs Slate or Copper Hill Volcanics (Folsom South of Highway 50, Rancho Murieta)
Project Length	0.10	miles
Total Project Area	0.01	acres
Maximum Area Disturbed/Day	0.005	acres
Water Trucks Used?	2	1. Yes 2. No

Please note that the soil type instructions provided in cells E18 to E20 are specific to Sacramento County. Maps available from the California Geologic Survey (see weblink below) can be used to determine soil type outside Sacramento County.

http://www.conservation.ca.gov/cgs/information/geologic_mapping/Pages/googlemaps.aspx#regionalseries

Material Hauling Quantity Input

Material Type	Phase	Haul Truck Capacity (yd^3) (assume 20 if unknown)	Import Volume (yd^3/day)	Export Volume (yd^3/day)
Soil	Grubbing/Land Clearing	15.00	0.00	0.00
	Grading/Excavation	15.00	0.00	0.00
	Drainage/Utilities/Sub-Grade	15.00	35.00	20.00
	Paving	15.00	0.00	0.00
Asphalt	Grubbing/Land Clearing	15.00	0.00	0.00
	Grading/Excavation	15.00	0.00	0.00
	Drainage/Utilities/Sub-Grade	15.00	0.00	0.00
	Paving	15.00	30.00	0.00

Mitigation Options

On-road Fleet Emissions Mitigation	No Mitigation	Select "2010 and Newer On-road Vehicles Fleet" option when the on-road heavy-duty truck fleet for the project will be limited to vehicles of model year 2010 or newer
Off-road Equipment Emissions Mitigation	No Mitigation	Select "20% NOx and 45% Exhaust PM reduction" option if the project will be required to use a lower emitting off-road construction fleet. The SMAQMD Construction Mitigation Calculator can be used to confirm compliance with this mitigation measure (http://www.airquality.org/ceqa/mitigation.shtml). Select "Tier 4 Equipment" option if some or all off-road equipment used for the project meets CARB Tier 4 Standard

Road Construction Emissions Model, Version 8.1.0

Daily Emission Estimates for -> Butterfield- PTGB

Project Phases (Pounds)	ROG (lbs/day)	CO (lbs/day)	NOx (lbs/day)	Total PM10 (lbs/day)	Exhaust PM10 (lbs/day)	Fugitive Dust PM10 (lbs/day)	Total PM2.5 (lbs/day)	Exhaust PM2.5 (lbs/day)	Fugitive Dust PM2.5 (lbs/day)	SOx (lbs/day)	CO2 (lbs/day)	CH4 (lbs/day)	N2O (lbs/day)	CO2e (lbs/day)
Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Drainage/Utilities/Sub-Grade	0.44	3.87	4.04	0.60	0.20	0.40	0.23	0.14	0.08	0.01	1,379.13	0.11	0.03	1,390.09
Paving	0.02	0.12	0.76	0.02	0.02	0.00	0.01	0.01	0.00	0.00	226.42	0.00	0.01	228.72
Maximum (pounds/day)	0.47	3.99	4.80	0.62	0.22	0.40	0.24	0.15	0.08	0.02	1,605.55	0.11	0.03	1,618.81
Total (tons/construction project)	0.01	0.08	0.10	0.01	0.00	0.01	0.00	0.00	0.00	0.00	33.56	0.00	0.00	33.83

Notes:

Project Start Year ->	2018
Project Length (months) ->	2
Total Project Area (acres) ->	0.0
Maximum Area Disturbed/Day (acres) ->	0.01
Water Truck Used? ->	No

	Total Material Imported/Exported Volume (yd^3/day)		Daily VMT (miles/day)			
Phase	Soil	Asphalt	Soil Hauling	Asphalt Hauling	Worker Commute	Water Truck
Grubbing/Land Clearing	0	0	0	0	0	0
Grading/Excavation	0	0	0	0	0	0
Drainage/Utilities/Sub-Grade	55	0	120	0	640	0
Paving	0	30	0	60	0	0

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns G and H. Total PM2.5 emissions shown in Column I are the sum of exhaust and fugitive dust emissions shown in columns J and K.

CO2e emissions are estimated by multiplying mass emissions for each GHG by its global warming potential (GWP), 1 , 25 and 298 for CO2, CH4 and N2O, respectively. Total CO2e is then estimated by summing CO2e estimates over all GHGs.

Total Emission Estimates by Phase for -> Butterfield- PTGB

Project Phases (Tons for all except CO2e. Metric tonnes for CO2e)	ROG (tons/phase)	CO (tons/phase)	NOx (tons/phase)	Total PM10 (tons/phase)	Exhaust PM10 (tons/phase)	Fugitive Dust PM10 (tons/phase)	Total PM2.5 (tons/phase)	Exhaust PM2.5 (tons/phase)	Fugitive Dust PM2.5 (tons/phase)	SOx (tons/phase)	CO2 (tons/phase)	CH4 (tons/phase)	N2O (tons/phase)	CO2e (MT/phase)
Grubbing/Land Clearing	0.000	0.000	0.000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0.00	0.00
Grading/Excavation	0.000	0.000	0.000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0.00	0.00
Drainage/Utilities/Sub-Grade	0.009	0.081	0.085	0.0126	0.0042	0.0084	0.0047	0.0030	0.0017	0.00	28.82	0.00	0.00	26.36
Paving	0.001	0.002	0.016	0.0004	0.0004	0.0000	0.0003	0.0003	0.0000	0.00	4.73	0.00	0.00	4.34
Maximum (tons/phase)	0.009	0.081	0.085	0.013	0.004	0.008	0.005	0.003	0.002	0.00	28.82	0.00	0.00	26.36
Total (tons/construction project)	0.010	0.083	0.100	0.013	0.005	0.008	0.005	0.003	0.002	0.00	33.56	0.00	0.00	30.69

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns G and H. Total PM2.5 emissions shown in Column I are the sum of exhaust and fugitive dust emissions shown in columns J and K.

CO2e emissions are estimated by multiplying mass emissions for each GHG by its global warming potential (GWP), 1 , 25 and 298 for CO2, CH4 and N2O, respectively. Total CO2e is then estimated by summing CO2e estimates over all GHGs.

The CO2e emissions are reported as metric tons per phase.

Road Construction Emissions Model
Data Entry Worksheet

Version 8.1.0

Note: Required data input sections have a yellow background.
Optional data input sections have a blue background. Only areas with a yellow or blue background can be modified. Program defaults have a white background.
The user is required to enter information in cells D10 through D24, E28 through G35, and D38 through D41 for all project types.
Please use "Clear Data Input & User Overrides" button first before changing the Project Type or begin a new project.

To begin a new project, click this button to clear data previously entered. This button will only work if you opted not to disable macros when loading this spreadsheet.

SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT

Input Type

Project Name	Butterfield- Pipe Bursting	
Construction Start Year	2018	Enter a Year between 2014 and 2025 (inclusive)
Project Type For 4: Other Linear Project Type, please provide project specific off-road equipment population and vehicle trip data	4	1) New Road Construction : Project to build a roadway from bare ground, which generally requires more site preparation than widening an existing roadway 2) Road Widening : Project to add a new lane to an existing roadway 3) Bridge/Overpass Construction : Project to build an elevated roadway, which generally requires some different equipment than a new roadway, such as a crane 4) Other Linear Project Type: Non-roadway project such as a pipeline, transmission line, or levee construction
Project Construction Time	0.50	months
Working Days per Month	22.00	days (assume 22 if unknown)
Predominant Soil/Site Type: Enter 1, 2, or 3 (for project within "Sacramento County", follow soil type selection instructions in cells E18 to E20 otherwise see instructions provided in cells J18 to J22)	2	1) Sand Gravel : Use for quaternary deposits (Delta/West County) 2) Weathered Rock-Earth : Use for Laguna formation (Jackson Highway area) or the Ione formation (Scott Road, Rancho Murieta) 3) Blasted Rock : Use for Salt Springs Slate or Copper Hill Volcanics (Folsom South of Highway 50, Rancho Murieta)
Project Length	0.15	miles
Total Project Area	0.02	acres
Maximum Area Disturbed/Day	0.005	acres
Water Trucks Used?	2	1. Yes 2. No

Please note that the soil type instructions provided in cells E18 to E20 are specific to Sacramento County. Maps available from the California Geologic Survey (see weblink below) can be used to determine soil type outside Sacramento County.

http://www.conservation.ca.gov/cgs/information/geologic_mapping/Pages/googlemaps.aspx#regionalseries

Material Hauling Quantity Input

Material Type	Phase	Haul Truck Capacity (yd^3) (assume 20 if unknown)	Import Volume (yd^3/day)	Export Volume (yd^3/day)
Soil	Grubbing/Land Clearing	15.00	0.00	0.00
	Grading/Excavation	15.00	0.00	0.00
	Drainage/Utilities/Sub-Grade	15.00	33.30	15.00
	Paving	15.00	0.00	0.00
Asphalt	Grubbing/Land Clearing	15.00	0.00	0.00
	Grading/Excavation	15.00	0.00	0.00
	Drainage/Utilities/Sub-Grade	15.00	0.00	0.00
	Paving	15.00	30.00	0.00

Mitigation Options

On-road Fleet Emissions Mitigation	No Mitigation	Select "2010 and Newer On-road Vehicles Fleet" option when the on-road heavy-duty truck fleet for the project will be limited to vehicles of model year 2010 or newer
Off-road Equipment Emissions Mitigation	No Mitigation	Select "20% NOx and 45% Exhaust PM reduction" option if the project will be required to use a lower emitting off-road construction fleet. The SMAQMD Construction Mitigation Calculator can be used to confirm compliance with this mitigation measure (http://www.airquality.org/ceqa/mitigation.shtml). Select "Tier 4 Equipment" option if some or all off-road equipment used for the project meets CARB Tier 4 Standard

Road Construction Emissions Model, Version 8.1.0

Daily Emission Estimates for -> Butterfield- Pipe Bursting

Project Phases (Pounds)	ROG (lbs/day)	CO (lbs/day)	NOx (lbs/day)	Total PM10 (lbs/day)	Exhaust PM10 (lbs/day)	Fugitive Dust PM10 (lbs/day)	Total PM2.5 (lbs/day)	Exhaust PM2.5 (lbs/day)	Fugitive Dust PM2.5 (lbs/day)	SOx (lbs/day)	CO2 (lbs/day)	CH4 (lbs/day)	N2O (lbs/day)	CO2e (lbs/day)
Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Drainage/Utilities/Sub-Grade	0.41	3.30	2.83	0.58	0.18	0.40	0.21	0.12	0.08	0.01	1,134.14	0.04	0.03	1,142.77
Paving	0.09	0.73	1.36	0.06	0.06	0.00	0.05	0.05	0.00	0.00	309.88	0.03	0.01	313.05
Maximum (pounds/day)	0.50	4.03	4.18	0.64	0.24	0.40	0.25	0.17	0.08	0.01	1,444.02	0.07	0.03	1,455.81
Total (tons/construction project)	0.00	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.94	0.00	0.00	8.01

Notes:

Project Start Year ->	2018
Project Length (months) ->	1
Total Project Area (acres) ->	0.0
Maximum Area Disturbed/Day (acres) ->	0.01
Water Truck Used? ->	No

	Total Material Imported/Exported Volume (yd^3/day)		Daily VMT (miles/day)			
Phase	Soil	Asphalt	Soil Hauling	Asphalt Hauling	Worker Commute	Water Truck
Grubbing/Land Clearing	0	0	0	0	0	0
Grading/Excavation	0	0	0	0	0	0
Drainage/Utilities/Sub-Grade	48	0	120	0	640	0
Paving	0	30	0	60	0	0

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns G and H. Total PM2.5 emissions shown in Column I are the sum of exhaust and fugitive dust emissions shown in columns J and K.

CO2e emissions are estimated by multiplying mass emissions for each GHG by its global warming potential (GWP), 1 , 25 and 298 for CO2, CH4 and N2O, respectively. Total CO2e is then estimated by summing CO2e estimates over all GHGs.

Total Emission Estimates by Phase for -> Butterfield- Pipe Bursting

Project Phases (Tons for all except CO2e. Metric tonnes for CO2e)	ROG (tons/phase)	CO (tons/phase)	NOx (tons/phase)	Total PM10 (tons/phase)	Exhaust PM10 (tons/phase)	Fugitive Dust PM10 (tons/phase)	Total PM2.5 (tons/phase)	Exhaust PM2.5 (tons/phase)	Fugitive Dust PM2.5 (tons/phase)	SOx (tons/phase)	CO2 (tons/phase)	CH4 (tons/phase)	N2O (tons/phase)	CO2e (MT/phase)
Grubbing/Land Clearing	0.000	0.000	0.000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0.00	0.00
Grading/Excavation	0.000	0.000	0.000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0.00	0.00
Drainage/Utilities/Sub-Grade	0.002	0.018	0.016	0.0032	0.0010	0.0022	0.0011	0.0007	0.0005	0.00	6.24	0.00	0.00	5.70
Paving	0.001	0.004	0.007	0.0003	0.0003	0.0000	0.0003	0.0003	0.0000	0.00	1.70	0.00	0.00	1.56
Maximum (tons/phase)	0.002	0.018	0.016	0.003	0.001	0.002	0.001	0.001	0.000	0.00	6.24	0.00	0.00	5.70
Total (tons/construction project)	0.003	0.022	0.023	0.004	0.001	0.002	0.001	0.001	0.000	0.00	7.94	0.00	0.00	7.26

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns G and H. Total PM2.5 emissions shown in Column I are the sum of exhaust and fugitive dust emissions shown in columns J and K.

CO2e emissions are estimated by multiplying mass emissions for each GHG by its global warming potential (GWP), 1 , 25 and 298 for CO2, CH4 and N2O, respectively. Total CO2e is then estimated by summing CO2e estimates over all GHGs.

The CO2e emissions are reported as metric tons per phase.

Road Construction Emissions Model Version 8.1.0

Data Entry Worksheet

Note: Required data input sections have a yellow background.
Optional data input sections have a blue background. Only areas with a yellow or blue background can be modified. Program defaults have a white background.
The user is required to enter information in cells D10 through D24, E28 through G35, and D38 through D41 for all project types.
Please use "Clear Data Input & User Overrides" button first before changing the Project Type or begin a new project.

To begin a new project, click this button to clear data previously entered. This button will only work if you opted not to disable macros when loading this spreadsheet.

SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT

Input Type

Project Name	Butterfield- Pipe Reaming	
Construction Start Year	2018	Enter a Year between 2014 and 2025 (inclusive)
Project Type For 4: Other Linear Project Type, please provide project specific off-road equipment population and vehicle trip data	4	1) New Road Construction : Project to build a roadway from bare ground, which generally requires more site preparation than widening an existing roadway 2) Road Widening : Project to add a new lane to an existing roadway 3) Bridge/Overpass Construction : Project to build an elevated roadway, which generally requires some different equipment than a new roadway, such as a crane 4) Other Linear Project Type: Non-roadway project such as a pipeline, transmission line, or levee construction
Project Construction Time	0.40	months
Working Days per Month	22.00	days (assume 22 if unknown)
Predominant Soil/Site Type: Enter 1, 2, or 3 (for project within "Sacramento County", follow soil type selection instructions in cells E18 to E20 otherwise see instructions provided in cells J18 to J22)	2	1) Sand Gravel : Use for quaternary deposits (Delta/West County) 2) Weathered Rock-Earth : Use for Laguna formation (Jackson Highway area) or the Ione formation (Scott Road, Rancho Murieta) 3) Blasted Rock : Use for Salt Springs Slate or Copper Hill Volcanics (Folsom South of Highway 50, Rancho Murieta)
Project Length	0.08	miles
Total Project Area	0.02	acres
Maximum Area Disturbed/Day	0.005	acres
Water Trucks Used?	2	1. Yes 2. No

Please note that the soil type instructions provided in cells E18 to E20 are specific to Sacramento County. Maps available from the California Geologic Survey (see weblink below) can be used to determine soil type outside Sacramento County.

http://www.conservation.ca.gov/cgs/information/geologic_mapping/Pages/googlemaps.aspx#regionalseries

Material Hauling Quantity Input

Material Type	Phase	Haul Truck Capacity (yd^3) (assume 20 if unknown)	Import Volume (yd^3/day)	Export Volume (yd^3/day)
Soil	Grubbing/Land Clearing	15.00	0.00	0.00
	Grading/Excavation	15.00	0.00	0.00
	Drainage/Utilities/Sub-Grade	15.00	34.00	15.00
	Paving	15.00	0.00	0.00
Asphalt	Grubbing/Land Clearing	15.00	0.00	0.00
	Grading/Excavation	15.00	0.00	0.00
	Drainage/Utilities/Sub-Grade	15.00	0.00	0.00
	Paving	15.00	30.00	0.00

Mitigation Options

On-road Fleet Emissions Mitigation	No Mitigation	Select "2010 and Newer On-road Vehicles Fleet" option when the on-road heavy-duty truck fleet for the project will be limited to vehicles of model year 2010 or newer
Off-road Equipment Emissions Mitigation	No Mitigation	Select "20% NOx and 45% Exhaust PM reduction" option if the project will be required to use a lower emitting off-road construction fleet. The SMAQMD Construction Mitigation Calculator can be used to confirm compliance with this mitigation measure (http://www.airquality.org/ceqa/mitigation.shtml). Select "Tier 4 Equipment" option if some or all off-road equipment used for the project meets CARB Tier 4 Standard

Road Construction Emissions Model, Version 8.1.0

Daily Emission Estimates for -> Butterfield- Pipe Reaming

Project Phases (Pounds)	ROG (lbs/day)	CO (lbs/day)	NOx (lbs/day)	Total PM10 (lbs/day)	Exhaust PM10 (lbs/day)	Fugitive Dust PM10 (lbs/day)	Total PM2.5 (lbs/day)	Exhaust PM2.5 (lbs/day)	Fugitive Dust PM2.5 (lbs/day)	SOx (lbs/day)	CO2 (lbs/day)	CH4 (lbs/day)	N2O (lbs/day)	CO2e (lbs/day)
Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Drainage/Utilities/Sub-Grade	0.36	3.49	3.08	0.58	0.18	0.40	0.21	0.12	0.08	0.01	1,182.06	0.06	0.03	1,191.18
Paving	0.09	0.73	1.36	0.06	0.06	0.00	0.05	0.05	0.00	0.00	309.88	0.03	0.01	313.05
Maximum (pounds/day)	0.45	4.21	4.43	0.64	0.24	0.40	0.25	0.17	0.08	0.01	1,491.93	0.09	0.03	1,504.23
Total (tons/construction project)	0.00	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.56	0.00	0.00	6.62

Notes:

Project Start Year ->	2018
Project Length (months) ->	0
Total Project Area (acres) ->	0.0
Maximum Area Disturbed/Day (acres) ->	0.01
Water Truck Used? ->	No

	Total Material Imported/Exported Volume (yd^3/day)		Daily VMT (miles/day)			
Phase	Soil	Asphalt	Soil Hauling	Asphalt Hauling	Worker Commute	Water Truck
Grubbing/Land Clearing	0	0	0	0	0	0
Grading/Excavation	0	0	0	0	0	0
Drainage/Utilities/Sub-Grade	49	0	120	0	640	0
Paving	0	30	0	60	0	0

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns G and H. Total PM2.5 emissions shown in Column I are the sum of exhaust and fugitive dust emissions shown in columns J and K.

CO2e emissions are estimated by multiplying mass emissions for each GHG by its global warming potential (GWP), 1 , 25 and 298 for CO2, CH4 and N2O, respectively. Total CO2e is then estimated by summing CO2e estimates over all GHGs.

Total Emission Estimates by Phase for -> Butterfield- Pipe Reaming

Project Phases (Tons for all except CO2e. Metric tonnes for CO2e)	ROG (tons/phase)	CO (tons/phase)	NOx (tons/phase)	Total PM10 (tons/phase)	Exhaust PM10 (tons/phase)	Fugitive Dust PM10 (tons/phase)	Total PM2.5 (tons/phase)	Exhaust PM2.5 (tons/phase)	Fugitive Dust PM2.5 (tons/phase)	SOx (tons/phase)	CO2 (tons/phase)	CH4 (tons/phase)	N2O (tons/phase)	CO2e (MT/phase)
Grubbing/Land Clearing	0.000	0.000	0.000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0.00	0.00
Grading/Excavation	0.000	0.000	0.000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0.00	0.00
Drainage/Utilities/Sub-Grade	0.002	0.015	0.014	0.0026	0.0008	0.0018	0.0009	0.0005	0.0004	0.00	5.20	0.00	0.00	4.75
Paving	0.000	0.003	0.006	0.0003	0.0003	0.0000	0.0002	0.0002	0.0000	0.00	1.36	0.00	0.00	1.25
Maximum (tons/phase)	0.002	0.015	0.014	0.003	0.001	0.002	0.001	0.001	0.000	0.00	5.20	0.00	0.00	4.75
Total (tons/construction project)	0.002	0.019	0.020	0.003	0.001	0.002	0.001	0.001	0.000	0.00	6.56	0.00	0.00	6.00

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns G and H. Total PM2.5 emissions shown in Column I are the sum of exhaust and fugitive dust emissions shown in columns J and K.

CO2e emissions are estimated by multiplying mass emissions for each GHG by its global warming potential (GWP), 1 , 25 and 298 for CO2, CH4 and N2O, respectively. Total CO2e is then estimated by summing CO2e estimates over all GHGs.

The CO2e emissions are reported as metric tons per phase.

Road Construction Emissions Model Version 8.1.0

Data Entry Worksheet

Note: Required data input sections have a yellow background.
Optional data input sections have a blue background. Only areas with a yellow or blue background can be modified. Program defaults have a white background.
The user is required to enter information in cells D10 through D24, E28 through G35, and D38 through D41 for all project types.
Please use "Clear Data Input & User Overrides" button first before changing the Project Type or begin a new project.

To begin a new project, click this button to clear data previously entered. This button will only work if you opted not to disable macros when loading this spreadsheet.

SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT

Input Type

Project Name	Butterfield- sewer Monholes	
Construction Start Year	2018	Enter a Year between 2014 and 2025 (inclusive)
Project Type For 4: Other Linear Project Type, please provide project specific off-road equipment population and vehicle trip data	4	1) New Road Construction : Project to build a roadway from bare ground, which generally requires more site preparation than widening an existing roadway 2) Road Widening : Project to add a new lane to an existing roadway 3) Bridge/Overpass Construction : Project to build an elevated roadway, which generally requires some different equipment than a new roadway, such as a crane 4) Other Linear Project Type: Non-roadway project such as a pipeline, transmission line, or levee construction
Project Construction Time	0.90	months
Working Days per Month	22.00	days (assume 22 if unknown)
Predominant Soil/Site Type: Enter 1, 2, or 3 (for project within "Sacramento County", follow soil type selection instructions in cells E18 to E20 otherwise see instructions provided in cells J18 to J22)	2	1) Sand Gravel : Use for quaternary deposits (Delta/West County) 2) Weathered Rock-Earth : Use for Laguna formation (Jackson Highway area) or the Ione formation (Scott Road, Rancho Murieta) 3) Blasted Rock : Use for Salt Springs Slate or Copper Hill Volcanics (Folsom South of Highway 50, Rancho Murieta)
Project Length	0.00	miles
Total Project Area	0.05	acres
Maximum Area Disturbed/Day	0.005	acres
Water Trucks Used?	2	1. Yes 2. No

Please note that the soil type instructions provided in cells E18 to E20 are specific to Sacramento County. Maps available from the California Geologic Survey (see weblink below) can be used to determine soil type outside Sacramento County.

http://www.conservation.ca.gov/cgs/information/geologic_mapping/Pages/googlemaps.aspx#regionalseries

Material Hauling Quantity Input

Material Type	Phase	Haul Truck Capacity (yd^3) (assume 20 if unknown)	Import Volume (yd^3/day)	Export Volume (yd^3/day)
Soil	Grubbing/Land Clearing	15.00	0.00	0.00
	Grading/Excavation	15.00	0.00	0.00
	Drainage/Utilities/Sub-Grade	15.00	45.00	15.00
	Paving	15.00	0.00	0.00
Asphalt	Grubbing/Land Clearing	15.00	0.00	0.00
	Grading/Excavation	15.00	0.00	0.00
	Drainage/Utilities/Sub-Grade	15.00	0.00	0.00
	Paving	15.00	30.00	0.00

Mitigation Options

On-road Fleet Emissions Mitigation	No Mitigation	Select "2010 and Newer On-road Vehicles Fleet" option when the on-road heavy-duty truck fleet for the project will be limited to vehicles of model year 2010 or newer
Off-road Equipment Emissions Mitigation	No Mitigation	Select "20% NOx and 45% Exhaust PM reduction" option if the project will be required to use a lower emitting off-road construction fleet. The SMAQMD Construction Mitigation Calculator can be used to confirm compliance with this mitigation measure (http://www.airquality.org/ceqa/mitigation.shtml). Select "Tier 4 Equipment" option if some or all off-road equipment used for the project meets CARB Tier 4 Standard

Road Construction Emissions Model, Version 8.1.0

Daily Emission Estimates for -> Butterfield- sewer Monholes

Project Phases (Pounds)	ROG (lbs/day)	CO (lbs/day)	NOx (lbs/day)	Total PM10 (lbs/day)	Exhaust PM10 (lbs/day)	Fugitive Dust PM10 (lbs/day)	Total PM2.5 (lbs/day)	Exhaust PM2.5 (lbs/day)	Fugitive Dust PM2.5 (lbs/day)	SOx (lbs/day)	CO2 (lbs/day)	CH4 (lbs/day)	N2O (lbs/day)	CO2e (lbs/day)
Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Drainage/Utilities/Sub-Grade	0.32	3.01	2.60	0.56	0.16	0.40	0.18	0.10	0.08	0.01	1,114.68	0.04	0.03	1,123.06
Paving	0.09	0.73	1.36	0.06	0.06	0.00	0.05	0.05	0.00	0.00	309.88	0.03	0.01	313.05
Maximum (pounds/day)	0.42	3.73	3.96	0.61	0.21	0.40	0.23	0.15	0.08	0.01	1,424.55	0.06	0.03	1,436.11
Total (tons/construction project)	0.00	0.04	0.04	0.01	0.00	0.00	0.00	0.00	0.00	0.00	14.10	0.00	0.00	14.22

Notes:

Project Start Year ->	2018
Project Length (months) ->	1
Total Project Area (acres) ->	0.1
Maximum Area Disturbed/Day (acres) ->	0.01
Water Truck Used? ->	No

	Total Material Imported/Exported Volume (yd^3/day)		Daily VMT (miles/day)			
Phase	Soil	Asphalt	Soil Hauling	Asphalt Hauling	Worker Commute	Water Truck
Grubbing/Land Clearing	0	0	0	0	0	0
Grading/Excavation	0	0	0	0	0	0
Drainage/Utilities/Sub-Grade	60	0	120	0	640	0
Paving	0	30	0	60	0	0

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns G and H. Total PM2.5 emissions shown in Column I are the sum of exhaust and fugitive dust emissions shown in columns J and K.

CO2e emissions are estimated by multiplying mass emissions for each GHG by its global warming potential (GWP), 1 , 25 and 298 for CO2, CH4 and N2O, respectively. Total CO2e is then estimated by summing CO2e estimates over all GHGs.

Total Emission Estimates by Phase for -> Butterfield- sewer Monholes

Project Phases (Tons for all except CO2e. Metric tonnes for CO2e)	ROG (tons/phase)	CO (tons/phase)	NOx (tons/phase)	Total PM10 (tons/phase)	Exhaust PM10 (tons/phase)	Fugitive Dust PM10 (tons/phase)	Total PM2.5 (tons/phase)	Exhaust PM2.5 (tons/phase)	Fugitive Dust PM2.5 (tons/phase)	SOx (tons/phase)	CO2 (tons/phase)	CH4 (tons/phase)	N2O (tons/phase)	CO2e (MT/phase)
Grubbing/Land Clearing	0.000	0.000	0.000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0.00	0.00
Grading/Excavation	0.000	0.000	0.000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0.00	0.00
Drainage/Utilities/Sub-Grade	0.003	0.030	0.026	0.0055	0.0015	0.0040	0.0018	0.0010	0.0008	0.00	11.04	0.00	0.00	10.09
Paving	0.001	0.007	0.013	0.0006	0.0006	0.0000	0.0005	0.0005	0.0000	0.00	3.07	0.00	0.00	2.81
Maximum (tons/phase)	0.003	0.030	0.026	0.006	0.002	0.004	0.002	0.001	0.001	0.00	11.04	0.00	0.00	10.09
Total (tons/construction project)	0.004	0.037	0.039	0.006	0.002	0.004	0.002	0.001	0.001	0.00	14.10	0.00	0.00	12.90

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns G and H. Total PM2.5 emissions shown in Column I are the sum of exhaust and fugitive dust emissions shown in columns J and K.

CO2e emissions are estimated by multiplying mass emissions for each GHG by its global warming potential (GWP), 1 , 25 and 298 for CO2, CH4 and N2O, respectively. Total CO2e is then estimated by summing CO2e estimates over all GHGs.

The CO2e emissions are reported as metric tons per phase.

Road Construction Emissions Model
Data Entry Worksheet

Version 8.1.0

Note: Required data input sections have a yellow background.
Optional data input sections have a blue background. Only areas with a yellow or blue background can be modified. Program defaults have a white background.
The user is required to enter information in cells D10 through D24, E28 through G35, and D38 through D41 for all project types.
Please use "Clear Data Input & User Overrides" button first before changing the Project Type or begin a new project.

To begin a new project, click this button to clear data previously entered. This button will only work if you opted not to disable macros when loading this spreadsheet.

SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT

Input Type

Project Name	Nokomis- Open Cut Sewer&Laterals	
Construction Start Year	2018	Enter a Year between 2014 and 2025 (inclusive)
Project Type For 4: Other Linear Project Type, please provide project specific off-road equipment population and vehicle trip data	4	1) New Road Construction : Project to build a roadway from bare ground, which generally requires more site preparation than widening an existing roadway 2) Road Widening : Project to add a new lane to an existing roadway 3) Bridge/Overpass Construction : Project to build an elevated roadway, which generally requires some different equipment than a new roadway, such as a crane 4) Other Linear Project Type: Non-roadway project such as a pipeline, transmission line, or levee construction
Project Construction Time	0.60	months
Working Days per Month	22.00	days (assume 22 if unknown)
Predominant Soil/Site Type: Enter 1, 2, or 3 (for project within "Sacramento County", follow soil type selection instructions in cells E18 to E20 otherwise see instructions provided in cells J18 to J22)	2	1) Sand Gravel : Use for quaternary deposits (Delta/West County) 2) Weathered Rock-Earth : Use for Laguna formation (Jackson Highway area) or the Ione formation (Scott Road, Rancho Murieta) 3) Blasted Rock : Use for Salt Springs Slate or Copper Hill Volcanics (Folsom South of Highway 50, Rancho Murieta)
Project Length	0.20	miles
Total Project Area	0.07	acres
Maximum Area Disturbed/Day	0.02	acres
Water Trucks Used?	2	1. Yes 2. No

Please note that the soil type instructions provided in cells E18 to E20 are specific to Sacramento County. Maps available from the California Geologic Survey (see weblink below) can be used to determine soil type outside Sacramento County.

http://www.conservation.ca.gov/cgs/information/geologic_mapping/Pages/googlemaps.aspx#regionalseries

Material Hauling Quantity Input

Material Type	Phase	Haul Truck Capacity (yd^3) (assume 20 if unknown)	Import Volume (yd^3/day)	Export Volume (yd^3/day)
Soil	Grubbing/Land Clearing	15.00	0.00	0.00
	Grading/Excavation	15.00	0.00	0.00
	Drainage/Utilities/Sub-Grade	15.00	30.00	15.00
	Paving	15.00	0.00	0.00
Asphalt	Grubbing/Land Clearing	15.00	0.00	0.00
	Grading/Excavation	15.00	0.00	0.00
	Drainage/Utilities/Sub-Grade	15.00	0.00	0.00
	Paving	15.00	30.00	0.00

Mitigation Options

On-road Fleet Emissions Mitigation	No Mitigation	Select "2010 and Newer On-road Vehicles Fleet" option when the on-road heavy-duty truck fleet for the project will be limited to vehicles of model year 2010 or newer
Off-road Equipment Emissions Mitigation	No Mitigation	Select "20% NOx and 45% Exhaust PM reduction" option if the project will be required to use a lower emitting off-road construction fleet. The SMAQMD Construction Mitigation Calculator can be used to confirm compliance with this mitigation measure (http://www.airquality.org/ceqa/mitigation.shtml). Select "Tier 4 Equipment" option if some or all off-road equipment used for the project meets CARB Tier 4 Standard

Road Construction Emissions Model, Version 8.1.0

Daily Emission Estimates for -> Nokomis- Open Cut Sewer&Laterals

Project Phases (Pounds)	ROG (lbs/day)	CO (lbs/day)	NOx (lbs/day)	Total PM10 (lbs/day)	Exhaust PM10 (lbs/day)	Fugitive Dust PM10 (lbs/day)	Total PM2.5 (lbs/day)	Exhaust PM2.5 (lbs/day)	Fugitive Dust PM2.5 (lbs/day)	SOx (lbs/day)	CO2 (lbs/day)	CH4 (lbs/day)	N2O (lbs/day)	CO2e (lbs/day)
Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Drainage/Utilities/Sub-Grade	0.33	3.14	2.41	0.36	0.16	0.20	0.14	0.10	0.04	0.01	1,027.50	0.04	0.02	1,035.01
Paving	0.09	0.73	1.36	0.06	0.06	0.00	0.05	0.05	0.00	0.00	309.88	0.03	0.01	313.05
Maximum (pounds/day)	0.42	3.87	3.77	0.41	0.21	0.20	0.19	0.15	0.04	0.01	1,337.38	0.07	0.03	1,348.05
Total (tons/construction project)	0.00	0.03	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.83	0.00	0.00	8.90

Notes:

Project Start Year ->	2018
Project Length (months) ->	1
Total Project Area (acres) ->	0.1
Maximum Area Disturbed/Day (acres) ->	0.02
Water Truck Used? ->	No

	Total Material Imported/Exported Volume (yd^3/day)		Daily VMT (miles/day)			
Phase	Soil	Asphalt	Soil Hauling	Asphalt Hauling	Worker Commute	Water Truck
Grubbing/Land Clearing	0	0	0	0	0	0
Grading/Excavation	0	0	0	0	0	0
Drainage/Utilities/Sub-Grade	45	0	90	0	640	0
Paving	0	30	0	60	0	0

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns G and H. Total PM2.5 emissions shown in Column I are the sum of exhaust and fugitive dust emissions shown in columns J and K.

CO2e emissions are estimated by multiplying mass emissions for each GHG by its global warming potential (GWP), 1 , 25 and 298 for CO2, CH4 and N2O, respectively. Total CO2e is then estimated by summing CO2e estimates over all GHGs.

Total Emission Estimates by Phase for -> Nokomis- Open Cut Sewer&Laterals

Project Phases (Tons for all except CO2e. Metric tonnes for CO2e)	ROG (tons/phase)	CO (tons/phase)	NOx (tons/phase)	Total PM10 (tons/phase)	Exhaust PM10 (tons/phase)	Fugitive Dust PM10 (tons/phase)	Total PM2.5 (tons/phase)	Exhaust PM2.5 (tons/phase)	Fugitive Dust PM2.5 (tons/phase)	SOx (tons/phase)	CO2 (tons/phase)	CH4 (tons/phase)	N2O (tons/phase)	CO2e (MT/phase)
Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Drainage/Utilities/Sub-Grade	0.00	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.78	0.00	0.00	6.20
Paving	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.05	0.00	0.00	1.87
Maximum (tons/phase)	0.002	0.021	0.016	0.002	0.001	0.001	0.001	0.001	0.000	0.00	6.78	0.00	0.00	6.20
Total (tons/construction project)	0.003	0.026	0.025	0.003	0.001	0.001	0.001	0.001	0.000	0.00	8.83	0.00	0.00	8.07

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns G and H. Total PM2.5 emissions shown in Column I are the sum of exhaust and fugitive dust emissions shown in columns J and K.

CO2e emissions are estimated by multiplying mass emissions for each GHG by its global warming potential (GWP), 1 , 25 and 298 for CO2, CH4 and N2O, respectively. Total CO2e is then estimated by summing CO2e estimates over all GHGs.

The CO2e emissions are reported as metric tons per phase.

Road Construction Emissions Model Version 8.1.0

Data Entry Worksheet

Note: Required data input sections have a yellow background.
Optional data input sections have a blue background. Only areas with a yellow or blue background can be modified. Program defaults have a white background.
The user is required to enter information in cells D10 through D24, E28 through G35, and D38 through D41 for all project types.
Please use "Clear Data Input & User Overrides" button first before changing the Project Type or begin a new project.

To begin a new project, click this button to clear data previously entered. This button will only work if you opted not to disable macros when loading this spreadsheet.

SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT

Input Type

Project Name	Nokomis- CIPP	
Construction Start Year	2018	Enter a Year between 2014 and 2025 (inclusive)
Project Type For 4: Other Linear Project Type, please provide project specific off-road equipment population and vehicle trip data	4	1) New Road Construction : Project to build a roadway from bare ground, which generally requires more site preparation than widening an existing roadway 2) Road Widening : Project to add a new lane to an existing roadway 3) Bridge/Overpass Construction : Project to build an elevated roadway, which generally requires some different equipment than a new roadway, such as a crane 4) Other Linear Project Type: Non-roadway project such as a pipeline, transmission line, or levee construction
Project Construction Time	0.05	months
Working Days per Month	22.00	days (assume 22 if unknown)
Predominant Soil/Site Type: Enter 1, 2, or 3 (for project within "Sacramento County", follow soil type selection instructions in cells E18 to E20 otherwise see instructions provided in cells J18 to J22)	2	1) Sand Gravel : Use for quaternary deposits (Delta/West County) 2) Weathered Rock-Earth : Use for Laguna formation (Jackson Highway area) or the Ione formation (Scott Road, Rancho Murieta) 3) Blasted Rock : Use for Salt Springs Slate or Copper Hill Volcanics (Folsom South of Highway 50, Rancho Murieta)
Project Length	0.07	miles
Total Project Area	0.00	acres
Maximum Area Disturbed/Day	0.00	acres
Water Trucks Used?	2	1. Yes 2. No

Please note that the soil type instructions provided in cells E18 to E20 are specific to Sacramento County. Maps available from the California Geologic Survey (see weblink below) can be used to determine soil type outside Sacramento County.

http://www.conservation.ca.gov/cgs/information/geologic_mapping/Pages/googlemaps.aspx#regionalseries

Material Hauling Quantity Input

Material Type	Phase	Haul Truck Capacity (yd^3) (assume 20 if unknown)	Import Volume (yd^3/day)	Export Volume (yd^3/day)
Soil	Grubbing/Land Clearing	15.00	0.00	0.00
	Grading/Excavation	15.00	0.00	0.00
	Drainage/Utilities/Sub-Grade	15.00	15.00	0.00
	Paving	15.00	0.00	0.00
Asphalt	Grubbing/Land Clearing	15.00	0.00	0.00
	Grading/Excavation	15.00	0.00	0.00
	Drainage/Utilities/Sub-Grade	15.00	0.00	0.00
	Paving	15.00	0.00	0.00

Mitigation Options

On-road Fleet Emissions Mitigation	No Mitigation	Select "2010 and Newer On-road Vehicles Fleet" option when the on-road heavy-duty truck fleet for the project will be limited to vehicles of model year 2010 or newer
Off-road Equipment Emissions Mitigation	No Mitigation	Select "20% NOx and 45% Exhaust PM reduction" option if the project will be required to use a lower emitting off-road construction fleet. The SMAQMD Construction Mitigation Calculator can be used to confirm compliance with this mitigation measure (http://www.airquality.org/ceqa/mitigation.shtml). Select "Tier 4 Equipment" option if some or all off-road equipment used for the project meets CARB Tier 4 Standard

Road Construction Emissions Model, Version 8.1.0

Daily Emission Estimates for -> Nokomis- CIPP

Project Phases (Pounds)	ROG (lbs/day)	CO (lbs/day)	NOx (lbs/day)	Total PM10 (lbs/day)	Exhaust PM10 (lbs/day)	Fugitive Dust PM10 (lbs/day)	Total PM2.5 (lbs/day)	Exhaust PM2.5 (lbs/day)	Fugitive Dust PM2.5 (lbs/day)	SOx (lbs/day)	CO2 (lbs/day)	CH4 (lbs/day)	N2O (lbs/day)	CO2e (lbs/day)
Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Drainage/Utilities/Sub-Grade	0.54	4.69	3.88	0.32	0.32	0.00	0.26	0.26	0.00	0.01	1,011.16	0.11	0.02	1,018.60
Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum (pounds/day)	0.54	4.69	3.88	0.32	0.32	0.00	0.26	0.26	0.00	0.01	1,011.16	0.11	0.02	1,018.60
Total (tons/construction project)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.56	0.00	0.00	0.56

Notes:

Project Start Year ->	2018
Project Length (months) ->	0
Total Project Area (acres) ->	0.0
Maximum Area Disturbed/Day (acres) ->	0.00
Water Truck Used? ->	No

	Total Material Imported/Exported Volume (yd^3/day)		Daily VMT (miles/day)			
Phase	Soil	Asphalt	Soil Hauling	Asphalt Hauling	Worker Commute	Water Truck
Grubbing/Land Clearing	0	0	0	0	0	0
Grading/Excavation	0	0	0	0	0	0
Drainage/Utilities/Sub-Grade	15	0	30	0	640	0
Paving	0	0	0	0	0	0

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns G and H. Total PM2.5 emissions shown in Column I are the sum of exhaust and fugitive dust emissions shown in columns J and K.

CO2e emissions are estimated by multiplying mass emissions for each GHG by its global warming potential (GWP), 1 , 25 and 298 for CO2, CH4 and N2O, respectively. Total CO2e is then estimated by summing CO2e estimates over all GHGs.

Total Emission Estimates by Phase for -> Nokomis- CIPP

Project Phases (Tons for all except CO2e. Metric tonnes for CO2e)	ROG (tons/phase)	CO (tons/phase)	NOx (tons/phase)	Total PM10 (tons/phase)	Exhaust PM10 (tons/phase)	Fugitive Dust PM10 (tons/phase)	Total PM2.5 (tons/phase)	Exhaust PM2.5 (tons/phase)	Fugitive Dust PM2.5 (tons/phase)	SOx (tons/phase)	CO2 (tons/phase)	CH4 (tons/phase)	N2O (tons/phase)	CO2e (MT/phase)
Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Drainage/Utilities/Sub-Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.56	0.00	0.00	0.51
Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum (tons/phase)	0.000	0.003	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.56	0.00	0.00	0.51
Total (tons/construction project)	0.000	0.003	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.56	0.00	0.00	0.51

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns G and H. Total PM2.5 emissions shown in Column I are the sum of exhaust and fugitive dust emissions shown in columns J and K.

CO2e emissions are estimated by multiplying mass emissions for each GHG by its global warming potential (GWP), 1 , 25 and 298 for CO2, CH4 and N2O, respectively. Total CO2e is then estimated by summing CO2e estimates over all GHGs.

The CO2e emissions are reported as metric tons per phase.

Road Construction Emissions Model
Data Entry Worksheet

Version 8.1.0

Note: Required data input sections have a yellow background.
Optional data input sections have a blue background. Only areas with a yellow or blue background can be modified. Program defaults have a white background.
The user is required to enter information in cells D10 through D24, E28 through G35, and D38 through D41 for all project types.
Please use "Clear Data Input & User Overrides" button first before changing the Project Type or begin a new project.

To begin a new project, click this button to clear data previously entered. This button will only work if you opted not to disable macros when loading this spreadsheet.

SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT

Input Type

Project Name	Nokomis- Sewer Monholes	
Construction Start Year	2018	Enter a Year between 2014 and 2025 (inclusive)
Project Type For 4: Other Linear Project Type, please provide project specific off-road equipment population and vehicle trip data	4	1) New Road Construction : Project to build a roadway from bare ground, which generally requires more site preparation than widening an existing roadway 2) Road Widening : Project to add a new lane to an existing roadway 3) Bridge/Overpass Construction : Project to build an elevated roadway, which generally requires some different equipment than a new roadway, such as a crane 4) Other Linear Project Type: Non-roadway project such as a pipeline, transmission line, or levee construction
Project Construction Time	0.20	months
Working Days per Month	22.00	days (assume 22 if unknown)
Predominant Soil/Site Type: Enter 1, 2, or 3 (for project within "Sacramento County", follow soil type selection instructions in cells E18 to E20 otherwise see instructions provided in cells J18 to J22)	2	1) Sand Gravel : Use for quaternary deposits (Delta/West County) 2) Weathered Rock-Earth : Use for Laguna formation (Jackson Highway area) or the Ione formation (Scott Road, Rancho Murieta) 3) Blasted Rock : Use for Salt Springs Slate or Copper Hill Volcanics (Folsom South of Highway 50, Rancho Murieta)
Project Length	0.00	miles
Total Project Area	0.01	acres
Maximum Area Disturbed/Day	0.003	acres
Water Trucks Used?	2	1. Yes 2. No

Please note that the soil type instructions provided in cells E18 to E20 are specific to Sacramento County. Maps available from the California Geologic Survey (see weblink below) can be used to determine soil type outside Sacramento County.

http://www.conservation.ca.gov/cgs/information/geologic_mapping/Pages/googlemaps.aspx#regionalseries

Material Hauling Quantity Input

Material Type	Phase	Haul Truck Capacity (yd^3) (assume 20 if unknown)	Import Volume (yd^3/day)	Export Volume (yd^3/day)
Soil	Grubbing/Land Clearing	15.00	0.00	0.00
	Grading/Excavation	15.00	0.00	0.00
	Drainage/Utilities/Sub-Grade	15.00	45.00	15.00
	Paving	15.00	0.00	0.00
Asphalt	Grubbing/Land Clearing	15.00	0.00	0.00
	Grading/Excavation	15.00	0.00	0.00
	Drainage/Utilities/Sub-Grade	15.00	0.00	0.00
	Paving	15.00	30.00	0.00

Mitigation Options

On-road Fleet Emissions Mitigation	No Mitigation	Select "2010 and Newer On-road Vehicles Fleet" option when the on-road heavy-duty truck fleet for the project will be limited to vehicles of model year 2010 or newer
Off-road Equipment Emissions Mitigation	No Mitigation	Select "20% NOx and 45% Exhaust PM reduction" option if the project will be required to use a lower emitting off-road construction fleet. The SMAQMD Construction Mitigation Calculator can be used to confirm compliance with this mitigation measure (http://www.airquality.org/ceqa/mitigation.shtml). Select "Tier 4 Equipment" option if some or all off-road equipment used for the project meets CARB Tier 4 Standard

Road Construction Emissions Model, Version 8.1.0

Daily Emission Estimates for -> Nokomis- Sewer Monholes

Project Phases (Pounds)	ROG (lbs/day)	CO (lbs/day)	NOx (lbs/day)	Total PM10 (lbs/day)	Exhaust PM10 (lbs/day)	Fugitive Dust PM10 (lbs/day)	Total PM2.5 (lbs/day)	Exhaust PM2.5 (lbs/day)	Fugitive Dust PM2.5 (lbs/day)	SOx (lbs/day)	CO2 (lbs/day)	CH4 (lbs/day)	N2O (lbs/day)	CO2e (lbs/day)
Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Drainage/Utilities/Sub-Grade	0.31	2.99	2.59	0.20	0.15	0.05	0.11	0.10	0.01	0.01	1,115.61	0.04	0.03	1,124.01
Paving	0.09	0.73	1.36	0.06	0.06	0.00	0.05	0.05	0.00	0.00	309.88	0.03	0.01	313.05
Maximum (pounds/day)	0.40	3.71	3.95	0.26	0.21	0.05	0.15	0.14	0.01	0.01	1,425.49	0.06	0.03	1,437.06
Total (tons/construction project)	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.14	0.00	0.00	3.16

Notes:

Project Start Year ->	2018
Project Length (months) ->	0
Total Project Area (acres) ->	0.0
Maximum Area Disturbed/Day (acres) ->	0.00
Water Truck Used? ->	No

	Total Material Imported/Exported Volume (yd^3/day)		Daily VMT (miles/day)			
Phase	Soil	Asphalt	Soil Hauling	Asphalt Hauling	Worker Commute	Water Truck
Grubbing/Land Clearing	0	0	0	0	0	0
Grading/Excavation	0	0	0	0	0	0
Drainage/Utilities/Sub-Grade	60	0	120	0	640	0
Paving	0	30	0	60	0	0

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns G and H. Total PM2.5 emissions shown in Column I are the sum of exhaust and fugitive dust emissions shown in columns J and K.

CO2e emissions are estimated by multiplying mass emissions for each GHG by its global warming potential (GWP), 1 , 25 and 298 for CO2, CH4 and N2O, respectively. Total CO2e is then estimated by summing CO2e estimates over all GHGs.

Total Emission Estimates by Phase for -> Nokomis- Sewer Monholes

Project Phases (Tons for all except CO2e. Metric tonnes for CO2e)	ROG (tons/phase)	CO (tons/phase)	NOx (tons/phase)	Total PM10 (tons/phase)	Exhaust PM10 (tons/phase)	Fugitive Dust PM10 (tons/phase)	Total PM2.5 (tons/phase)	Exhaust PM2.5 (tons/phase)	Fugitive Dust PM2.5 (tons/phase)	SOx (tons/phase)	CO2 (tons/phase)	CH4 (tons/phase)	N2O (tons/phase)	CO2e (MT/phase)
Grubbing/Land Clearing	0.000	0.000	0.000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0.00	0.00
Grading/Excavation	0.000	0.000	0.000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0.00	0.00
Drainage/Utilities/Sub-Grade	0.001	0.007	0.006	0.0004	0.0003	0.0001	0.0002	0.0002	0.0000	0.00	2.45	0.00	0.00	2.24
Paving	0.000	0.002	0.003	0.0001	0.0001	0.0000	0.0001	0.0001	0.0000	0.00	0.68	0.00	0.00	0.62
Maximum (tons/phase)	0.001	0.007	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.00	2.45	0.00	0.00	2.24
Total (tons/construction project)	0.001	0.008	0.009	0.001	0.000	0.000	0.000	0.000	0.000	0.00	3.14	0.00	0.00	2.87

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns G and H. Total PM2.5 emissions shown in Column I are the sum of exhaust and fugitive dust emissions shown in columns J and K.

CO2e emissions are estimated by multiplying mass emissions for each GHG by its global warming potential (GWP), 1 , 25 and 298 for CO2, CH4 and N2O, respectively. Total CO2e is then estimated by summing CO2e estimates over all GHGs.

The CO2e emissions are reported as metric tons per phase.

APPENDIX C

Biological Resource Assessment

ENVIRONMENTAL COLLABORATIVE

Consultation • Documentation • Restoration
41 Jeanette Court • Walnut Creek, CA 94596
Phone 510-393-0770 • beach127@aol.com

MEMORANDUM

TO: Mr. Paul Scheidegger
Scheidegger & Associates
201 North Civic Drive, Suite 115
Walnut Creek, California 94608

FROM: Jim Martin
ENVIRONMENTAL COLLABORATIVE

DATE: 27 November 2017

SUBJECT: Biological Resource Assessment
Ross Valley Sanitary District
FY2016/17 Gravity Sewer Improvement Project

As you requested, I have conducted a Biological Resource Assessment (BRA) of the proposed Ross Valley Sanitary District (RVSD) FY2016/17 Gravity Sewer Improvement Project (Project) in San Anselmo, California. The Butterfield component consists of open cut, trenchless CIPP, pipe bursting, and pilot tube guided boring (PTGB) along Butterfield Road, Meadowcroft Drive, Broadmoor Avenue, and Sir Francis Drake Boulevard, with new manholes installed along the corridor. The Nokomis component consists of open cut and CIPP along Madrone Avenue and Sycamore Avenue, together with new man holes. Approximately 150 feet of the open cut for the Nokomis component would be located outside of existing roadways, near the top of bank to San Anselmo Creek near the Madrone Avenue Bridge. All other segments of the project corridors would be located within improved roadways and right-of-ways. A detailed Project Description and maps of the area of potential effect (APE) are contained in **Appendix A**.

The environmental documentation for the Clean Water State Revolving Fund Program administered by the State Water Resources Control Board, Division of Financial Assistance, requires completion of a BRA to confirm presence or absence of any federally-listed species and to ensure compliance with the federal Endangered Species Act, the Clean Water Act, the Migratory Bird Treaty Act, and the Magnuson-Stevens Fishery Conservation and Management Act, among other legislation. This BRA has been prepared to address potential effects of the proposed improvements on biological resources, based on the results of a background information review and field reconnaissance survey. This BRA provides a description of existing conditions in the APE, and an assessment of potential effects on biological and wetland resources. No additional field surveys are considered necessary based on the highly disturbed conditions of the APE.

SETTING

Background and Methods

Biological resources associated with the APE were identified through a review of available background information and a field reconnaissance survey. Available documentation was reviewed to provide information on general resources in the San Anselmo area, presence of sensitive natural communities, and the distribution and habitat requirements of special-status species which have been recorded from or are suspected to occur in the Project vicinity. Literature review included: the occurrence records of the California Natural Diversity Data Base (CNDDB) of the California Department of Fish and Wildlife (CDFW); the California Native Plant Society (CNPS) *Inventory of Rare and Endangered Plants*; and a list of federally-listed and candidate species prepared by the U.S. Fish and Wildlife Service (USFWS) for the Project site vicinity (dated October 18, 2017January 2, 2017). A field reconnaissance survey was conducted by James Martin, a biologist and principal of Environmental Collaborative, on February 8, 2017 to determine the vegetation and wildlife resources, absence of any sensitive resources such as potential jurisdictional wetlands, and potential suitability of the APEs to support populations of special-status species. Mr. Martin also attended the Marin Project Coordinator's meeting on November 2, 2017 to receive input from regulatory agency representatives from the CDFW, U.S. Army Corps of Engineers and the Regional Water Quality Control Board on the Project and extent of their jurisdiction. The CNDDB, USFWS and CNPS species list are contained in **Appendix B**.

Existing Vegetation and Wildlife Habitat Conditions

The APE consists largely of road rights-of-ways that have been developed with roadways, roadside ditches, planted street trees and adjacent landscaping, with no remaining natural habitat. The one exception to this is the approximately 150-foot segment of the Nokomis open cut off upgrade off of Madrone Avenue near the top of bank to San Anselmo Creek. San Anselmo Creek remains a natural channel where it passes along the edge of the APE. The existing sewer line occurs just at or outside the top of bank to the creek channel, and riprap has installed along portions of the upper bank along a portion of this segment. Vegetation along the creek banks is dominated by invasive groundcover species such as English ivy (*Hedera helix*) and Algerian ivy (*Hedera canariensis* var. *algeriensis*), and a large clump of invasive giant reed (*Arundo donax*). A number of native California bay (*Umbellularia californica*) and coast live oak (*Quercus agrifolia*) trees grow along the 150-foot segment. These consist of a coast live oak with an estimated 18-inch diameter at breast height (DBH), a 32-inch California bay, and a multi-trunk (24/28/32-inch) California bay.

Landscaping along the roadway frontages consists of native and non-native trees, shrubs and groundcovers. Native tree species growing along the roadway frontages include: valley oak (*Quercus lobata*), coast live oak, California bay, and coast redwood (*Sequoia sempervirens*), of varying size and condition. Some larger sized specimens most likely predate the residential development in the area, such as some of the trees along San Anselmo Creek and Sleepy Hollow Creek. Non-native tree species growing along the roadway frontages include: blackwood acacia (*Acacia melanoxylon*), olive (*Olea europaea*), magnolia (*Magnolia* spp.), London Plane Tree (*Platanus acerifolia*), and liquid amber *(Liquidambar styraciflua*), among others. Shrubs and groundcovers are generally non-native ornamental species such as ivy, periwinkle (*Vinca* spp.), oleander (*Nerium oleander*), pyracantha (*Pyracantha* sp.), privet (*Ligustrum* spp.), rose (*Rosa* spp.), camellia (*Camellia* spp.), and irrigated lawns.

Most of the APE generally provides very little in terms of wildlife habitat given its developed

condition as roadway and adjacent residential frontages. The limited vegetative cover, intensity of human disturbance and activity, and risk of vehicle strikes limits its importance as foraging and dispersal habitat. Species typical of residential development utilize the mature trees and well-developed landscape for foraging, perching and possibly nesting substrate. These include: house finch (*Haemorhous mexicanus*), house sparrow (*Passer domesticus*), northern mocking bird (*Mimus polyglottos*), American robin (*Turdus migratorius*), scrub jay (*Aphelocoma californica*), mourning dove (*Zenaida macroura*), and California towhee (*Melozone crissalis*), among others. Common mammals include naturalized pest species such as house mouse (*Mus musculus*), Norway rat (*Rattus norvegicus*), and raccoon (*Procyon lotor*). The introduced marsupial Virginia opossum (*Didelphis virginiana*) is also common throughout east Marin, including the San Anselmo area. There was no evidence of any bird nesting observed in the trees and other landscaping along the APE during the field reconnaissance.

The San Anselmo and Sleepy Hollow Creek channels do provide for movement of terrestrial and aquatic species along the edge of the APE. Perennial and seasonal flows in San Anselmo and Sleepy Hollow Creeks does allow for movement of the federally-threatened steelhead trout (*Oncorhynchus mykiss*), both of which are designated as critical habitat for this species by the U.S. Fish and Wildlife Service. Surface water was present within both creek channels at the time of the site visits, although deep pools were absent along the San Anselmo Creek segment near the APE. The creek corridors may serve as a movement corridor for other fish species, and possibly western pond turtle (*Actinemys marmorata*), aquatic garter snake (*Thamnophis atratus*), amphibians such as Pacific chorus frog (*Pseudacris regilla*) and western toad (*Anaxyrus boreas*), and a number of aquatic invertebrates when surface water is present.

Special-Status Species

Special-status species are plants and animals that are legally protected under the state and/or federal Endangered Species Acts[1] or other regulations, as well as other species that are considered rare enough by the scientific community and trustee agencies to warrant special consideration, particularly with regard to protection of isolated populations, nesting or denning locations, communal roosts and other essential habitat. Species with legal protection under the Endangered Species Acts often represent major constraints to development, particularly when they are wide-ranging or highly sensitive to habitat disturbance and where proposed development would result in a "take" [2] of these species.

A record search conducted by the CNDDB, together with review of lists from the USFWS and CNPS indicates that occurrences of numerous plant and animal species with special-status have been recorded from or are suspected to occur in the Ross area of Marin County. **Figures 1** and **2** show the known occurrences of special-status plants and animals, respectively, as mapped by the CNDDB in an approximately two mile radius of the APE. **Figure 3** shows the location of observations and activity centers for northern spotted owl (*Strix occidentalis caurina*) within

[1] The federal Endangered Species Act (FESA) of 1973 declares that all federal departments and agencies shall utilize their authority to conserve endangered and threatened plant and animal species. The California Endangered Species Act (CESA) of 1984 parallels the policies of FESA and pertains to native California species.

[2] "Take" as defined by the FESA means "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect" a threatened or endangered species. "Harm" is further defined by the U.S. Fish and Wildlife Service (USFWS) to include the killing or harming of wildlife due to significant obstruction of essential behavior patterns (i.e., breeding, feeding, or sheltering) through significant habitat modification or degradation. The CDFW also considers the loss of listed species habitat as take, although this policy lacks statutory authority and case law support under the CESA.

several miles of the APE. The attached lists from the CNDDB, USFWS, and CNPS (see **Appendix B**) show the broad list of special-status plants and animals known from a wide range of habitat types found in Marin County, none of which contain suitable habitat any longer within in the APE due to the extent of past and on-going development and disturbance. The following provides a summary of the plant and animal species suspected to occur in the surrounding area away from the APE where natural habitat remains.

Animal Species. Based on the review of CNDDB data and the USFWS species list (see **Appendix B**), a total of 59 special-status mammal, birds, reptiles, amphibians, fish, and invertebrate species are known or suspected to occur in the vicinity of the APE. **Table 1** located at the end of this BRA provides a summary of each of these 59 species, their status, typical habitat characteristics, and conclusion regarding absence from the APE. Suitable habitat for all of these species is absent from the limits of construction disturbance within the APE. This includes absence of coastal salt marsh and open water habitat for many of the fish, mammal, and bird species known from the Baylands, forest and woodland habitat necessary to support the federally-threatened northern spotted owl, and suitable nesting habitat for special-status bird species.

As noted above, the San Anselmo and Sleepy Hollow Creek corridors are known to support the federally threatened steelhead, and are designated by the USFWS as critical habitat for this species (see **Figure 2**). The segments of the creek corridors adjacent to the APE provide dispersal to upstream and downstream locations, but lack foraging or retreat pools. A number of other aquatic-dependent species may also move along the creek corridors near the APE, such as western pond turtle and California giant salamander (*Dicampton ensatus*). But again, no essential habitat features are present for these species within the actual APE. No occurrences of foothill-yellow legged frog (*Rana boylii*) or California red-led legged frog (*Rana draytonii*) have been reported by the CNDDB anywhere within the surrounding watersheds, and their presence in the San Anselmo vicinity is highly unlikely.

No evidence of any bird nesting was observed during the field reconnaissance survey. The intensity of human activity and absence of suitable habitat limits the likelihood that any special-status bird species listed in **Table 1** nest in or near the APE, including northern spotted owl. But there is a possibility that new nests of more common bird species could be established in the future in advance of project construction. Nests in active use of both special-status and more common bird species are protected under the federal Migratory Bird Treaty Act and State Fish and Game code.

Plant Species. Based on the review of CNDDB data, the USFWS species list, and the CNPS Inventory (see **Appendix B**), a total of 44 special-status plant species were suspected to possibly occur in the San Anselmo vicinity. **Table 2** provides a summary of each of these species, their status, typical habitat characteristics, and conclusion regarding absence from the APE. These have varied status, and most are considered rare (list 1B) by the CNPS in their electronic *Inventory of Rare and Endangered Plants of California*. However, suitable habitat for special-status plant species known from the surrounding area is absent and none are expected to occur in the APE due to past development and on-going disturbance observed during the field reconnaissance. The APE has been completely disturbed by past grading, installation of pavement, ornamental landscaping, and existing sewer line facilities, which precludes the possibility of presence of any species-status plant species in the APE. This includes the 150-foot segment of the Nokomis improvements near the top of bank to San Anselmo Creek, which now supports a cover of invasive ivy and giant reed.

Jurisdictional Waters

Although definitions vary, wetlands are generally considered to be areas that are periodically or permanently inundated by surface or groundwater, and support vegetation adapted life in saturated soil. Wetlands are recognized as important features on a regional and national level due to their inherent value to fish and wildlife, use as storage areas for storm and floodwaters, and water recharge, filtration and purification functions. Jurisdiction of the U.S. Army Corps of Engineers (Corps) is established through provisions of Section 404 of the Clean Water Act, which prohibits the discharge of dredged or fill material into "waters of the U.S." without a permit. The Regional Water Quality Control Board (RWQCB) jurisdiction is established through Section 401 of the Clean Water Act, which requires certification or waiver to control discharges in water quality whenever a Corps permit is required under Section 404 of the Clean Water Act, and State waters as regulated under the Porter-Cologne Act. Jurisdictional authority of the CDFW over wetland areas is established under Sections 1600-1607 of the State Fish and Wildlife Code, which pertains to activities that would disrupt the natural flow or alter the channel, bed or bank of any lake, river or stream.

Based on a review of the National Wetland Inventory mapping and the observations made during the field reconnaissance survey, the San Anselmo and Sleepy Hollow Creek corridors are the only potential jurisdictional wetlands or regulated unvegetated "other waters of the U.S." in the vicinity of the APE. San Anselmo Creek passes within 50 feet of the APE where the sewer line replacement would occur north of Madrone Avenue for the Nokomis component of the Project. But construction would be restricted at or beyond the top of bank, and no disturbance to the active channel of San Anselmo Creek is anticipated. The existing sewer line would be abandoned in place to avoid disturbance to the bank of San Anselmo Creek. Based on input received from regulatory agency representatives during the Marin Project Coordinator's meeting on November 2, 2017 (which was attended by the IS biologist), the project will require review by and possibly authorization from the CDFW but would not affect waters regulated by the Corps or RWQCB under the Clean Water Act.

Improvements along Butterfield Road for the Butterfield component of the Project would not disturb the Sleepy Hollow Creek corridor, and no impacts to this feature are anticipated. Best Management Practices would be used to prevent any construction-generated sediment or other debris from entering the storm drain systems in the roadways and eventually entering either creek. This would include temporary installation of filter fabric over storm drain inlets, use of fiber rolls, and other methods to contain and control construction-generated sediments.

IMPACT ANALYSIS

Control Measures Incorporated by RVSD

The following control measures will be implemented by RVSD during construction to prevent potential impacts on sensitive biological resources and to ensure that trees and other landscaping affected by the Project will be replaced.

BIO-1. Adequate measures shall be taken to avoid inadvertent take of bird nests protected under the federal Migratory Bird Treaty Act and State Fish and Game Code when in active use. This shall be accomplished by taking the following steps.

- If initial construction is proposed during the nesting season (February 1 to August 31), a focused survey for nesting raptors and other migratory birds shall be conducted by a qualified biologist within 7 days prior to the onset of construction in order to determine

whether any active nests are present in the APE and surrounding area within 100 feet of proposed construction. The survey shall be reconducted any time construction has been delayed or curtailed for more than 7 days during the nesting season.

- If no active nests are identified during the construction survey period, or development is initiated during the non-breeding season (September 1 to January 31), construction may proceed with no restrictions.
- If bird nests are found, an adequate setback shall be established around the nest location and construction activities restricted within this no-disturbance zone until the qualified biologist has confirmed that any young birds have fledged and are able to function outside the nest location. Required setback distances for the no-disturbance zone shall be based on input received from the CDFW, and may vary depending on species and sensitivity to disturbance. As necessary, the no-disturbance zone shall be fenced with temporary orange construction fencing if construction is to be initiated elsewhere in the APE.
- A report of findings shall be prepared by the qualified biologist and submitted to the RVSD for review and approval prior to initiation of construction during the nesting season (February 1 to August 31). The report shall either confirm absence of any active nests or should confirm that any young are located within a designated no-disturbance zone and construction can proceed. No report of findings is required if construction is initiated during the non-nesting season (September 1 to January 31) and continues uninterrupted according to the above criteria.

BIO-2. The RVSD shall secure any required authorizations from regulatory agencies, conform to any conditions included in these authorizations, and comply with all applicable State and federal laws related to biological and wetland resources. This shall include submittal of a Notification to the CDFW for the open cut segment of the Nokomis component of the Project near San Anselmo Creek, which would most likely avoid disturbance to the bed or bank of the channel, but involves construction near the top of bank.

BIO-3. A Water Pollution Control Plan (WPCP) will be prepared. Provisions shall be incorporated into the WPCP to prevent any construction debris from entering San Anselmo and Sleepy Hollow Creek corridors. This shall include use of Best Management Practices such as filter fabric over storm drain culvert inlets, fiber-rolls around culvert inlets, and other practices.

BIO-4. Trees and other landscaping removed during construction shall be replaced by RVSD on-site. If required, RVSD shall obtain a permit from the Town of San Anselmo for the removal of street trees in conformance with Chapter 9 of Municipal Code.

BIO-5. The contractor shall exercise due diligence and implement necessary precautions to avoid needlessly damaging or destroying trees, shrubs or other landscaping in the Project limits. Of particular concern are the three mature native coast live oak and California bay trees along the open cut segment of the Nokomis component of the Project near San Anselmo Creek. Temporary orange construction fencing shall be installed around the perimeter of trunks of these three trees and other vegetation what could be damaged and is to be protected from construction equipment operation, and shall remain in place for the duration of construction. All construction equipment operators shall be trained that trees and other vegetation to be avoided must be protected, and that the orange construction fencing Is to remain in place for the duration of construction.

Significance Criteria

Resource Category/Significance Criteria	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
BIOLOGICAL RESOURCES. Would the Project:				
1) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	□	□	X	□
2) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	□	□	□	X
3) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	□	□	X	□
4) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	□	□	X	□
5) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	□	□	X	□
6) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan or other approved local, regional, or state habitat conservation plan?	□	□	□	X

Discussion

1) **Less than Significant Impact.**

Due to the extent of past development and absence of suitable habitat, no special-status species are believed to occur within the construction area in the APE, and no adverse effects are anticipated. Most of the APE is located in developed upland, composed of existing roadways and landscaped frontages, unsuitable for special-status species known from the San Anselmo vicinity and east Marin County. The open cut segment of the Nokomis component of the Project near San Anselmo Creek would be constructed outside the active channel in the yard

area of the existing residence. Adequate controls would be taken to prevent any excavated materials from rolling down the bank and into the active creek channel. No disturbance to the bed or banks of either San Anselmo or Sleepy Hollow Creeks is anticipated, and no disturbance to the habitat it provides steelhead, other fish species, western pond turtle, and other aquatic-dependent species would occur as a result of project implementation. Suitable habitat for other federally-listed or candidate species such as northern spotted owl, California red-legged frog, San Bruno elfin butterfly (*Callophyrys mossil bayensis*), Mission blue butterfly (*Plebujus icarioides missionensis*), and Myrtle's silverspot butterfly (*Speyeria zerene myrtleae*), among others, is absent from the APE. Thus pursuant to CEQA-Plus requirements, no federally-listed species would be affected and there would be no impact relative to the federal ESA as a result of Project implementation.

There was no evidence of any bird nesting within the APE observed during the field reconnaissance survey. Although the limited habitat values and extent of on-going disturbance generally precludes the potential for nesting birds in the APE, there remains a remote possibility that new bird nests could be established in the trees and other vegetation in and near the APE. If construction were initiated during the bird nesting season (March 1 – August 31) construction-related disturbance could result in abandonment of the nests if any are present in the immediate vicinity. If construction-related noise and disturbance resulted in destruction or abandonment of a nest in active use and loss of any eggs or young in the nest, this would be a significant adverse impact and violation of the federal Migratory Bird Treaty Act and State Fish and Game Code sections. **Control Measure BIO-1**, however, has been incorporated into the Project by RVSD which would serve to avoid this potential for violation of federal and state regulations by conducting a preconstruction survey and implementing appropriate construction restrictions if any active nests are encountered until any young birds have successfully fledged.

Thus, impacts on special-status species would be less-than-significant.

2) **No Impact.**

The APE does not contain any riparian habitat or other sensitive natural community types, and no impacts are anticipated. The segments of San Anselmo and Sleepy Hollow Creek corridors near the projects do contain native species, including willows and other riparian tree and shrub species. But no construction is proposed within the bed or bank of these creeks, and no adverse impacts on sensitive natural communities is anticipated.

3) **Less Than Significant Impact.**

The San Anselmo and Sleepy Hollow Creek channels are the only federally protected waters near the APE. All improvements near the Sleepy Hollow Creek corridor would be contained within Butterfield Road, with no disturbance within the creek channel. The open cut segment of the Nokomis component of the Project near San Anselmo Creek would be constructed outside the active channel in the yard area of the existing residence, and adequate controls would be taken to prevent any excavated materials from rolling down the bank and into the active creek channel. Appropriate controls would be implemented during construction to prevent any materials from entering the San Anselmo and Sleepy Hollow Creek corridors, and Best Management Practices would be followed to prevent sediments and other construction-generated pollutants from reaching downstream waters, as called for in **Control Measure BIO-3**.

Given that disturbance to the waters of San Anselmo and Sleepy Hollow Creeks (within or outside the OHWM) is not anticipated, authorization from the Corps or RWQCB under the

provisions of the Clean Water Act do not appear necessary. The CDFW typically requires notification any time modifications are proposed near a regulated drainage, such as San Anselmo Creek. This was confirmed during the Marin Project Coordinator's meeting on November 2, 2017. **Control Measure BIO-2** requires that the RVSD secure any required authorizations from regulatory agencies and conform to any conditions included in these authorizations. This includes submittal of a Notification to the CDFW for the portion of the open cut construction work north of Madrone Avenue along San Anselmo Creek for the Nokomis component of the Project, even though disturbance to the bed or bank are not anticipated.

Thus, pursuant to CEQA-Plus requirements, the Project is consistent with Executive Order 11990 – Protection of Wetlands. Because California does not have a Coastal Barriers Resources System, no impacts relative to the Coastal Barriers Resources Act will occur.

4) **Less than Significant Impact.**

The proposed Project would not have any significant adverse impacts on wildlife movement opportunities or adversely impact native wildlife nursery sites. Wildlife in the vicinity of the APE are already acclimated to human activity, and construction-related disturbance would not cause any significant impacts on wildlife movement in the surrounding area. Species common to the area would continue to utilize the surrounding area, even during construction.

Pursuant to CEQA-Plus requirements, no essential fish habitat would be affected and the Project is consistent with the Magnuson-Stevens Fishery Conservation and Management Act. The proposed open cut segment of the Nokomis Project near San Anselmo Creek would be constructed outside the active channel in the yard area of the existing residence. Adequate controls would be taken to prevent any excavated materials from rolling down the bank and into the active creek channel, and no impacts to fish habitat would occur as a result of project implementation.

5) **Less than Significant Impact.**

Policies in the Conservation Element of the *Town of San Anselmo General Plan* address the protection of sensitive biological and wetland resources, including creeks, significant habitat for fish, wildlife and flora, and natural features. With the exception of San Anselmo and Sleepy Hollow Creek corridors, and street trees that grow along the roadways in the APE, there are no other sensitive biological resources in the vicinity of the proposed Projects. As discussed above, no direct impacts to San Anselmo or Sleepy Hollow Creeks is anticipated as a result of project implementation. Appropriate controls would be implemented during construction to prevent any construction-generated materials from entering the San Anselmo and Sleepy Hollow Creek corridors, and Best Management Practices would be followed to prevent sediments and other construction-generated pollutants from reaching downstream waters, as called for in **Control Measure BIO-3**. Tree removal and damage would be minimized, and replacement provided where avoidance was infeasible, as called for in **Control Measures BIO-4** and **BIO-5**. No conflicts with the Town's General Plan are anticipated as a result of Project implementation.

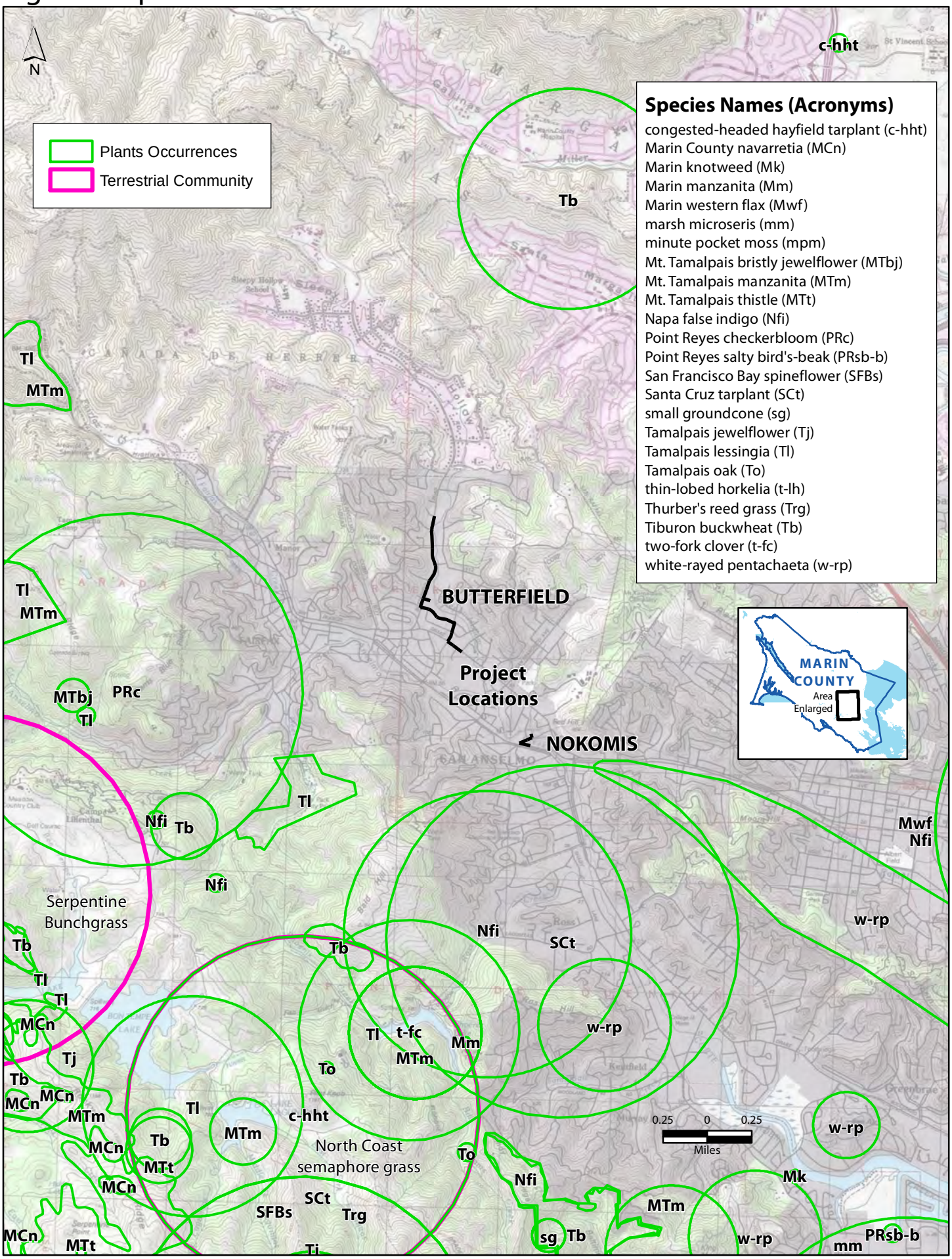
The Town of San Anselmo Municipal Code includes provisions related to the protection and management of street trees (Chapter 9 of Title 5). Section 4-9.06 requires a permit before any street tree can be removed or altered. Some of the project improvements could affect a number of trees along the APE, including both non-native ornamentals and remnant native oaks and California bay trees. Damage to the tree root zones, limbs, and trunk could occur as a result of trenching and other construction activities. And in some locations tree removal may be required to accommodate replacement facilities, where avoidance is infeasible. As discussed above,

trees and other landscaping removed to accommodate improvements associated with the Project would be replaced by RVSD. And any inadvertent damage to the trees in the vicinity of construction would be addressed by the Contractor, as required under **Control Measure BIO-5**. No major conflicts with local plans and policies are anticipated, and potential impact would be less than significant.

6) **No Impact.**

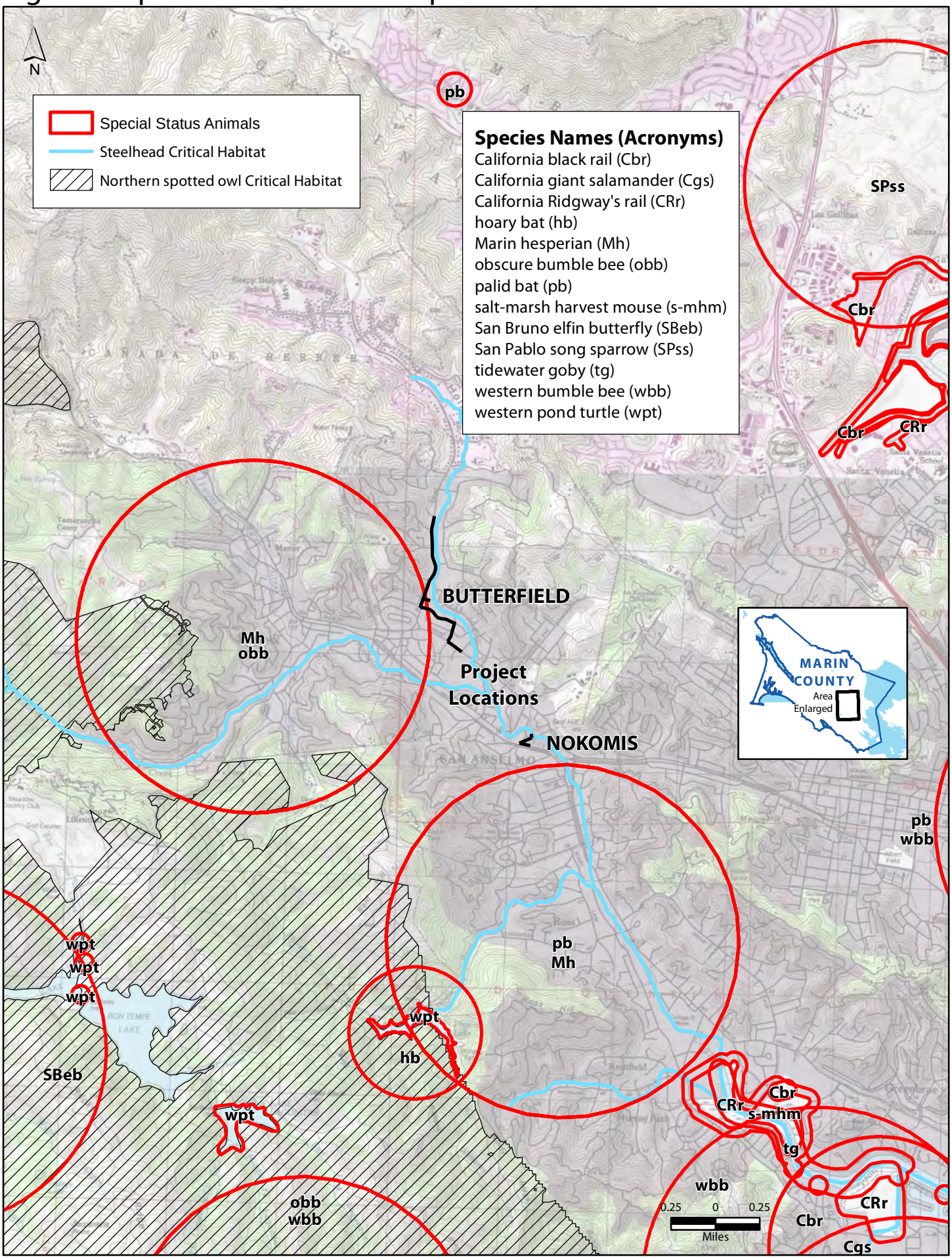
No habitat conservation plans have been prepared addressing the APE, and the Project would therefore not conflict with any adopted habitat conservation plans. As indicated in **Figure 3**, San Anselmo Creek and Sleepy Hollow Creek have been identified as Critical Habitat for steelhead and other species. However, as discussed above, no disturbance near Sleepy Hollow Creek is anticipated and the open cut segment of the Nokomis component of the Project near San Anselmo Creek would be constructed outside the active channel with adequate controls taken to prevent any excavated materials from rolling down the bank and into the active creek channel. As a result, the Projects would not result in any direct or indirect impacts to the creek corridors with suitable habitat for steelhead or other special-status species. And the RVSD has committed to securing all authorizations required under State or federal laws related to biological and wetland resources, as called for in **Control Measure BIO-1**. As a result, no impact would occur.

Figure 1. Special-Status Plants and Sensitive Natural Communities



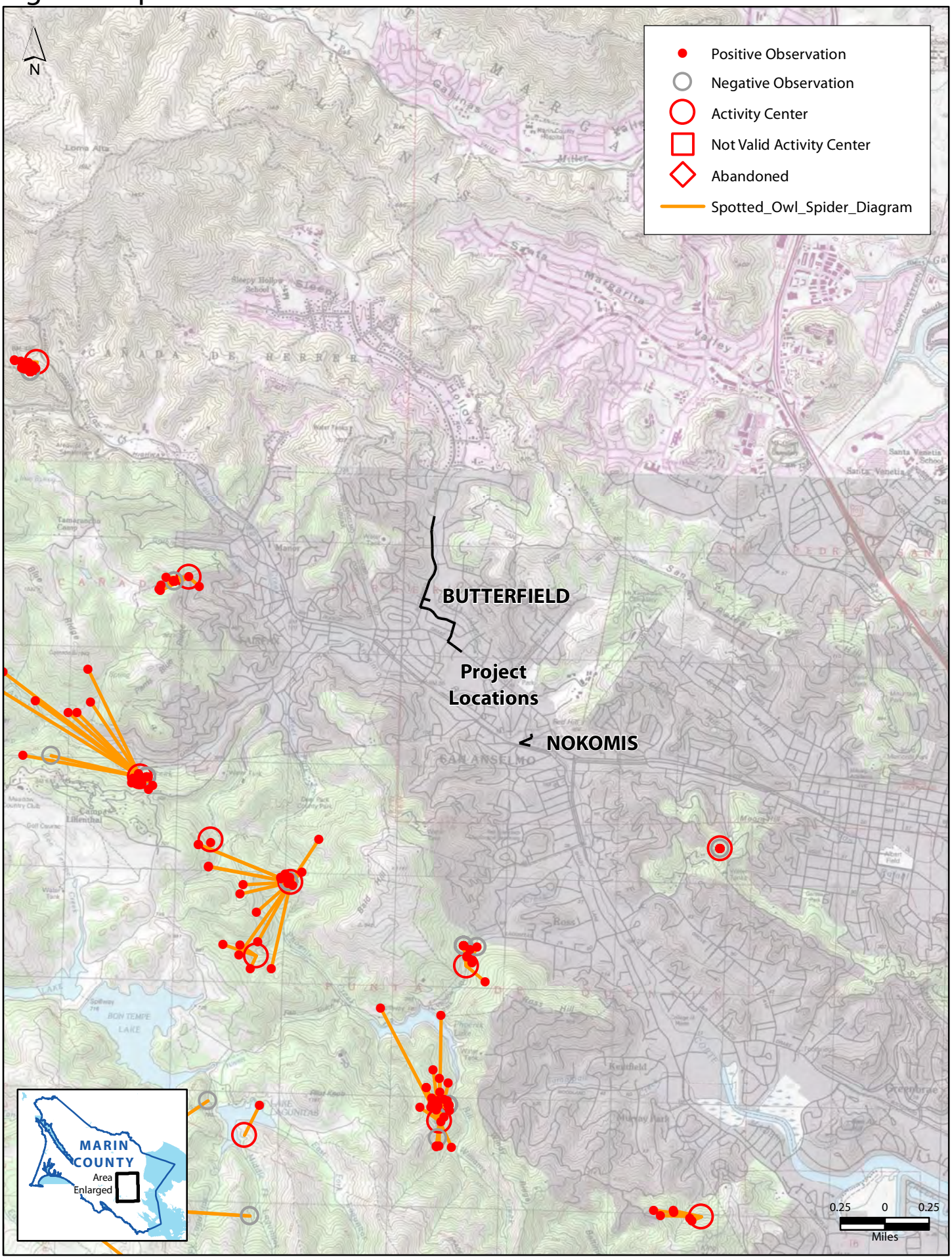
SOURCE: California Natural Diversity Database accessed on Sept. 28th, 2017; USFWS Critical Habitat data layers accessed on Sept 28th, 2017;
Service Layer Credits: Copyright:© 2013 National Geographic Society, i-cubed.

Figure 2. Special-Status Animal Species and Critical Habitat



SOURCE: California Natural Diversity Database accessed on Sept. 28th, 2017; USFWS Critical Habitat data layers accessed on Sept 28th, 2017;
Service Layer Credits: Copyright:© 2013 National Geographic Society, i-cubed.

Figure 3. Spotted Owl Observations



SOURCE: California Natural Diversity Database accessed on Sept. 28th, 2017; USFWS Critical Habitat data layers accessed on Sept 28th, 2017;
Service Layer Credits: Copyright:© 2013 National Geographic Society, i-cubed.

Table 1: Special-Status Animal Species Known to Occur or Potentially Occurring in San Anselmo Vicinity

Species	Status[a]	Habitat	Distribution and Potential for Occurrence within APE
Fish			
Coho salmon (Central California Coast ESU[b]) *Oncorhynchus kisutch*	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	Species historically occurred in Corte Madera Creek but is considered extinct in the watershed.[1] Species last recorded from San Francisco Bay tributary during early-to-mid 1980s.[2] Corte Madera Creek is designated as critical habitat (San Pablo Bay hydrologic unit #18050002) and essential fish habitat for this species. **No suitable habitat in APE.**
Chinook salmon (Central Valley Spring-run ESU) *Oncorhynchus tshawytscha*	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 Corte Madera Creek watershed.[3] **No suitable habitat in APE.**
Steelhead (Central California Coast ESU) *Oncorhynchus mykiss*	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 and tributary drainages, including Ross Creek.[4] Corte Madera Creek and Ross Creek are designated as critical habitat. **Suitable habitat at San Anselmo and Sleepy Hollow Creeks, adjacent to the APE. However, no direct or indirect effects are anticipated by construction, with no disturbance to the creek corridor.**
Green sturgeon *Acipenser medirostris*	FT, SSC	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, but not suspected from Ross Creek. **No suitable habitat in APE.**
Tidewater goby *Eucyclogobius newberryi*	FE, SSC	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 in Corte Madera Creek. Species is considered extirpated in the region. **No suitable habitat in APE.**
Delta smelt *Hypomesus transpacificus*	FT	Found in the Sacramento-San Joaquin estuary in saltwater, brackish and freshwater habitats	Reported from San Pablo Bay. **No suitable habitat in APE.**

[1] Leidy, R.A., C.S. Becker, and B.N. Harvey, 2007, *Historical Status of Coho Salmon in Streams of the Urbanized San Francisco Estuary, California*.
[2] Ibid.
[3] 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.
[4] Ibid.

Species	Status[a]	Habitat	Distribution and Potential for Occurrence within APE
Tomales roach *Lavinia symmetricus*	SSC	Known only from Walker Creek and Lagunitas Creek watersheds, in a variety of habitat conditions.	No CNDDB reported occurrences in the Ross Area. **No suitable habitat in APE.**
Longfin smelt *Spirinchus thaleichthys*	FC, ST, SSC	Open water estuaries and bays, both in saltwater and freshwater areas	Reported from San Pablo Bay. **No suitable habitat in APE.**
Amphibians and Reptiles			
Foothill yellow-legged frog *Rana boylii*	SSC	Perennial streams and drainages with cobble substrate.	CNDDB does not contain any occurrence records within four miles of the Ross area. **Marginally suitable habitat at San Anselmo and Sleepy Hollow Creeks, adjacent to the APE. However, no direct or indirect effects are anticipated by construction, with no disturbance to the creek corridor.**
California red-legged frog *Rana draytonii*	FT, SSC	Ponds, streams, drainages and associated uplands; requires areas of deep, still, and/or slow-moving water for breeding.	CNDDB does not contain any occurrence records within four miles of the Ross area. **Marginally suitable habitat at San Anselmo and Sleepy Hollow Creeks, adjacent to the APE. However, no direct or indirect effects are anticipated by construction, with no disturbance to the creek corridor.**
California giant salamander *Dicampton ensatus*	SSC	Ponds, streams, drainages and associated uplands; prefers fast moving water in coastal forests and valley-foothill riparian habitats with cover.	A general occurrence is reported by the CNDDB from the Corte Madera vicinity. **Marginally suitable habitat at San Anselmo and Sleepy Hollow Creeks, adjacent to the APE. However, no direct or indirect effects are anticipated by construction, with no disturbance to the creek corridor.**
Western pond turtle *Actinemys marmorata*	SSC	Ponds, streams with deep pools, drainages and associated uplands for egg laying	May occur in Corte Madera Creek, Phoenix Lake, and other freshwater/brackish features where suitable basking areas (sandy banks and rocks) are present. **Marginally suitable habitat at San Anselmo and Sleepy Hollow Creeks, adjacent to the APE. However, no direct or indirect effects are anticipated by construction, with no disturbance to the creek corridor.**
Invertebrates			
Opler's longhorn moth *Adela oplerella*	none	Typically found on serperntine grasslands where larval host plant, *Platystemon californicus*, is present.	Reported by the CNDDB from Ring Mountain Preserve in 1967. **No suitable habitat in APE.**
Obscure bumble bee *Bombus caliginosus*	none	Coastal areas from Santa Barbara County to Washington.	Reported by the CNDDB from the Mill Valley area in 1949 and 1959, Mt. Tamalpais, and other locations in Marin County. **No suitable habitat in APE.**
Western bumble bee *Bombus occidentalis*	none	Found in a variety of habitats. Once common and widespread. Species has declined precipitously, perhaps from disease	Reported from general occurrences in the Corte Madera area, and may remain in a variety of habitats. **No suitable habitat in APE.**

Species	Status[a]	Habitat	Distribution and Potential for Occurrence within APE
San Bruno elfin butterfly *Callophyrys mossil bayensis*	FE	Colonies are located on steep, north-facing slopes where larval host plant, *Sedum spathulifolium*, is present	Reported from a general occurrence in the vicinity of Alpine Lake. **No suitable habitat in APE.**
Monarch butterfly *Danaus plexippus*	none	Relatively common species in decline throughout its range. Overwintering colonies found in eucalyptus groves and conifer forests along coastal California. Overwintering colonies are of concern to CDFW	No CNDDB reported occurrences in the Ross Area. **No suitable habitat in APE.**
Mission blue butterfly *Plebujus icarioides missionensis*	FE	Found in coastal chaparral, scrub and grassland habitat where larval host plant, *Lupinus* spp., are present	No CNDDB reported occurrences in the Ross area. **No suitable habitat in APE.**
Robust walker *Pomatiopsis binneyi*	none	Amphibious snail living in humid habitat along the Coast Range, on marshy ground and periodically flooded soil. Typically associated with perennial seeps and rivulets.	No CNDDB reported occurrences in the Ross area. **No suitable habitat in APE.**
Myrtle's silverspot butterfly *Speyeria zerene myrtleae*	FE	Found in coastal prairie, coastal scrub and sand dunes where larval host plant, *Viola adunca*, is present	No reported occurrences in the Ross area. **No suitable habitat in APE.**
San Francisco Bay Area leaf-cutter bee *Trachusa gummifera*	none	A pollen-collecting bee known from grassland habitat and areas with suitable nectaring plants	Reported by the CNDDB from a general occurrence on Carson Ridge in 1962. **No suitable habitat in APE.**
Mimic tryonia (California brackishwater snail) *Tryonia imitator*	none	Inhabits coastal lagoons, estuaries and salt marshes from Sonoma County to San Diego County, typically found in permanently submerged areas	Reported by the CNDDB from a general occurrence in the San Rafael vicinity. **No suitable habitat in APE.**
Marin Hesperian *Vespericola marinensis*	none	Found in moist areas in coastal brushfields and chaparral, in riparian and mixed forest habitats	Reported by the CNDDB from the general vicinity of Fairfax, Ross, and Muir Woods. **No suitable habitat in APE.**
Birds			
Redhead *Aythya americana*	SSC	Large, deep bodies of water; nests in freshwater emergent wetlands	May winter in small numbers on open water habitats along Corte Madera Creek and San Francisco Bay. **No suitable habitat in APE.**
American white pelican *Pelecanus erythrorhynchos*	SSC	Forages over shallow inland waters and coastal marine habitats, nests on isolated islands or peninsulas	May forage and roost in the open water habitat in San Francisco Bay from late summer through spring; does not breed in San Francisco Bay. **No suitable habitat in APE.**
California brown pelican *Pelecanus occidentalis californicus*	FE, SE, CFP	Coastal shorelines and bays; rarely found on fresh water	May forage and roost in the open water habitat in San Francisco Bay from late summer through spring; does not breed in San Francisco Bay. **No suitable habitat in APE.**
California least tern (nesting colony) *Sterna antillarum browni*	FE, CE, CFP	Found along the Pacific coast, foraging in shallow estuaries and lagoons, and nesting on open beaches	Not reported from eastern Marin by the CNDDB. **No suitable habitat in APE.**
Western snowy plover *Charadrius alexandrines nivosus*	FT, SSC	Found along the Pacific coast and nests in barren to sparsely vegetated beaches and other shoreline areas	Not reported from eastern Marin by the CNDDB. **No suitable habitat in APE.**
Great egret (nesting colony) *Ardea alba*	none	Relatively common species, found foraging in a variety of aquatic habitats including shorelines of lakes, ponds, and drainages. Colonial nesting areas are of concern to CDFW	Observed in a variety of habitats in the Ross area where suitable foraging habitat is present. **No suitable habitat in APE.**

Species	Status[a]	Habitat	Distribution and Potential for Occurrence within APE
Great blue heron (nesting colony) *Ardea herodias*	none	Relatively common species, found foraging in a variety of aquatic habitats including shorelines of lakes, ponds, and drainages. Colonial nesting areas are of concern to CDFW	Observed in a variety of habitats in the Ross area where suitable foraging habitat is present. **No suitable habitat in APE.**
Snowy egret (nesting colony) *Egretta thula*	none	Relatively common species, found foraging in a variety of aquatic habitats including shorelines of lakes, ponds, and drainages. Colonial nesting areas are of concern to CDFW	Observed in a variety of habitats in the Ross area where suitable foraging habitat is present. **No suitable habitat in APE.**
Black-crowned night heron (nesting colony) *Nycticorax nycticorax*	none	Relatively common species, found foraging in a variety of aquatic habitats including shorelines of lakes, ponds, and drainages. Colonial nesting areas are of concern to CDFW	Observed in a variety of habitats in the Ross area where suitable foraging habitat is present. **No suitable habitat in APE.**
Marbled murrelet *Brachyramphus marmoratus*	FT, CE	Forages at sea and utilizes mature conifer forest for nesting	Suitable nesting and foraging habitat is absent in the Ross area. Designated critical habitat in west Marin, over four miles to the southwest. **No suitable habitat in APE.**
White-tailed kite *Elanus leucurus*	CFP	Open grasslands, meadows, or marshes; require dense-topped trees or shrubs for nesting and perching	Suitable nesting and foraging habitat present in the general Ross vicinity. **No evidence of nesting in APE.**
Bald eagle *Haliaeetus leucocephalus*	SE	Ocean shorelines, lake margins, and rivers for both nesting and wintering; nests in large trees with open branches	Known to occasionally forage along lower reaches of Corte Madera Creek during winter, but not likely to remain for long periods or breed in the Ross area. **No suitable habitat in APE.**
Northern harrier *Circus cyaneus*	SSC	Nests in wet meadows and marshes, forages over open grasslands and agricultural fields	Suitable foraging and nesting habitat present in the grassland and marshland habitat in the Ross area. **No suitable habitat in APE.**
Golden eagle *Aquila chrysaetos*	SSC, CFP	Rolling foothills and mountain areas. Nests in cliff-walled canyons or large trees in open areas	May occasionally forage in the Ross area, but not likely to remain for long periods or breed due to the lack of high quality nesting and foraging habitat. **No suitable habitat in APE.**
American peregrine falcon *Falco peregrinus*	SE, CFP	A variety of open habitats including coastlines, mountains, marshes, bay shorelines, and urban areas. Nest on cliffs, bridges, and tall buildings	May occasionally forage in the Ross area, but not likely to breed due to the lack of high quality nesting habitat. **No suitable habitat in APE.**
California black rail *Laterallus jamaicensis coturniculus*	FT, CFP	Salt marshes bordering larger bays, also found in brackish and freshwater marshes	Reported by CNDDB from Corte Madera Marsh State Ecological Reserve and Creekside Park, and most likely forages along Corte Madera Creek, but suitable habitat is absent in Ross area. **No suitable habitat in APE.**
Ridgway's rail/California clapper rail *Rallus longirostris obsoletus*	FE, SE, CFP	Tidal salt marshes with sloughs and substantial cordgrass (*Spartina* sp.) cover	Reported by CNDDB from Corte Madera Marsh State Ecological Reserve and Creekside Park, and most likely forages along Corte Madera Creek, but suitable habitat is absent in Ross area. **No suitable habitat in APE.**
Burrowing owl *Athene cunicularia*	SSC	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, but suitable habitat is absent in Ross area. **No suitable habitat in APE.**

Species	Status[a]	Habitat	Distribution and Potential for Occurrence within APE
Long-eared owl *Asio otus*	SSC	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 Ross area. Not likely to nest due to the limited extent of woodland habitat and relatively suburban setting. **No suitable habitat in APE.**
Northern spotted owl *Strix occidentalis caurina*	FT, SC, SSC	Dense forest and woodland, with suitable prey	Reported by the CNDDB from forests on the northeastern slopes of Mt. Tamalpais. Designated critical habitat extends over the dense forest and woodlands of western Ross, over a mile to the west. **No suitable habitat in APE.**
Short-tailed albatross *Phoebastria albatrus*	FE, SSC	A large sea bird that nests in the Hawaiian archipelago, foraging over the open ocean	May occasionally forage along the Marin coastline, but suitable habitat is absent in the Ross area. **No suitable habitat in APE.**
Olive-sided flycatcher *Contopus cooperi*	SSC	Coniferous forests with open canopies	May occur in coniferous forest habitat in the Ross area. **No suitable habitat in APE.**
Loggerhead shrike *Lanius ludovicianus*	SSC	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 areas of ruderal/grasslands and marshland fringes the Ross area. **No suitable habitat in APE.**
Purple martin *Progne subis*	SSC	Woodlands; nests in tree snags and abandoned woodpecker cavities and human-made structures	May forage in Ross area, but not likely to nest due to limited extent of suitable habitat. **No suitable habitat in APE.**
San Francisco (salt marsh) common yellowthroat *Geothlypis trichas sinuosa*	SSC	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 along Corte Madera Creek, but suitable habitat is absent in the Ross area. **No suitable habitat in APE.**
Bryant's savannah sparrow *Passerculus sandwichensis alaudinus*	SSC	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 along Corte Madera Creek, but suitable habitat is absent in the Ross area. **No suitable habitat in APE.**
Grasshopper sparrow *Ammodramus savannarum*	SSC	Grasslands with scattered shrubs.	May forage and breed in remaining large tracts of open grasslands in Ross area. **No suitable habitat in APE.**
San Pablo (Samuels) song sparrow *Melospiza melodia samuelis*	SSC	Tidal salt marshes dominated by pickleweed; nests primarily in pickleweed and marsh gumplant	Reported by CNDDB from Corte Madera Marsh State Ecological Reserve and may occur in suitable tidal marsh habitat along Corte Madera Creek, but suitable habitat is absent in the Ross area. **No suitable habitat in APE.**
Tricolored blackbird *Agelaius tricolor*	SSC	Nests in dense vegetation near open water; forages in grasslands and agricultural fields.	May forage in remaining grasslands during nonbreeding season, but not likely to breed in Ross area due to lack of large stands of freshwater marsh habitat. **No suitable habitat in APE.**

Species	Status[a]	Habitat	Distribution and Potential for Occurrence within APE
Mammals			
Salt marsh harvest mouse *Reithrodontomys raviventris*	FE, SE, CFP	Tidal salt marshes of San Francisco Bay and its tributaries. Requires tall, dense pickleweed for cover	Reported by CNDDB from Corte Madera Marsh State Ecological Reserve and Creekside Park, and may disperse along suitable tidal habitat along Corte Madera Creek, which is not present in the Ross area. **No suitable habitat in APE.**
Suisun shrew *Sorex ornatus sinuosus*	SSC	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.	Suitable habitat is present within tidal and brackish marsh habitat, but the Ross area is outside of the known range for this species. **No suitable habitat in APE.**
Pallid bat *Antrozous pallidus*	SSC	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 grassland and marshland habitats, but no active roosts are known from the Ross area. The CNDDB records include occurrences from 1891 and 1961 collected at unknown locations in the vicinity of San Rafael and Ross, respectively. **No suitable habitat in APE.**
Townsend's big-eared bat *Corynorhinus townsendii*	SC, SSC	Roots in the open in a variety of habitats, including tree cavities, caves and old buildings. Extremely sensitive to human disturbance.	Suitable habitat is present in forest and woodland habitat in the Ross area, but no active roosts have been reported by the CNDDB. **No suitable habitat in APE.**
Western red bat *Lasiurus blossevillii*	SSC	Forested canyons and riparian woodlands for roosting, a variety of open habitats for foraging; typically roosts in snags and trees with moderately dense canopies	Suitable habitat is present in coniferous forest and woodland habitat in the Ross area, but no active roosts have been reported by the CNDDB. **No suitable habitat in APE.**
Hoary bat *Lasiurus cinereus*	none	Prefers open habitats with access to trees for cover, roosting in dense foliage.	Reported by the CNDDB from a general occurrence at Phoenix Lake in 1948. **No suitable habitat in APE.**
American badger *Taxidea taxus*	SSC	Open habitats with friable soils	Marginal habitat present in remaining grassland habitat, but the relative small size and relative isolation of this habitat most likely precludes presence of this species in the Ross area. **No suitable habitat in APE.**

[a] Status:
FE = federally endangered
FT = federally threatened
FC = federal candidate
ST = State endangered
SC = State candidate
SSC = California Species of Special Concern
CFP = California Fully Protected Species

[b] ESU = Evolutionarily Significant Unit

Source: Based on CNDDB occurrences unless otherwise noted.

Table 2: Special-Status Plant Species Known to Occur or Potentially Occurring in San Anselmo Vicinity

Species	Status[a]	Habitat/Blooming Period	Potential for Occurrence in APEs
Amorpha californica var. napensis Napa false indigo	1B	Openings in broadleafed upland forest, chaparral, cismontane woodland. April-July	Suitable habitat occurs in forest, woodland and chaparral habitat absent in the APE. **No potential for occurrence in APE.**
Amsinckia lunaris Bent-flowered fiddleneck	1B	Coastal bluff scrub, cismontane woodland, valley and foothill grassland. March-June	Suitable grassland and woodland habitat absent in the APE. **No potential for occurrence in APE.**
Arctostaphylos hookeri ssp. montana Mt. Tamalpais Manzanita	1B	Chaparral, valley and foothill grassland/serpentinite, rocky. February-April	Suitable chaparral and grassland habitat absent in the APE. **No potential for occurrence in APE.**
Arctostaphylos virgate Marin Manzanita	1B	Broadleafed upland forest, closed-cone coniferous forest, chaparral, North Coast coniferous forest on sandstone, or granitic substrates. January-March	Suitable chaparral and forest habitat absent in the APE. **No potential for occurrence in APE.**
Astragalus pycnostachyus Coastal marsh milk-vetch	1B	Coastal dunes and scrub, marshes, swamps, and streamside. April-October	Suitable habitat absent in APE. **No potential for occurrence in APE.**
Calochortus tiburonensis Tiburon mariposa-lily	FT/ST	Open, rocky slopes in serpentine grassland. March-June	Suitable grassland habitat is absent in APE. **No potential for occurrence in APE.**
Calamagrostis crassiglumis Thurber's reed grass	2	Freshwater marsh in northern coastal scrub, freshwater wetlands and riparian wetlands. March-July	Suitable freshwater marsh habitat is absent in the APE. **No potential for occurrence in APE.**
Carex lyngbyei Lynbgye's sedge	2	Coastal salt marsh. April-August	Suitable coastal salt marsh habitat is absent in the APE. **No potential for occurrence in APE.**
Castilleja affinis ssp. neglecta Tiburon paintbrush	FE/ST	Rocky serpentine sites in grasslands. April-June	Suitable grassland habitat is absent in the APEs. **No potential for occurrence in APE.**
Ceanothus masonii Mason's ceanothus	1B	Chaparral, typically with serpentine substrate. March-April	Suitable habitat absent in APE. **No potential for occurrence in APE.**
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 in tidal marshlands absent in APE. Reported by CNDDB along the south bank of Corte Madera Creek, south of the Greenbrae boardwalk. **No potential for occurrence in APE.**
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)	Suitable grassland and scrub habitat absent in APE. **No potential for occurrence in APE.**
Cirsium hydrophilum var. vaseyi Mt. Tamalpais thistle	1B	Serpentine seeps and streams in chaparral and woodland. May-August	Suitable seep habitat in chaparral and woodlands absent in APE. **No potential for occurrence in APE.**
Cordylanthus maritimus ssp. palustris Point Reyes salty bird's-beak	1B	Coastal salt marsh and swamps. June-October	Suitable habitat absent in APE. **No potential for occurrence in APE.**
Dirca occidentalis Western leatherwood	1B	Wetland seeps and riparian areas in chaparral, foothill woodland, and forest habitats. January-March	Suitable habitat absent in APE. **No potential for occurrence in APE.**
Eriogonum luteolum var. caninum Tiburon buckwheat	1B	Serpentine soils; sandy to gravelly sites. May-September	Suitable grassland habitat absent in APE. **No potential for occurrence in APE.**
Fissidens pauperculus Minute pocket moss	1B	Moss growing on damp soil in coniferous forests along the coast; in dry streambeds and stream banks.	Suitable coniferous forest absent in APE. **No potential for occurrence in APE.**

Species	Status[a]	Habitat/Blooming Period	Potential for Occurrence in APEs
Fritillaria lanceolate var. tristulis Marin checker lily	1B	Coastal scrub, valley and foothill grassland, and coastal prairie; often on serpentine; various soils reported though usually clay. February-April	Suitable grassland habitat absent in APE. **No potential for occurrence in APE.**
Gilia capitate ssp. chamissonis Blue coast gilia	1B	Coastal dues and scrub. April-July	Suitable habitat absent in APE. **No potential for occurrence in APE.**
Gilia millefoliata Dark-eyed gilia	1B	Found in coastal strand habitat. April-July	Suitable habitat absent in APE. **No potential for occurrence in APE.**
Helianthella castanea Diablo helianthella	1B	Broadleafed upland forest, chaparral, cismontane woodland, coastal scrub, riparian woodland, valley and foothill grassland. March-June	Suitable interface of chaparral, forest, woodland, and grassland habitat absent in APE. **No potential for occurrence in APE.**
Hemizonia congesta ssp. leucocephala Congested-headed hayfield tarplant	1B	Valley and foothill grasslands, sometimes roadside. April-November	Suitable habitat absent in APE. **No potential for occurrence in APE.**
Hesperolinon congestum Marin western flax	FT/ST	Serpentine barrens and serpentine grassland and chaparral. April-July	Suitable grassland habitat absent in APE. Closest CNDDB occurrence is from a record in the 1880s generally reported from the vicinity of San Rafael. **No potential for occurrence in APE.**
Holocarpha macradenia Santa Cruz tarplant	FT/SE	Light, sandy soil or sandy clay, often with non-natives in coastal prairie and grasslands. June-October	Suitable grassland habitat absent in APE. **No potential for occurrence in APE.**
Horkelia tenuiloba Thin-lobed horkelia	1B	Broadleafed upland forest, chaparral, valley and foothill grassland on sandy soils, mesic openings. May-July	Suitable forest, chaparral, and grassland habitat absent in APE. **No potential for occurrence in APE.**
Kopsiopsis hookeri Small groundcone	2	Open woods, shrubby places, generally on *Gaultheria shallon*. April-August	Suitable forest and woodland habitat where host species is present absent in APE. **No potential for occurrence in APE.**
Lessingia micradenia var. micradenia Tamalpais lessingia	1B	Usually on serpentine, in serpentine grassland or chaparral, often on roadsides. (June rarely) July-October	Suitable grassland habitat absent in APE. **No potential for occurrence in APE.**
Microseris decipiens Santa Cruz microseris	1B	Closed-cone coniferous forest, cismontane woodland, coastal scrub, valley and foothill grassland. April-May	Suitable habitat absent in APE. **No potential for occurrence in APE.**
Microseris paludosa Marsh microseris	1B	Closed-cone coniferous forest, cismontane woodland, coastal scrub, valley and foothill grassland. April-June	Suitable forest, woodland, scrub and grassland habitat absent in APE. **No potential for occurrence in APE.**
Navarretia rosulata Marin County navarretia	1B	Closed-cone coniferous forest and chaparral on serpentinite. May-July	Suitable forest and chaparral habitat absent in APE. **No potential for occurrence in APE.**
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	Suitable grassland and woodland habitat absent in APE. **No potential for occurrence in APE.**
Plagiobothrys glaber Hairless popcorn-flower	1A	Coastal salt marshes, alkaline meadows, and seeps. March-May	Suitable marshland habitat absent in APE. **No potential for occurrence in APE.**
Pleuropogon hooverianus North Coast semaphore grass	1B	Wet grassy, usually shady areas, sometimes in freshwater marsh, associated with forest environments. April-June	Suitable freshwater marsh habitat is limited in the Ross vicinity. **No potential for occurrence in APE.**
Polypogon marinense Marin knotweed	3	Coastal salt marshes, brackish water marsh, and riparian wetlands. May-August	Suitable habitat is present in areas of coastal salt marsh and riparian wetlands. **No potential for occurrence in APE.**
Quercus parvula var. tamalpaisensis	1B	Lower montane coniferous forest. March-April	Suitable habitat is present in areas of forest and woodland. **No**

Species	Status[a]	Habitat/Blooming Period	Potential for Occurrence in APEs
Tamalpais oak			**potential for occurrence in APE.**
Sidalcea calycosa ssp. rhizomata Point Reyes checkerbloom	1B	Freshwater marshes near the coast. April-September	Suitable marshland habitat is limited in Ross vicinity. **No potential for occurrence in APE.**
Sidalcea hichmanii ssp. viridis Marin checkerbloom	1B	Chaparral, typically with serpentine substrate. May-June	Suitable habitat absent in APE. **No potential for occurrence in APE.**
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	Suitable habitat is present in areas of forest, chaparral, and grassland. **No potential for occurrence in APE.**
Streptanthus batrachopus Tamalpais jewel-flower	1B	Closed-cone coniferous forest, chaparral, Talus serpentine outcrops. April-June	Suitable forest and chaparral habitat is generally limited in Ross vicinity. **No potential for occurrence in APE.**
Streptanthus glandulosus ssp. Niger Tiburon jewel-flower	FE/SE	Shallow, rocky serpentine slopes in grasslands. May- June	Suitable grassland habitat is generally limited in Larkspur vicinity. **No potential for occurrence in APE.**
Streptanthus glandulosus ssp. pulchellus Mount Tamalpais bristly jewel-flower	1B	Serpentine slopes. May-July (August rarely)	Suitable habitat is generally absent from Ross vicinity. **No potential for occurrence in APE.**
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	Suitable marshland habitat is generally absent from Ross vicinity. **No potential for occurrence in APE.**
Trifolium amoenum Showy Rancheria (two-fork) clover	FE/1B	Coastal bluff scrub, valley and foothill grassland, sometimes on serpentinite. April-June	Suitable grassland and scrub habitat is generally absent from Ross vicinity. **No potential for occurrence in APE.**
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	Suitable grassland and scrub habitat is generally absent from Ross vicinity. **No potential for occurrence in APE.**

[a] Status: FE = federally endangered
SE = State endangered
FT = federally threatened
ST = State threatened
1A = Presumed extinct in California
1B = Rare, threatened or endangered in California and elsewhere
2 = Rare, threatened, or endangered in California, but more common elsewhere
3 = A review list

Source: Compiled by Environmental Collaborative based on CNDDB occurrence records, CNPS Inventory and other information. Nearest records are based on CNDDB occurrences unless otherwise noted.

APPENDIX A

Project Description and Map of APE

RVSD FY2016/17 Gravity Sewer Improvement – Project Description

Background

The Ross Valley Sanitary District (RVSD) is obligated to implement its capital program (the IAMP) under the cease and desist order No. R2- 2013-0020 (CDO). The IAMP presents projects to rehabilitate and replace the District's deficient wastewater facilities through the year 2020. The scope of this project includes the Design and Engineering Services for the IAMP's Fiscal Year 2016/2017 Gravity Sewer Improvements. Figures 1-3 show the locations of the proposed improvements and their construction characteristics. Further discussion is provided below.

Overview of Construction Methods

The FY 2016/17 Gravity Sewer Improvements includes the replacement of existing sewer pipes and the installation of new pipes by a variety of methods. These methods are:

- *Open Cut*: Existing sewer line would be exposed and removed by means of construction excavation equipment. A new pipe would then be installed and the trench would be backfilled.
- *Pipe Bursting*: Pipe bursting is a trenchless method where a new pipe is inserted into an existing pipe by means of a hydraulic winch. First, an insertion pit (roughly 3 feet wide by 45 feet long) and a receiving pit (roughly 4 feet wide by 8 feet long) are excavated at each end of a pipe segment. The locations of these pits are determined by the Contractor in the field based on site access. Prior to insertion of the new pipe, existing lateral connections are excavated and disconnected. A new pipe is then attached to a bursting head and pulled into the existing pipe. The bursting head breaks apart the existing pipe and creates a cavity for the new pipe. Once the new pipe is installed the existing laterals are reconnected and trenches are backfilled.
- *Pipe Reaming*: Pipe reaming is a trenchless method by which a new pipe replaces an existing pipe using a directional drill rig and reaming head. First, an insertion pit (roughly 3 feet wide by 45 feet long) and a receiving pit (roughly 4 feet wide by 8 feet long) are excavated at each end of a pipe segment. The locations of these pits are determined by the Contractor in the field based on site access. Prior to insertion of the new pipe, existing lateral connections are excavated and disconnected. A directional drill is then used to insert a drill string through the existing pipe. A specialized reaming tool and the replacement pipe are then attached to the end of the drill string. The directional drill then back-reams through the existing pipe, enlarging the hole while grinding the existing pipe and pulling the new pipe into place. The fragments of the host pipe along with other cuttings are suspended in drilling fluid and pushed ahead of the reamer through the existing pipe to the receiving pit, where they are extracted and disposed of.
- *Cured in Place Pipe (CIPP):* This process involves a liquid thermoset resin-saturated felt tube material that is inserted into the existing pipe by hydrostatic or air inversion through a manhole. Then, the tube is expanded against the wall of the existing pipe by water, air or steam and cured by hot water or steam. For this project, only air and steam would be allowed for expanding and only steam would be allowed for curing. Last, the new pipe is cooled and drained. This process results in a seamless, jointless pipe with a smooth, continuous inner surface. Laterals would be reinstated after the CIPP liner has cured by trenchless robotic methods.
- *Pilot Tube Guided Boring (PTGB):* PTGB is a trenchless method of pipe installation employing a pilot tube, temporary auger casing and jacking system for pushing the product pipe. First, an insertion pit (roughly 12 foot diameter) and a receiving pit (roughly 8 feet wide by 8 feet long) are excavated at each end of a pipe segment. The pipe would then be installed in three passes. In the first pass, a 4" diameter pilot tube sets the line and grade of the proposed pipe via a steering head and theodolite guidance system. In the second pass, a reaming head and auger

tube casing are installed behind the pilot tube. In the third pass, the product pipe is connected to the auger casing and jacked into place, thereby removing the auger tube casing.

Project Summary

The project consists of two project areas: The Lower Butterfield/Meadowcroft area and the Nokomis area. Both project areas are located in The Town of San Anselmo (Town), one of the eleven service areas within the Ross Valley Sanitation District. The primary scope of this project is to relieve hydraulic and structural deficiencies in the area, and to abandon an inverted siphon under Sleepy Hollow Creek at Willow Way.

The project consists of the following components:

Lower Butterfield/Meadowcroft

- Installation of a new diversion pipe by open cut on Butterfield Road between Kenrick Avenue and Willow Way. Existing sewer lines would be abandoned, with flows and laterals re-routed to the new diversion sewer.
- Abandonment of existing inverted siphon at Willow Way and open cut installation of a new pipe connecting to the new diversion sewer in Butterfield Road.
- Cured in place pipe and pipe bursting rehabilitation of existing sewer pipes along Butterfield Road.
- Installation of a new diversion sewer by PTGB on Butterfield between Willow Way and Meadowcroft Drive, and on Meadowcroft Drive between Butterfield Road and Morningside Drive.
- Installation of new diversion sewer by open cut on Meadowcroft Drive between Morningside Drive and Broadmoor Avenue.
- Installation of new and upsized sewer on Broadmoor Avenue from Meadowcroft Drive to Sir Francis Drake Boulevard and on Sir Francis Drake Boulevard from Broadmoor Avenue to Mountain View Avenue. This portion of the work would consist of open cut construction, pipe bursting, and pipe reaming.

Nokomis

- CIPP of existing sewer on Sycamore Avenue south of Madrone Avenue.
- New diversion sewer on Madrone Avenue between Sycamore Avenue and 50 Madrone Avenue. Existing laterals would be re-routed to the new pipe.
- Upsize of existing pipe in sewer easement at 50 Madrone Avenue, adjacent to San Anselmo Creek.

Project pipelines would range in size from 8 inches to 24 inches of diameter. The project would construct approximately 8,700 linear feet of pipe. Of this, approximately 5,000 would be constructed by open cut, 400 by pipe bursting, 400 by pipe reaming, 500 by cured in place pipe, and 500 by PTGB. Additionally, approximately 1,900 linear feet of laterals would be replaced or extended by open cut. Approximately 30 manholes would be replaced or installed, each requiring an excavation of

approximately 8 feet by 8 feet. It is anticipated that the project would take approximately 180 working days for construction.

Construction Staging

Prior to the start of construction, the Contractor would determine appropriate staging areas. It is anticipated that the contractor would stage in paved areas. However, the contract documents would require that any staging that takes place in un-paved areas would include proper Stormwater control measures.

Bypass Pumping

Bypass pumping would be required. We anticipate the contractor would pump the sewage flow from a manhole upstream of the work area to a manhole downstream of the work area. Residents who have sewer lateral connections within the work area would be asked to minimize water use during work in their area. The Contractor would notify residents to not use washing machines or dishwashers, not to perform swimming pool discharges into the sanitary sewer system, and to limit the use of sinks, showers and toilets during the period determined by the Contractor. The Contractor would be required to submit a bypass pumping plan adequate to bypass all flows around the work site.

Overview of Environmental Control Measures

Numerous control measures would be incorporated into the project's Contract Documents by RVSD to address environmental and public health and safety issues. Control measures are procedures known to further reduce the potential for impacts based on regulatory agency requirements, standards in the industry, and construction/operating experiences of RVSD and the design engineer.

Regulatory agency requirements would be contained in the permits for the projects. The Contractor would be required to obtain encroachment permits from the appropriate local jurisdiction, including the Town of San Anselmo and Marin County. These permits would contain specific requirements for traffic control and parking, emergency access, pavement restoration, noise control, allowable work hours, and provide for the safety of residents, pedestrians, and motorists. The Contractor would be required to comply with all conditions set forth in the encroachment permits and corresponding RVSD standards.

Coordination would be established and maintained with local residents businesses and schools along the alignment and a mechanism for monitoring construction activities and addressing any complaints would be implemented. Any damaged landscaped and/or hardscaped areas would be restored, and a series of best management practices (BMPs) would be enforced to maintain site appearance; control dust, erosion, and stormwater discharge; and provide noise attenuation if needed. Biological and cultural resources technical reports will be completed which will identify measures that would be included in the Contract Documents to address potential impacts. Deep excavations would be needed in some areas to support the open cut, pipe bursting, and PTGB construction methods. A variety of geotechnical and regulatory agency control measures would be included to provide for the constructability of the Project and its environmental compatibility, and to ensure the protection of workers' and the public's health and safety.

Figure 1. Key Map for Proposed Project

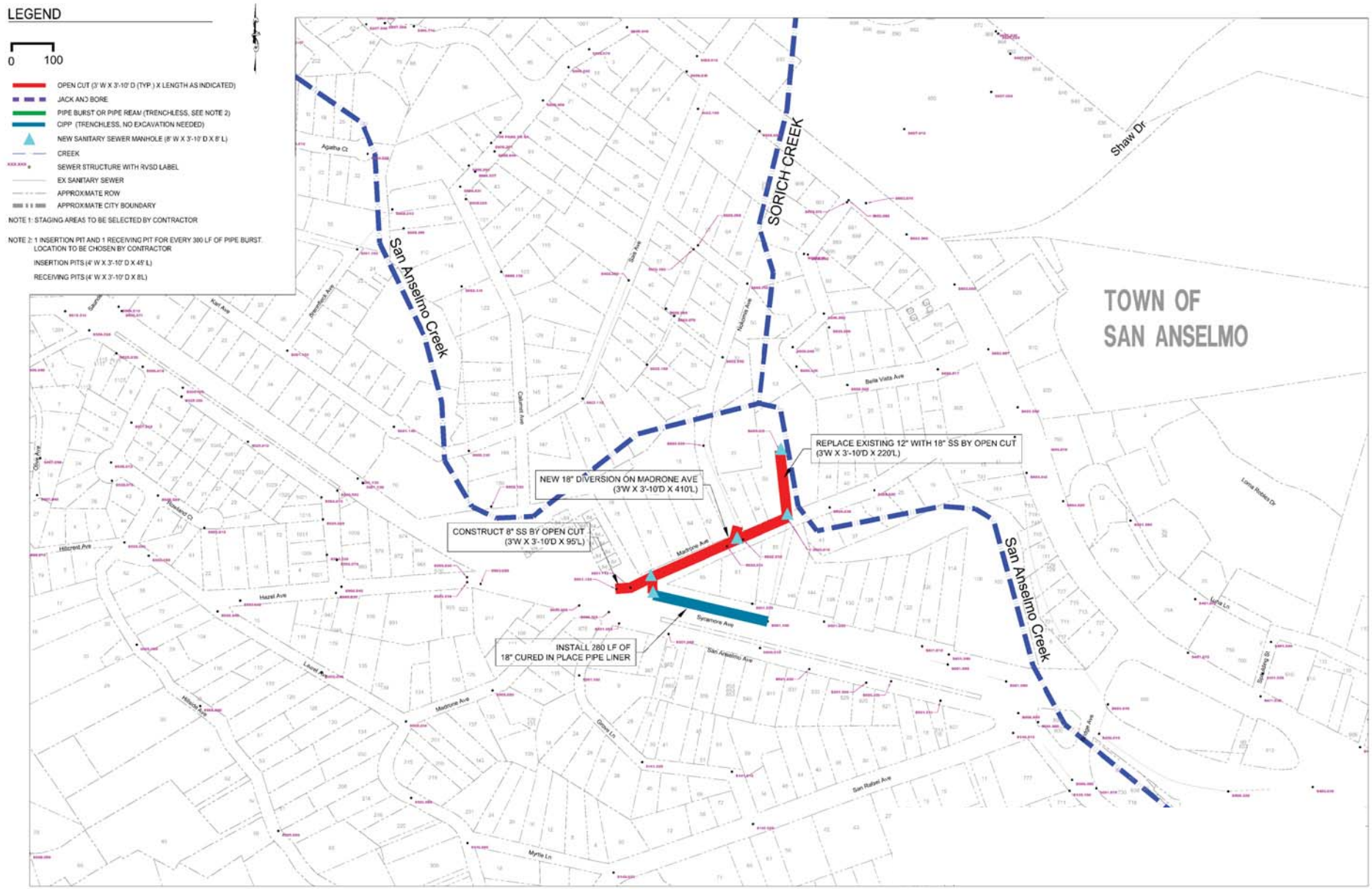


Figure 2. Construction Characteristics for the Nokomis Alignment

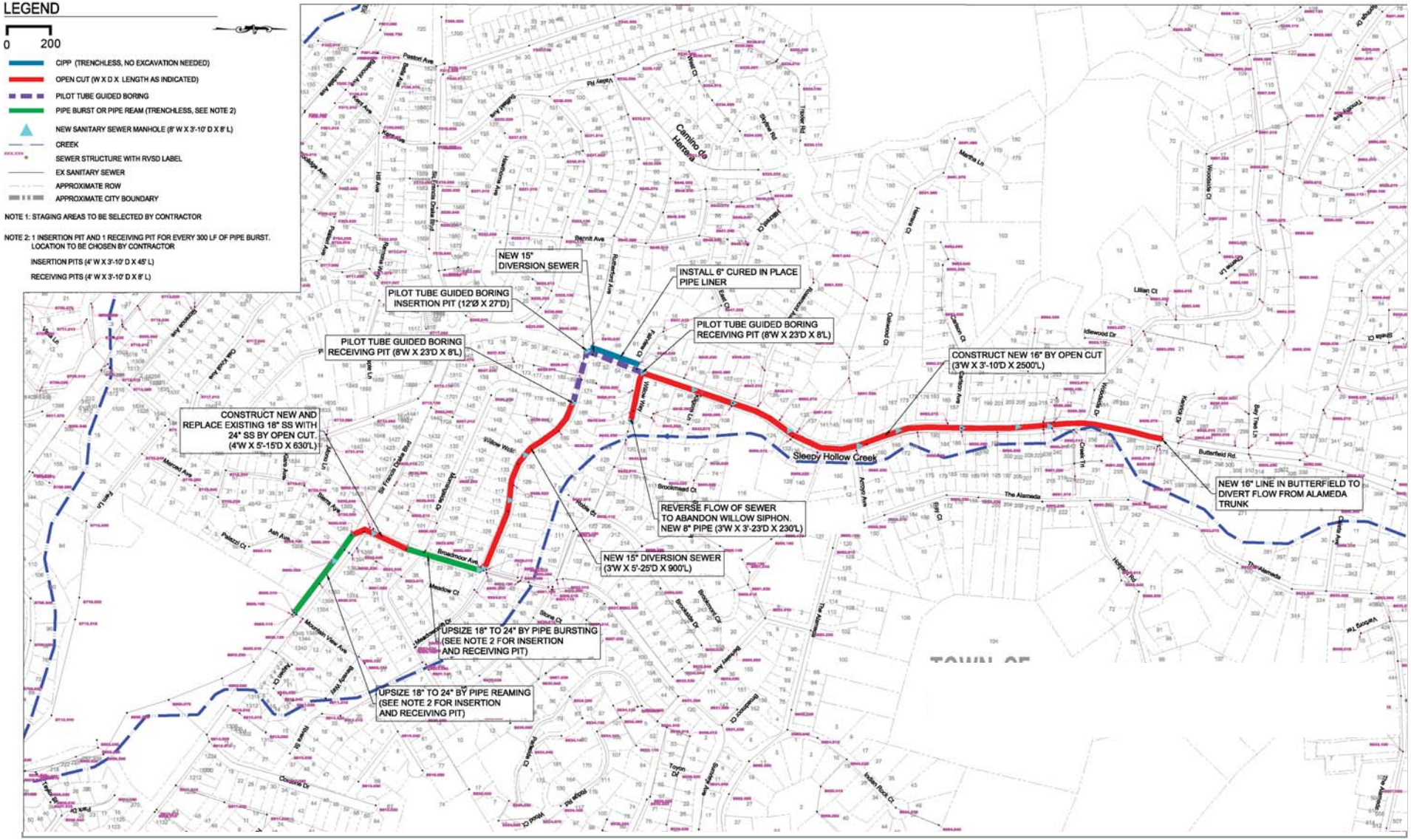


Figure 3. Construction Characteristics for the Butterfield Alignment

APPENDIX B

Species Lists from USFWS, CNDDB and CNPS

IPaC

U.S. Fish & Wildlife Service

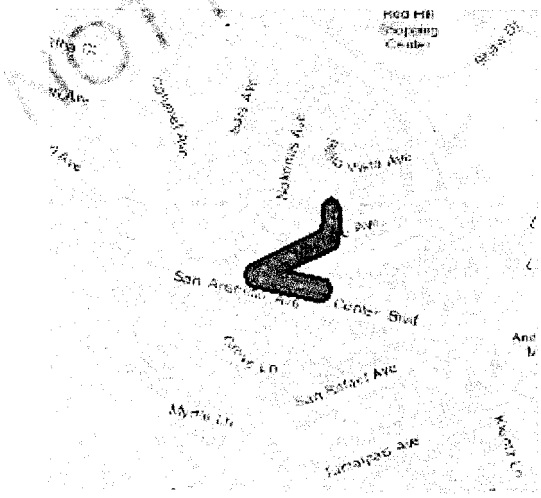
IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Marin County, California



Local office

Sacramento Fish And Wildlife Office

(916) 414-6600
(916) 414-6713

Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service.

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
Salt Marsh Harvest Mouse Reithrodontomys raviventris No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/613	Endangered

Birds

NAME	STATUS

California Clapper Rail Rallus longirostris obsoletus — Endangered
No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/4240

California Least Tern Sterna antillarum browni — Endangered
No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/8104

Marbled Murrelet Brachyramphus marmoratus — Threatened
There is **final** critical habitat for this species. Your location is outside the critical habitat.

https://ecos.fws.gov/ecp/species/4467

Northern Spotted Owl Strix occidentalis caurina — Threatened
There is **final** critical habitat for this species. Your location is outside the critical habitat.

https://ecos.fws.gov/ecp/species/1123

Short-tailed Albatross Phoebastria (=Diomedea) albatrus — Endangered
No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/433

Western Snowy Plover Charadrius alexandrinus nivosus — Threatened
There is **final** critical habitat for this species. Your location is outside the critical habitat.

https://ecos.fws.gov/ecp/species/8035

Reptiles

NAME — STATUS

Green Sea Turtle Chelonia mydas — Threatened
No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/6199

Amphibians

NAME — STATUS

California Red-legged Frog Rana draytonii — Threatened
There is **final** critical habitat for this species. Your location is outside the critical habitat.

https://ecos.fws.gov/ecp/species/2891

Fishes

NAME	STATUS
Delta Smelt Hypomesus transpacificus There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/321	Threatened
Steelhead Oncorhynchus (=Salmo) mykiss There is **final** critical habitat for this species. Your location overlaps the critical habitat. https://ecos.fws.gov/ecp/species/1007	Threatened
Tidewater Goby Eucyclogobius newberryi There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/57	Endangered

Insects

NAME	STATUS
Mission Blue Butterfly Icaricia icarioides missionensis There is **proposed** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/6928	Endangered
Myrtle's Silverspot Butterfly Speyeria zerene myrtleae No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/6929	Endangered
San Bruno Elfin Butterfly Callophrys mossii bayensis There is **proposed** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/3394	Endangered

Flowering Plants

NAME	STATUS
Marin Dwarf-flax Hesperolinon congestum No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/5363	Threatened

Santa Cruz Tarplant Holocarpha macradenia — Threatened
There is **final** critical habitat for this species. Your location is outside the critical habitat.

https://ecos.fws.gov/ecp/species/6832

Showy Indian Clover Trifolium amoenum — Endangered
No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/6459

White-rayed Pentachaeta Pentachaeta bellidiflora — Endangered
No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/7782

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

This location overlaps the critical habitat for the following species:

NAME	TYPE
Steelhead Oncorhynchus (=Salmo) mykiss Southern California DPS https://ecos.fws.gov/ecp/species/1007#crithab	Final
Steelhead Oncorhynchus (=Salmo) mykiss California Central Valley DPS https://ecos.fws.gov/ecp/species/1007#crithab	Final
Steelhead Oncorhynchus (=Salmo) mykiss Central California Coast DPS https://ecos.fws.gov/ecp/species/1007#crithab	Final
Steelhead Oncorhynchus (=Salmo) mykiss South-Central California Coast DPS https://ecos.fws.gov/ecp/species/1007#crithab	Final
Steelhead Oncorhynchus (=Salmo) mykiss Northern California DPS https://ecos.fws.gov/ecp/species/1007#crithab	Final

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any activity that results in the take (to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct) of migratory birds or eagles is prohibited unless authorized by the U.S. Fish and Wildlife Service[3]. There are no provisions for allowing the take of migratory birds that are unintentionally killed or injured. Any person or organization who plans or conducts activities that may result in the take of migratory birds is responsible for complying with the appropriate regulations and implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

The birds listed below are USFWS Birds of Conservation Concern that might be affected by activities in this location. The list does not contain every bird you may find in this location, nor is it guaranteed that all of the birds on the list will be found on or near this location. To get a better idea of the specific locations where certain species have been reported and their level of occurrence, please refer to resources such as the E-bird data mapping tool (year-round bird sightings by birders and the general public) and Breeding Bird Survey (relative abundance maps for breeding birds). Although it is important to try to avoid and minimize impacts to all birds, special attention should be given to the birds on the list below. To get a list of all birds potentially present in your project area, visit the E-bird Explore Data Tool.

NAME	BREEDING SEASON
Allen's Hummingbird Selasphorus sasin https://ecos.fws.gov/ecp/species/9637	Breeds Feb 1 to Jul 15
Ashy Storm-petrel Oceanodroma homochroa https://ecos.fws.gov/ecp/species/7237	Breeds May 1 to Jan 15
Black Oystercatcher Haematopus bachmani https://ecos.fws.gov/ecp/species/9591	Breeds Apr 15 to Oct 31

Black Rail Laterallus jamaicensis https://ecos.fws.gov/ecp/species/7717	Breeds Mar 1 to Sep 15
Black Skimmer Rynchops niger https://ecos.fws.gov/ecp/species/5234	Breeds May 20 to Sep 15
Black Swift Cypseloides niger https://ecos.fws.gov/ecp/species/8878	Breeds Jun 15 to Sep 10
Black Turnstone Arenaria melanocephala	Breeds elsewhere
Black-chinned Sparrow Spizella atrogularis https://ecos.fws.gov/ecp/species/9447	Breeds Apr 15 to Jul 31
Burrowing Owl Athene cunicularia https://ecos.fws.gov/ecp/species/9737	Breeds Mar 15 to Aug 31
California Spotted Owl Strix occidentalis occidentalis https://ecos.fws.gov/ecp/species/7266	Breeds Mar 10 to Jun 15
California Thrasher Toxostoma redivivum	Breeds Jan 1 to Jul 31
Common Yellowthroat Geothlypis trichas sinuosa https://ecos.fws.gov/ecp/species/2084	Breeds May 20 to Jul 31
Lawrence's Goldfinch Carduelis lawrencei https://ecos.fws.gov/ecp/species/9464	Breeds Mar 20 to Sep 20
Lewis's Woodpecker Melanerpes lewis https://ecos.fws.gov/ecp/species/9408	Breeds Apr 20 to Sep 30
Long-billed Curlew Numenius americanus https://ecos.fws.gov/ecp/species/5511	Breeds elsewhere
Marbled Godwit Limosa fedoa https://ecos.fws.gov/ecp/species/9481	Breeds elsewhere
Mountain Plover Charadrius montanus https://ecos.fws.gov/ecp/species/3638	Breeds elsewhere
Nuttall's Woodpecker Picoides nuttallii https://ecos.fws.gov/ecp/species/9410	Breeds Apr 1 to Jul 20

Oak Titmouse Baeolophus inornatus https://ecos.fws.gov/ecp/species/9656	Breeds Mar 15 to Jul 15
Red Knot Calidris canutus ssp. roselaari https://ecos.fws.gov/ecp/species/8880	Breeds elsewhere
Rufous Hummingbird selasphorus rufus https://ecos.fws.gov/ecp/species/8002	Breeds elsewhere
Short-billed Dowitcher Limnodromus griseus https://ecos.fws.gov/ecp/species/9480	Breeds elsewhere
Snowy Plover Charadrius alexandrinus	Breeds Mar 5 to Sep 15
Song Sparrow Melospiza melodia pusillula https://ecos.fws.gov/ecp/species/3509	Breeds Feb 20 to Sep 5
Spotted Towhee Pipilo maculatus clementae https://ecos.fws.gov/ecp/species/4243	Breeds Apr 15 to Jul 20
Tricolored Blackbird Agelaius tricolor https://ecos.fws.gov/ecp/species/3910	Breeds Mar 15 to Aug 10
Whimbrel Numenius phaeopus https://ecos.fws.gov/ecp/species/9483	Breeds elsewhere
Yellow Rail Coturnicops noveboracensis https://ecos.fws.gov/ecp/species/9476	Breeds elsewhere

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds.

Probability of Presence (▒)

Each green bar represents the bird's relative probability of presence in your project's counties during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the

week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.

2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

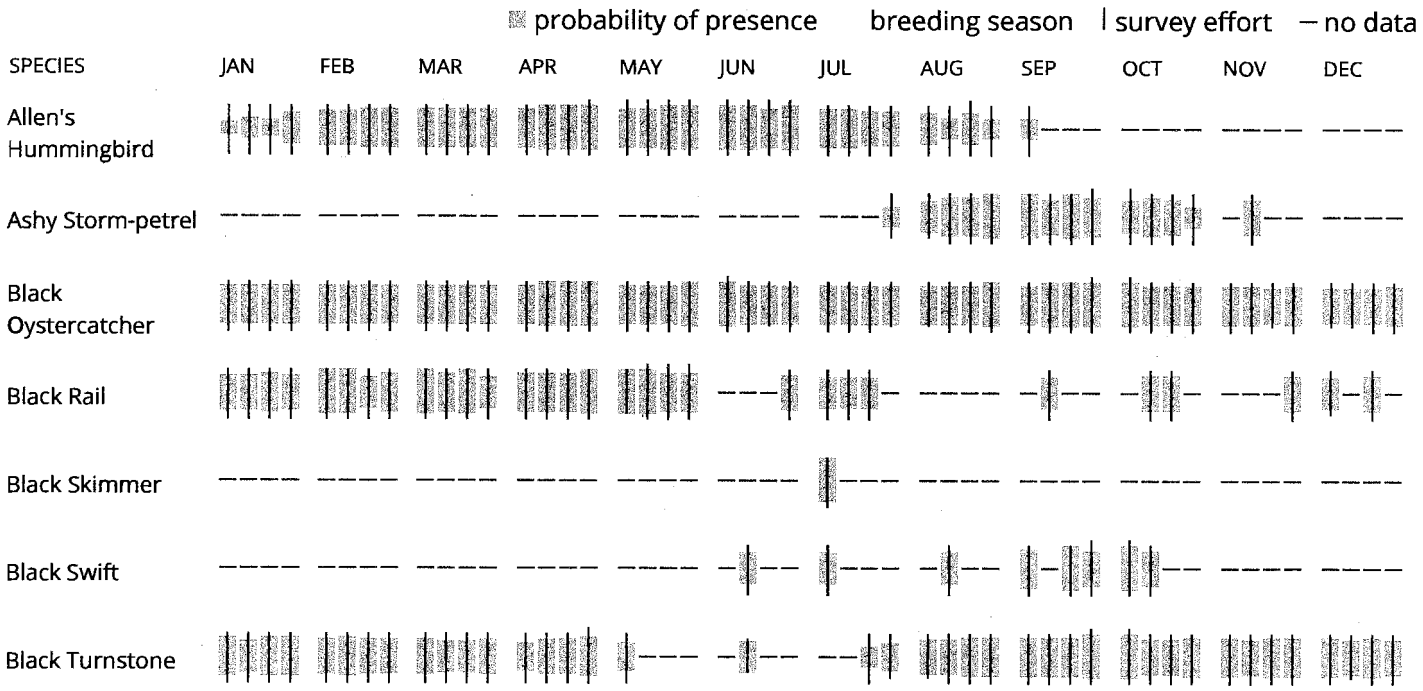
Breeding Season ( )
Yellow bars denote when the bird breeds in the Bird Conservation Region(s) in which your project lies. If there are no yellow bars shown for a bird, it does not breed in your project area.

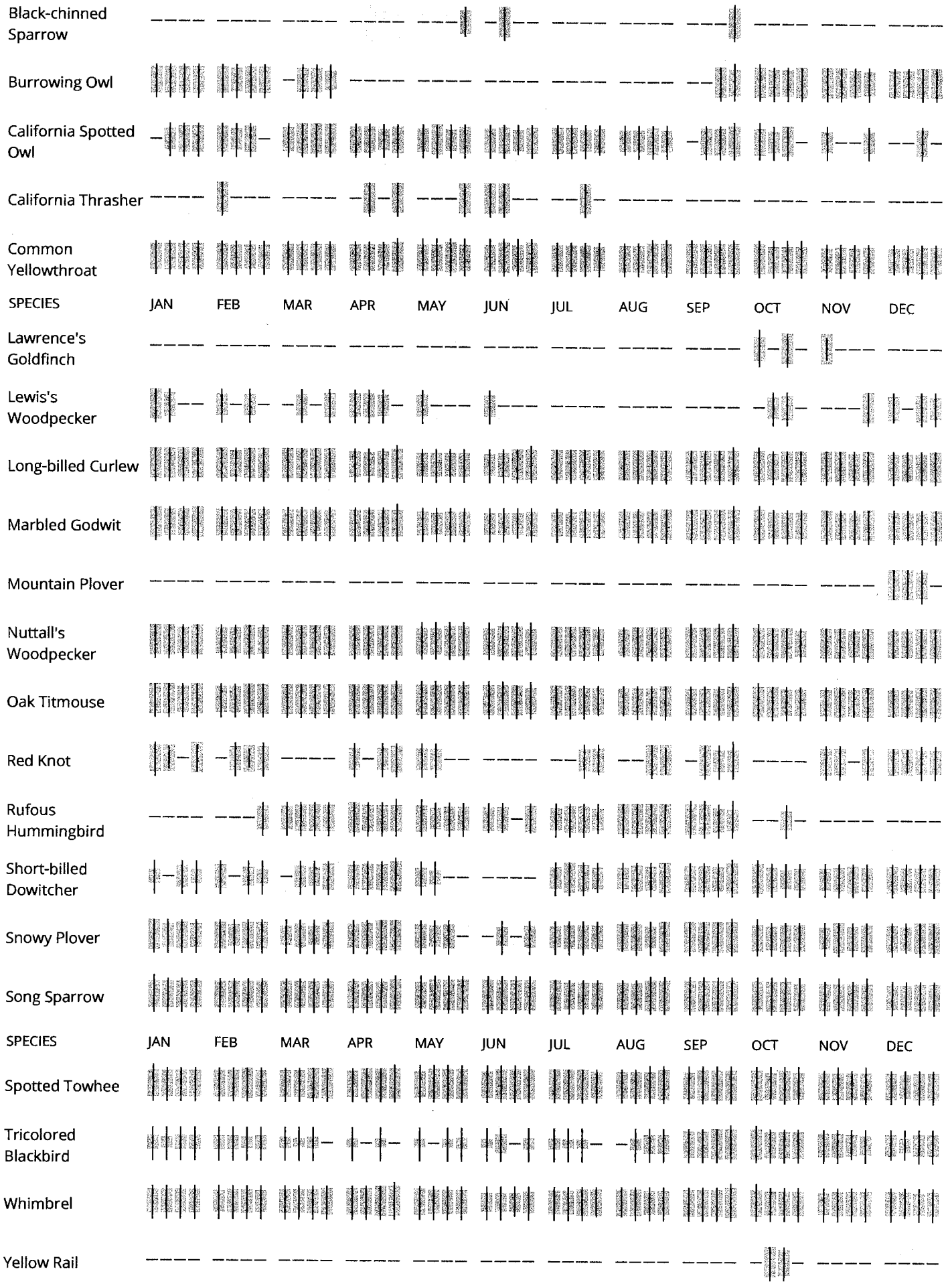
Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the counties of your project area. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information.




Black-chinned Sparrow
Burrowing Owl
California Spotted Owl
California Thrasher
Common Yellowthroat
SPECIES
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
Lawrence's Goldfinch
Lewis's Woodpecker
Long-billed Curlew
Marbled Godwit
Mountain Plover
Nuttall's Woodpecker
Oak Titmouse
Red Knot
Rufous Hummingbird
Short-billed Dowitcher
Snowy Plover
Song Sparrow
SPECIES
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
Spotted Towhee
Tricolored Blackbird
Whimbrel
Yellow Rail

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Such measures are particularly important when birds are most likely to occur in the project area. To see when birds are most likely to occur in your project area, view the Probability of Presence Summary. Special attention should be made to look for nests and avoid nest destruction during the breeding season. The best information about when birds are breeding can be found in Birds of North America (BNA) Online under the "Breeding Phenology" section of each species profile. Note that accessing this information may require a subscription. Additional measures and/or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) that might be affected by activities in your project location. These birds are of priority concern because it has been determined that without additional conservation actions, they are likely to become candidates for listing under the Endangered Species Act (ESA).

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets. The AKN list represents all birds reported to be occurring at some level throughout the year in the counties in which your project lies. That list is then narrowed to only the Birds of Conservation Concern for your project area.

Again, the Migratory Bird Resource list only includes species of particular priority concern, and is not representative of all birds that may occur in your project area. Although it is important to try to avoid and minimize impacts to all birds, special attention should be made to avoid and minimize impacts to birds of priority concern. To get a list of all birds potentially present in your project area, please visit the E-bird Explore Data Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets.

Probability of presence data is continuously being updated as new and better information becomes available.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird entry on your migratory bird species list indicates a breeding season, it is probable the bird breeds in your project's counties at some point within the time-frame specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

Facilities

Wildlife refuges

Any activity proposed on National Wildlife Refuge lands must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGES AT THIS LOCATION.

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

This location overlaps the following wetlands:

RIVERINE
R3UBF

A full description for each wetland code can be found at the National Wetlands Inventory website: https://ecos.fws.gov/ipac/wetlands/decoder

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged

aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

IPaC

U.S. Fish & Wildlife Service

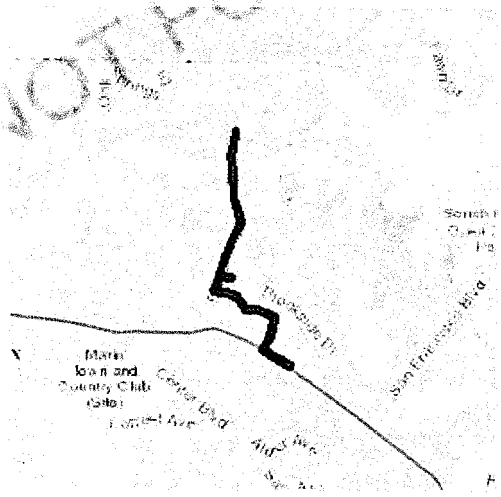
IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Marin County, California



Local office

Sacramento Fish And Wildlife Office

(916) 414-6600
(916) 414-6713

Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service.

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
Salt Marsh Harvest Mouse Reithrodontomys raviventris No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/613	Endangered

Birds

NAME	STATUS

California Clapper Rail Rallus longirostris obsoletus — Endangered
No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/4240

California Least Tern Sterna antillarum browni — Endangered
No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/8104

Marbled Murrelet Brachyramphus marmoratus — Threatened
There is **final** critical habitat for this species. Your location is outside the critical habitat.

https://ecos.fws.gov/ecp/species/4467

Northern Spotted Owl Strix occidentalis caurina — Threatened
There is **final** critical habitat for this species. Your location is outside the critical habitat.

https://ecos.fws.gov/ecp/species/1123

Short-tailed Albatross Phoebastria (=Diomedea) albatrus — Endangered
No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/433

Western Snowy Plover Charadrius alexandrinus nivosus — Threatened
There is **final** critical habitat for this species. Your location is outside the critical habitat.

https://ecos.fws.gov/ecp/species/8035

Reptiles

NAME — STATUS

Green Sea Turtle Chelonia mydas — Threatened
No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/6199

Amphibians

NAME — STATUS

California Red-legged Frog Rana draytonii — Threatened
There is **final** critical habitat for this species. Your location is outside the critical habitat.

https://ecos.fws.gov/ecp/species/2891

Fishes

NAME	STATUS
Delta Smelt Hypomesus transpacificus There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/321	Threatened
Steelhead Oncorhynchus (=Salmo) mykiss There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/1007	Threatened
Tidewater Goby Eucyclogobius newberryi There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/57	Endangered

Insects

NAME	STATUS
Mission Blue Butterfly Icaricia icarioides missionensis There is **proposed** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/6928	Endangered
Myrtle's Silverspot Butterfly Speyeria zerene myrtleae No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/6929	Endangered
San Bruno Elfin Butterfly Callophrys mossii bayensis There is **proposed** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/3394	Endangered

Flowering Plants

NAME	STATUS
Marin Dwarf-flax Hesperolinon congestum No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/5363	Threatened

Santa Cruz Tarplant Holocarpha macradenia — Threatened
There is **final** critical habitat for this species. Your location is outside the critical habitat.

https://ecos.fws.gov/ecp/species/6832

Showy Indian Clover Trifolium amoenum — Endangered
No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/6459

White-rayed Pentachaeta Pentachaeta bellidiflora — Endangered
No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/7782

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any activity that results in the take (to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct) of migratory birds or eagles is prohibited unless authorized by the U.S. Fish and Wildlife Service[3]. There are no provisions for allowing the take of migratory birds that are unintentionally killed or injured. Any person or organization who plans or conducts activities that may result in the take of migratory birds is responsible for complying with the appropriate regulations and implementing appropriate conservation measures, as described below.

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Additional information can be found using the following links:

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- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/

conservation-measures.php

- Nationwide conservation measures for birds
  http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

MIGRATORY BIRD INFORMATION IS NOT AVAILABLE AT THIS TIME

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Such measures are particularly important when birds are most likely to occur in the project area. To see when birds are most likely to occur in your project area, view the Probability of Presence Summary. Special attention should be made to look for nests and avoid nest destruction during the breeding season. The best information about when birds are breeding can be found in Birds of North America (BNA) Online under the "Breeding Phenology" section of each species profile. Note that accessing this information may require a subscription. Additional measures and/or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

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Facilities

Wildlife refuges

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THERE ARE NO REFUGES AT THIS LOCATION.

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

This location overlaps the following wetlands:

RIVERINE

- R4SBC
- R4SBA

A full description for each wetland code can be found at the National Wetlands Inventory website: https://ecos.fws.gov/ipac/wetlands/decoder

Data limitations

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Data exclusions

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Data precautions

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Summary Table Report

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: Quad IS (San Rafael (3712285) OR Novato (3812215))

Name (Scientific/Common)	CNDDB Ranks	Listing Status (Fed/State)	Other Lists	Elev. Range (ft.)	Total EO's	Element Occ. Ranks						Population Status		Presence		
						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
Adela oplerella Opler's longhorn moth	G2 S2	None None		400 1,300	14 S:3	0	0	0	0	0	3	3	0	3	0	0
Amorpha californica var. napensis Napa false indigo	G4T2 S2	None None	Rare Plant Rank - 1B.2 SB_RSABG-Rancho Santa Ana Botanic Garden	500 2,000	69 S:9	0	0	0	0	1	8	4	5	8	1	0
Amsinckia lunaris bent-flowered fiddleneck	G2G3 S2S3	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive		64 S:1	0	0	0	0	0	1	1	0	1	0	0
Antrozous pallidus pallid bat	G5 S3	None None	BLM_S-Sensitive CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern USFS_S-Sensitive WBWG_H-High Priority	40 225	409 S:4	0	0	0	0	2	2	2	2	2	2	0
Arctostaphylos montana ssp. montana Mt. Tamalpais manzanita	G3T3 S3	None None	Rare Plant Rank - 1B.3	500 2,220	15 S:9	0	1	0	0	0	8	6	3	9	0	0
Arctostaphylos virgata Marin manzanita	G2 S2	None None	Rare Plant Rank - 1B.2 SB_RSABG-Rancho Santa Ana Botanic Garden SB_USDA-US Dept of Agriculture	200 2,625	32 S:8	0	0	0	1	0	7	7	1	8	0	0
Ardea alba great egret	G5 S4	None None	CDF_S-Sensitive IUCN_LC-Least Concern	18 18	40 S:1	0	1	0	0	0	0	0	1	1	0	0
Ardea herodias great blue heron	G5 S4	None None	CDF_S-Sensitive IUCN_LC-Least Concern	18 100	145 S:3	0	1	0	0	0	2	2	1	3	0	0
Athene cunicularia burrowing owl	G4 S3	None None	BLM_S-Sensitive CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern USFWS_BCC-Birds of Conservation Concern	-1 10	1941 S:2	0	0	1	0	0	1	1	1	2	0	0

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California Department of Fish and Wildlife

California Natural Diversity Database

Name (Scientific/Common)	CNDDB Ranks	Listing Status (Fed/State)	Other Lists	Elev. Range (ft.)	Total EO's	Element Occ. Ranks						Population Status		Presence		
						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
Bombus caliginosus obscure bumble bee	G4? S1S2	None None	IUCN_VU-Vulnerable	100 2,500	181 S:5	0	0	0	0	0	5	5	0	5	0	0
Bombus occidentalis western bumble bee	G2G3 S1	None None	USFS_S-Sensitive XERCES_IM-Imperiled	25 2,000	282 S:6	0	0	0	0	0	6	6	0	6	0	0
Calamagrostis crassiglumis Thurber's reed grass	G3Q S2	None None	Rare Plant Rank - 2B.1		15 S:1	0	0	0	0	0	1	1	0	1	0	0
Calicina diminua Marin blind harvestman	G1 S1	None None		150 150	1 S:1	0	0	0	0	0	1	1	0	1	0	0
Callophrys mossii bayensis San Bruno elfin butterfly	G4T1 S1	Endangered None	XERCES_CI-Critically Imperiled	780 780	10 S:1	0	0	0	0	0	1	1	0	1	0	0
Charadrius alexandrinus nivosus western snowy plover	G3T3 S2S3	Threatened None	CDFW_SSC-Species of Special Concern NABCI_RWL-Red Watch List USFWS_BCC-Birds of Conservation Concern	0 0	134 S:1	0	1	0	0	0	0	0	1	1	0	0
Chloropyron maritimum ssp. palustre Point Reyes salty bird's-beak	G4?T2 S2	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive	4 6	68 S:8	0	2	0	0	1	5	4	4	7	1	0
Chorizanthe cuspidata var. cuspidata San Francisco Bay spineflower	G2T1 S1	None None	Rare Plant Rank - 1B.2	1,800 1,800	17 S:1	0	0	0	0	0	1	1	0	1	0	0
Cirsium hydrophilum var. vaseyi Mt. Tamalpais thistle	G2T1 S1	None None	Rare Plant Rank - 1B.2	760 2,000	14 S:7	1	4	0	0	0	2	3	4	7	0	0
Coastal Brackish Marsh Coastal Brackish Marsh	G2 S2.1	None None		15 15	30 S:2	0	0	1	0	0	1	2	0	2	0	0
Coastal Terrace Prairie Coastal Terrace Prairie	G2 S2.1	None None		400 400	8 S:1	0	0	0	0	0	1	1	0	1	0	0
Corynorhinus townsendii Townsend's big-eared bat	G3G4 S2	None None	BLM_S-Sensitive CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern USFS_S-Sensitive WBWG_H-High Priority	150 320	626 S:3	0	1	0	0	0	2	1	2	3	0	0

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California Natural Diversity Database

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						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
Dicamptodon ensatus California giant salamander	G3 S2S3	None None	CDFW_SSC-Species of Special Concern IUCN_NT-Near Threatened	75 1,300	231 S:9	2	3	0	1	0	3	4	5	9	0	0
Dirca occidentalis western leatherwood	G2 S2	None None	Rare Plant Rank - 1B.2 SB_RSABG-Rancho Santa Ana Botanic Garden	2,000 2,000	71 S:1	0	0	0	0	0	1	0	1	1	0	0
Egretta thula snowy egret	G5 S4	None None	IUCN_LC-Least Concern	18 18	18 S:1	0	1	0	0	0	0	0	1	1	0	0
Elanus leucurus white-tailed kite	G5 S3S4	None None	BLM_S-Sensitive CDFW_FP-Fully Protected IUCN_LC-Least Concern	75 75	164 S:1	0	0	0	0	0	1	1	0	1	0	0
Emys marmorata western pond turtle	G3G4 S3	None None	BLM_S-Sensitive CDFW_SSC-Species of Special Concern IUCN_VU-Vulnerable USFS_S-Sensitive	180 784	1246 S:3	0	0	2	0	0	1	0	3	3	0	0
Eriogonum luteolum var. caninum Tiburon buckwheat	G5T2 S2	None None	Rare Plant Rank - 1B.2	312 2,100	26 S:12	0	0	0	0	0	12	8	4	12	0	0
Eucyclogobius newberryi tidewater goby	G3 S3	Endangered None	AFS_EN-Endangered CDFW_SSC-Species of Special Concern IUCN_VU-Vulnerable	10 10	124 S:2	0	0	0	0	2	0	2	0	0	0	2
Fissidens pauperculus minute pocket moss	G3? S2	None None	Rare Plant Rank - 1B.2 USFS_S-Sensitive	1,000 1,000	22 S:2	0	0	0	0	0	2	2	0	2	0	0
Fritillaria lanceolata var. tristulis Marin checker lily	G5T2 S2	None None	Rare Plant Rank - 1B.1	600 600	32 S:1	0	0	0	0	0	1	1	0	1	0	0
Fritillaria liliacea fragrant fritillary	G2 S2	None None	Rare Plant Rank - 1B.2 USFS_S-Sensitive	200 200	81 S:1	0	0	0	0	0	1	0	1	1	0	0
Geothlypis trichas sinuosa saltmarsh common yellowthroat	G5T3 S3	None None	CDFW_SSC-Species of Special Concern USFWS_BCC-Birds of Conservation Concern	10 14	112 S:2	0	2	0	0	0	0	0	2	2	0	0
Gilia millefoliata dark-eyed gilia	G2 S2	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive		54 S:1	0	0	0	0	0	1	1	0	1	0	0

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California Department of Fish and Wildlife

California Natural Diversity Database

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						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
Helianthella castanea Diablo helianthella	G2 S2	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive		107 S:1	0	0	0	0	0	1	1	0	1	0	0
Hemizonia congesta ssp. congesta congested-headed hayfield tarplant	G5T1T2 S1S2	None None	Rare Plant Rank - 1B.2	100 492	33 S:3	0	1	0	0	0	2	3	0	3	0	0
Hesperolinon congestum Marin western flax	G1 S1	Threatened Threatened	Rare Plant Rank - 1B.1 SB_RSABG-Rancho Santa Ana Botanic Garden	680 1,120	26 S:4	0	1	0	0	0	3	1	3	4	0	0
Holocarpha macradenia Santa Cruz tarplant	G1 S1	Threatened Endangered	Rare Plant Rank - 1B.1 SB_RSABG-Rancho Santa Ana Botanic Garden	120 120	37 S:2	0	0	0	0	1	1	2	0	1	1	0
Horkelia tenuiloba thin-lobed horkelia	G2 S2	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive SB_RSABG-Rancho Santa Ana Botanic Garden	1,100 2,100	27 S:4	1	2	0	0	0	1	2	2	4	0	0
Kopsiopsis hookeri small groundcone	G4? S1S2	None None	Rare Plant Rank - 2B.3	400 1,785	21 S:4	0	0	1	0	0	3	3	1	4	0	0
Lasiurus cinereus hoary bat	G5 S4	None None	IUCN_LC-Least Concern WBWG_M-Medium Priority	180 180	236 S:1	0	0	0	0	0	1	1	0	1	0	0
Laterallus jamaicensis coturniculus California black rail	G3G4T1 S1	None Threatened	BLM_S-Sensitive CDFW_FP-Fully Protected IUCN_NT-Near Threatened NABCI_RWL-Red Watch List USFWS_BCC-Birds of Conservation Concern	1 9	303 S:11	3	4	0	2	1	1	2	9	10	1	0
Lessingia micradenia var. micradenia Tamalpais lessingia	G2T2 S2	None None	Rare Plant Rank - 1B.2 SB_RSABG-Rancho Santa Ana Botanic Garden SB_USDA-US Dept of Agriculture	200 1,000	9 S:6	0	1	0	0	0	5	3	3	6	0	0
Melospiza melodia samuelis San Pablo song sparrow	G5T2 S2	None None	CDFW_SSC-Species of Special Concern USFWS_BCC-Birds of Conservation Concern	0 20	41 S:10	0	4	0	0	0	6	6	4	10	0	0

Summary Table Report

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						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
Microseris paludosa marsh microseris	G2 S2	None None	Rare Plant Rank - 1B.2	500 500	39 S:2	0	0	0	0	0	2	2	0	2	0	0
Navarretia rosulata Marin County navarretia	G2 S2	None None	Rare Plant Rank - 1B.2	1,150 2,100	15 S:7	0	1	0	0	0	6	3	4	7	0	0
Northern Coastal Salt Marsh Northern Coastal Salt Marsh	G3 S3.2	None None		10 15	53 S:6	0	1	1	0	0	4	6	0	6	0	0
Oncorhynchus kisutch coho salmon - central California coast ESU	G4 S2?	Endangered Endangered	AFS_EN-Endangered	130 130	22 S:1	0	0	0	0	0	1	0	1	1	0	0
Pentachaeta bellidiflora white-rayed pentachaeta	G1 S1	Endangered Endangered	Rare Plant Rank - 1B.1 SB_UCBBG-UC Berkeley Botanical Garden	120 400	14 S:6	0	0	0	0	5	1	6	0	1	0	5
Plagiobothrys glaber hairless popcornflower	GH SH	None None	Rare Plant Rank - 1A		9 S:1	0	0	0	0	1	0	1	0	0	1	0
Pleuropogon hooverianus North Coast semaphore grass	G2 S2	None Threatened	Rare Plant Rank - 1B.1 BLM_S-Sensitive SB_BerrySB-Berry Seed Bank SB_RSABG-Rancho Santa Ana Botanic Garden		27 S:1	0	0	0	0	1	0	1	0	0	1	0
Polygonum marinense Marin knotweed	G2Q S2	None None	Rare Plant Rank - 3.1	5 5	32 S:2	0	0	2	0	0	0	2	0	2	0	0
Pomatiopsis binneyi robust walker	G1 S1	None None		2,040 2,040	2 S:1	0	0	0	0	0	1	1	0	1	0	0
Quercus parvula var. tamalpaisensis Tamalpais oak	G4T2 S2	None None	Rare Plant Rank - 1B.3	500 2,000	9 S:6	0	1	0	1	0	4	6	0	6	0	0
Rallus obsoletus obsoletus California Ridgway's rail	G5T1 S1	Endangered Endangered	CDFW_FP-Fully Protected NABCI_RWL-Red Watch List	2 18	98 S:10	1	5	0	0	1	3	3	7	9	1	0
Rana boylii foothill yellow-legged frog	G3 S3	None Candidate Threatened	BLM_S-Sensitive CDFW_SSC-Species of Special Concern IUCN_NT-Near Threatened USFS_S-Sensitive	650 1,600	1230 S:2	0	1	0	0	0	1	1	1	2	0	0

Summary Table Report

California Department of Fish and Wildlife

California Natural Diversity Database

Name (Scientific/Common)	CNDDB Ranks	Listing Status (Fed/State)	Other Lists	Elev. Range (ft.)	Total EO's	Element Occ. Ranks						Population Status		Presence		
						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
Reithrodontomys raviventris salt-marsh harvest mouse	G1G2 S1S2	Endangered Endangered	CDFW_FP-Fully Protected IUCN_EN-Endangered	1 4	144 S:6	0	0	0	2	1	3	5	1	5	1	0
Serpentine Bunchgrass Serpentine Bunchgrass	G2 S2.2	None None		1,000 1,000	22 S:1	0	0	0	0	0	1	1	0	1	0	0
Sidalcea calycosa ssp. rhizomata Point Reyes checkerbloom	G5T2 S2	None None	Rare Plant Rank - 1B.2	300 300	34 S:1	0	0	0	0	0	1	1	0	1	0	0
Sidalcea hickmanii ssp. viridis Marin checkerbloom	G3TH SH	None None	Rare Plant Rank - 1B.1	500 500	4 S:1	0	0	0	0	0	1	1	0	1	0	0
Spirinchus thaleichthys longfin smelt	G5 S1	Candidate Threatened	CDFW_SSC-Species of Special Concern	0 0	45 S:2	0	0	0	0	0	2	0	2	2	0	0
Stebbinsoseris decipiens Santa Cruz microseris	G2 S2	None None	Rare Plant Rank - 1B.2	460 2,450	19 S:3	0	0	0	0	1	2	1	2	2	1	0
Streptanthus batrachopus Tamalpais jewelflower	G2 S2	None None	Rare Plant Rank - 1B.3	1,840 2,200	8 S:5	0	1	1	0	0	3	2	3	5	0	0
Streptanthus glandulosus ssp. pulchellus Mt. Tamalpais bristly jewelflower	G4T2 S2	None None	Rare Plant Rank - 1B.2 SB_RSABG-Rancho Santa Ana Botanic Garden	420 2,200	24 S:10	3	3	0	0	0	4	7	3	10	0	0
Talanites ubicki Ubick's gnaphosid spider	G1 S1	None None		150 150	1 S:1	0	0	0	0	0	1	1	0	1	0	0
Trachusa gummifera San Francisco Bay Area leaf-cutter bee	G1 S1	None None		1,130 1,130	2 S:1	0	0	0	0	0	1	1	0	1	0	0
Trifolium amoenum two-fork clover	G1 S1	Endangered None	Rare Plant Rank - 1B.1 SB_RSABG-Rancho Santa Ana Botanic Garden SB_USDA-US Dept of Agriculture		26 S:1	0	0	0	0	0	1	1	0	1	0	0
Tryonia imitator mimic tryonia (=California brackishwater snail)	G2 S2	None None	IUCN_DD-Data Deficient	0 6	39 S:2	0	0	0	0	1	1	2	0	1	0	1
Vespericola marinensis Marin hesperian	G2 S2	None None		25 600	23 S:3	0	0	0	0	0	3	3	0	3	0	0

CNPS California Native Plant Rare and Endangered Plant Inventory

Plant List

35 matches found. *Click on scientific name for details*

Search Criteria

Rare Plant Rank is one of [1A, 1B, 2A, 2B, 3], Found in Quad 37122H5

Scientific Name	Common Name	Family	Lifeform	Rare Plant Rank	State Rank	Global Rank
Amorpha californica var. napensis	Napa false indigo	Fabaceae	perennial deciduous shrub	1B.2	S2	G4T2
Arctostaphylos montana ssp. montana	Mt. Tamalpais manzanita	Ericaceae	perennial evergreen shrub	1B.3	S3	G3T3
Arctostaphylos virgata	Marin manzanita	Ericaceae	perennial evergreen shrub	1B.2	S2	G2
Calamagrostis crassiglumis	Thurber's reed grass	Poaceae	perennial rhizomatous herb	2B.1	S2	G3Q
Chloropyron maritimum ssp. palustre	Point Reyes bird's-beak	Orobanchaceae	annual herb (hemiparasitic)	1B.2	S2	G4?T2
Chorizanthe cuspidata var. cuspidata	San Francisco Bay spineflower	Polygonaceae	annual herb	1B.2	S1	G2T1
Cirsium hydrophilum var. vaseyi	Mt. Tamalpais thistle	Asteraceae	perennial herb	1B.2	S1	G2T1
Eriogonum luteolum var. caninum	Tiburon buckwheat	Polygonaceae	annual herb	1B.2	S2	G5T2
Fissidens pauperculus	minute pocket moss	Fissidentaceae	moss	1B.2	S2	G3?
Fritillaria lanceolata var. tristulis	Marin checker lily	Liliaceae	perennial bulbiferous herb	1B.1	S2	G5T2
Gilia capitata ssp. tomentosa	woolly-headed gilia	Polemoniaceae	annual herb	1B.1	S1	G5T1
Gilia millefoliata	dark-eyed gilia	Polemoniaceae	annual herb	1B.2	S2	G2
Grindelia hirsutula var. maritima	San Francisco gumplant	Asteraceae	perennial herb	3.2	S1	G5T1Q
Helianthella castanea	Diablo helianthella	Asteraceae	perennial herb	1B.2	S2	G2
Hemizonia congesta ssp. congesta	congested-headed hayfield tarplant	Asteraceae	annual herb	1B.2	S1S2	G5T1T2
Hesperolinon congestum	Marin western flax	Linaceae	annual herb	1B.1	S1	G1
Holocarpha macradenia	Santa Cruz tarplant	Asteraceae	annual herb	1B.1	S1	G1
Horkelia tenuiloba	thin-lobed horkelia	Rosaceae	perennial herb	1B.2	S2	G2
Kopsiopsis hookeri	small groundcone	Orobanchaceae	perennial rhizomatous herb (parasitic)	2B.3	S1S2	G4?
Lessingia hololeuca	woolly-headed lessingia	Asteraceae	annual herb	3	S3?	G3?

Lessingia micradenia var. micradenia	Tamalpais lessingia	Asteraceae	annual herb	1B.2	S2	G2T2
Micropus amphibolus	Mt. Diablo cottonweed	Asteraceae	annual herb	3.2	S3S4	G3G4
Microseris paludosa	marsh microseris	Asteraceae	perennial herb	1B.2	S2	G2
Navarretia leucocephala ssp. bakeri	Baker's navarretia	Polemoniaceae	annual herb	1B.1	S2	G4T2
Navarretia rosulata	Marin County navarretia	Polemoniaceae	annual herb	1B.2	S2	G2
Pentachaeta bellidiflora	white-rayed pentachaeta	Asteraceae	annual herb	1B.1	S1	G1
Plagiobothrys glaber	hairless popcornflower	Boraginaceae	annual herb	1A	SH	GH
Pleuropogon hooverianus	North Coast semaphore grass	Poaceae	perennial rhizomatous herb	1B.1	S2	G2
Polygonum marinense	Marin knotweed	Polygonaceae	annual herb	3.1	S2	G2Q
Quercus parvula var. tamalpaisensis	Tamalpais oak	Fagaceae	perennial evergreen shrub	1B.3	S2	G4T2
Sidalcea calycosa ssp. rhizomata	Point Reyes checkerbloom	Malvaceae	perennial rhizomatous herb	1B.2	S2	G5T2
Stebbinsoseris decipiens	Santa Cruz microseris	Asteraceae	annual herb	1B.2	S2	G2
Streptanthus batrachopus	Tamalpais jewelflower	Brassicaceae	annual herb	1B.3	S2	G2
Streptanthus glandulosus ssp. pulchellus	Mt. Tamalpais bristly jewelflower	Brassicaceae	annual herb	1B.2	S2	G4T2
Trifolium amoenum	two-fork clover	Fabaceae	annual herb	1B.1	S1	G1

Suggested Citation

CNPS, Rare Plant Program. 2016. Inventory of Rare and Endangered Plants (online edition, v8-02). California Native Plant Society, Sacramento, CA. Website http://www.rareplants.cnps.org [accessed 07 December 2016].

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APPENDIX D

Phase I Cultural Resources
Evaluation Summary

Note: Not for Public Distribution Due to
Confidential Information

Executive Summary

The proposed project entails construction excavation related to the replacement or rehabilitation of sewer pipes and manholes in the town of San Anselmo, Marin County, California. The Nokomis and Butterfield capacity relief segments are part of the broader Ross Valley Sanitary District FY 16/17 Gravity Sewer Rehabilitation Project but were excluded from the previous Phase I cultural resources evaluation (Archeo-Tec 2017). They are now considered here as a standalone project.

A review of archaeological sites that have been previously identified within a half-mile radius of the Project Area of Potential Effect (APE) found three (3) prehistoric archaeological sites, two of which are approximately 100 meters from proposed construction locations. The largest of these sites is located directly upstream from the APE along San Anselmo Creek; it was spot-inspected as part of this survey and found to be at least partially extant. No site definitively extends into the APE.

A surface survey revealed no significant cultural materials within observable portions of the proposed alignment; however, much of the ground is paved over or otherwise obscured. A program of shovel test pits (STPs) was implemented for a small portion of the APE that was not obscured by roadways. The testing found a single historic feature but no prehistoric artifacts.

Due to the proximity to known archaeological sites and to creeks, the Nokomis and Butterfield APEs are highly sensitive for cultural materials. It is therefore recommended that ground-disturbing construction (Open Cut, insertion and extraction pits, new manholes, and Pilot Tube Guided Borings) be monitored by an archaeologist for the Nokomis and Butterfield Gravity Relief Improvements. Specifically, full-time monitoring is recommended for the Nokomis alignment, and initial full-time monitoring, to be reduced to periodic spot monitoring at the discretion of the archaeologist, is recommended for the Butterfield alignment. It is also recommended that a program of construction education in the form of an Alert Sheet be implemented in the case of accidental discovery of an archaeological site.

APPENDIX E

Summary of Butterfield Construction Constraints

MEMORANDUM

To: **James Smith, P.E.**
Jill Barnes, P.E.
Sanitary District No. 1 of Marin County
(Ross Valley Sanitary District)
2960 Kerner Blvd
San Rafael, CA 94901

From: **Kyle Carbert, P.E.**
Jasmine Cuffee, P.E.
Harris & Associates

Date: December 20, 2017

Subject: **RVSD 2016/2017 Task Order 2: Gravity Sewer Improvement Project**
Summary of Butterfield Construction Constraints

I. INTRODUCTION

Ross Valley Sanitary District's (RVSD) FY 16/17 Gravity Sewer Improvements Project (Project) includes work on a small section of Sir Francis Drake Boulevard, Butterfield Road from Meadowcroft Drive to Kenrick Drive, and portions of Meadowcroft Drive and Broadmoor Avenue. This work will require one-way traffic control and construction detours on residential streets during the construction operations. Butterfield Road is a principal route which serves over 2,400 homes, three schools and one public bus-route in the Town of San Anselmo (Town) and Marin County *(See Figure 1 on following page for a map of the project area).* This report is to organize the project constraints into a framework to facilitate discussions regarding construction phasing and permissible work-hours for the project.

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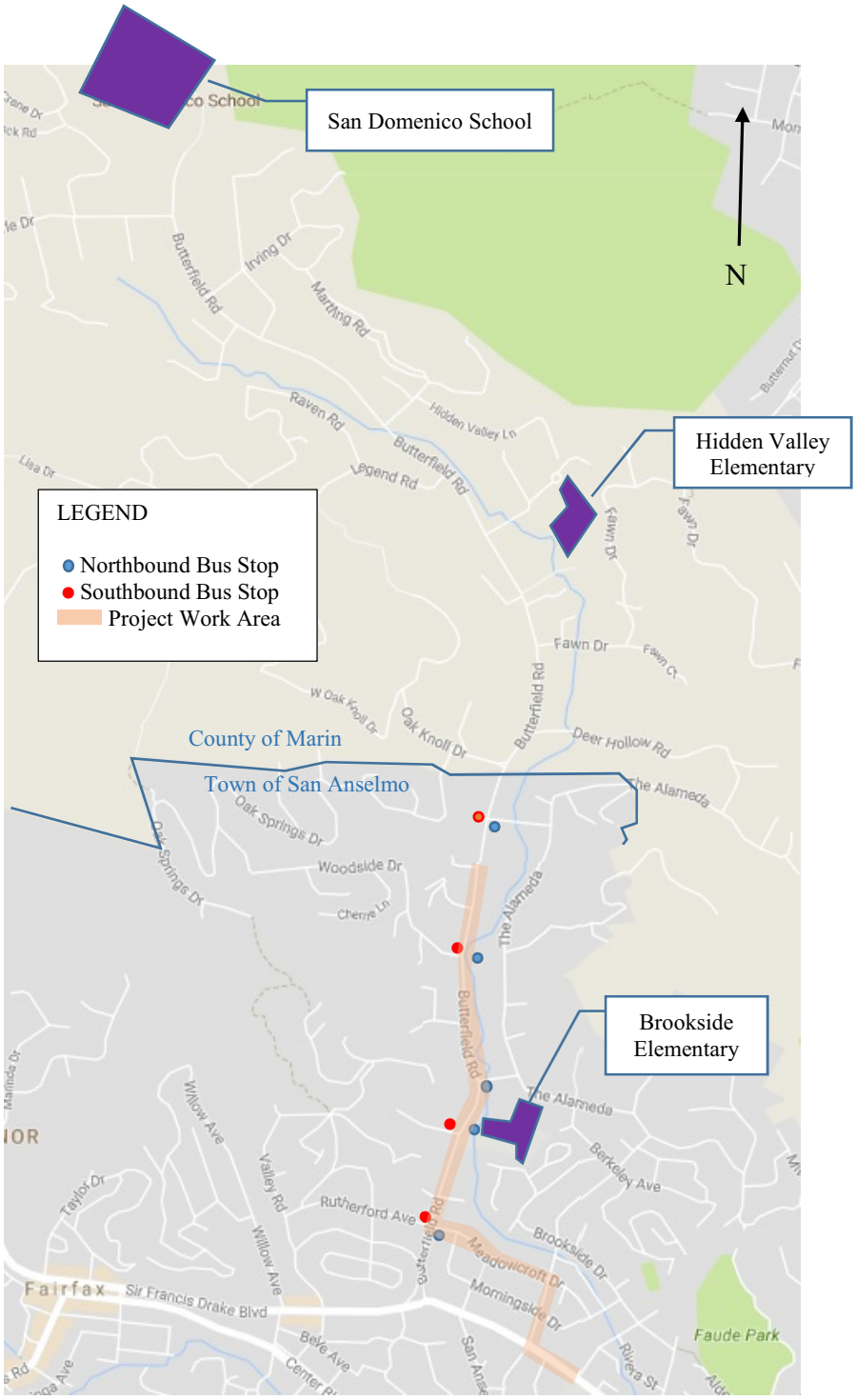

Figure 1: Map of Project Area

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II. DETOURS REQUIRED

The project includes new sewer pipe on Butterfield Road between Meadowcroft Drive and Kenrick Avenue. Given the location of the pipe, construction considerations, and existing roadway width, this construction will require one-way traffic on Butterfield Road coupled with detours. There are two distinct detours that would be required for different portions of the work, subsequently referred to as "Lower" and "Upper" Butterfield.

Lower Butterfield Detour
South of Arroyo Avenue, the work on Butterfield Road would require a closure of the northbound lane of Butterfield Road between Meadowcroft Drive and Arroyo Avenue. Northbound traffic would be directed at Sir Francis Drake Boulevard to Broadmoor Avenue, Berkeley Avenue, The Alameda, and Arroyo Avenue back to Butterfield Road. *For a graphical depiction of the detour, see the Phase 2 Exhibit in Attachment A*.

Parisi Transportation Consulting (Parisi) estimates that traffic volumes on the detour would increase approximately 8-fold on Broadmoor Avenue and Berkeley Avenue from Sir Francis Drake Boulevard to the Alameda. Traffic volumes on the Alameda between Berkeley Avenue and Arroyo Avenue would increase approximately 15-fold during the detour operation[1]. To safely accommodate the increase in traffic on the Alameda, Parisi recommends two options:

- Option 1: Operate the detour in the northbound direction only and direct all southbound traffic to Butterfield Road at Arroyo Avenue.
- Option 2: Widen narrow areas of the detour by paving the shoulder and restricting parking to allow the detour to operate in both directions. Option 2 improvements would be required before implementing the detour to accommodate large vehicles, encourage traffic flow, and avoid traffic delays and congestion.

Upper Butterfield Detour
Construction on Butterfield Road between Arroyo Avenue and Kenrick Drive would take place after the completion of the lower Butterfield improvements. This work would require a closure of the northbound lane of Butterfield Road between Arroyo Avenue and Caletta Avenue, and will impact school traffic. Northbound traffic would be directed to use Arroyo Avenue, The Alameda and Caletta Avenue *(see Attachment A, Phase 4 for a graphical depiction of the detour)*.

Parisi estimates that northbound traffic volumes on The Alameda between Arroyo Avenue and Caletta Avenue would increase approximately 15-fold during the detour operation. To safely accommodate the increase in traffic on The Alameda, Parisi recommends two options:

- Option 1: Operate the detour in the northbound direction only and direct all southbound traffic to Butterfield Road at Caletta Avenue.
- Option 2: Widen narrow areas of the detour by paving the shoulder and restricting parking to allow the detour to operate in both directions. Option 2 improvements would be required before implementing the detour to accommodate large vehicles, encourage traffic flow, and avoid traffic delays and congestion.

On November 27, 2017, the Town stipulated that the District must maintain two-way traffic on the detour roads. The Town has indicated that it would perform the required widening of the Upper portion of the Alameda.

[1] Parisi Transportation Consulting: "Memo: Analysis of Traffic Detour Plan, Lower Butterfield Relief Project"

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Sir Francis Drake Boulevard Traffic Control

The project also includes upgrades to pipes alongside and crossing Sir Francis Drake Boulevard between Mountain View Avenue and Broadmoor Avenue. Sir Francis Drake Boulevard consists of four lanes at this location (2 in each direction). The Town recommends work hours of 9AM to 3:30 PM for this work.

A portion of this work takes place in the shoulder and requires the closure of one of the four lanes, leaving three lanes available for traffic. Parisi recommends allowing two eastbound lanes and one westbound lane prior to 2PM. After 2PM, two lanes would operate in the westbound direction with one lane in the eastbound direction.

For approximately one week, the construction crews would need to trench across Sir Francis Drake Boulevard. This work would require the closure of two lanes (one in each direction).

During the entirety of the work on Sir Francis Drake Boulevard, left turns from eastbound Sir Francis Drake Boulevard onto Broadmoor Avenue would be restricted. Advance signage would be placed notifying eastbound travelers to turn left on Butterfield Road/Suffield Avenue for access to Broadmoor Avenue.

III. SUMMERTIME CONSIDERATIONS/CONSTRAINTS

To minimize traffic impacts, RVSD intends to construct the Project improvements on Butterfield Road from Meadowcroft Drive to Arroyo Avenue (Lower Butterfield) during the school break in summer 2018 *(See Phase 2 Exhibit in Attachment A)*. Based on the schools' 2017/18 schedules *(see Table 1 below),* we anticipate that the summer construction phase would start on June 18, 2018, and would end August 17, 2018. This amounts to 9 weeks or 45 working days total for work on Lower Butterfield.

Table 1 below lists each of the schools in the area and the last day of school for the 2017/2018 academic calendar and first day of school for 2018/19 academic calendar for each school.

Table 1: Anticipated School Dates

School Name	Last day of School Spring 2018	Expected first day of school Fall 2018
Brookside Elementary	June 14	August 21*
Hidden Valley Elementary	June 14	August 21*
San Domenico School	June 8	August 20
Sir Francis Drake High School	June 14 (June 15 graduation)	August 22

* Start dates for Brookside Elementary and Hidden Valley Elementary are not yet available. Dates shown are estimates based on 2017/2018 academic calendar, for which school began on the third Wednesday in August

Town staff have suggested that they would permit working hours from 6AM to 3PM during the summer to maximize construction on Butterfield Road when traffic is lighter.

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We estimate 45 working days are necessary to construct the improvements on the portion of Butterfield Road between Meadowcroft Drive and Arroyo Avenue (Lower Butterfield). This effectively requires the contractor to have two crews working concurrently. One crew, specialized in guided boring, would do trenchless pipe installation at and adjacent to the intersection of Butterfield and Meadowcroft, while the second crew would install pipes in shallower areas of this reach and on Sir Francis Drake Boulevard.

If the Upper Butterfield work were to take place during summertime with the 6Am to 3PM working hours noted above, it would take approximately 40 working days, or 8 weeks.

IV. SCHOOL YEAR CONSIDERATIONS/CONSTRAINTS

Discussions are underway with the Town concerning the timing of the Upper Butterfield Work. These discussions include the possibility of work taking place in the fall of 2018 or a future summer. The Town has indicated that working hours during the school year would be restricted to 9AM to 3PM so as to avoid conflicts with school traffic. This would lengthen the duration of construction on Upper Butterfield to approximately 60 working days, or 12 weeks.

Information and schedules on all schools and buses in the project area were compiled to analyze the affect this work may have on the schools. Table 2 below includes the start time and end times for each of the schools along Butterfield Road for the 2017/2018 school year. We anticipate that the schools will utilize similar hours for 2018/2019.

Table 2: School Times

School Name	Start Time	Release time	Early release (Wednesdays)
Brookside Elementary	8:35 AM	3:10 PM	1:50 PM
Hidden Valley Elementary	8:15 AM	2:50 PM	1:30 PM
San Domenico School	8:10 AM	3:10 PM	N/A

Tables 3 and 4 below provide a list of the bus routes that use the Butterfield corridor and their schedules and community served. It should be noted that some Marin Transit buses serving Hidden Valley and Brookside Elementaries in the afternoon have a separate Wednesday schedule. *Further detail on the bus schedules can be found in Attachments B, C, and D.*

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Table 3: Bus stops in northbound direction

Route	Route Details	Bus stops and times				
		Buttterfield/ Meadowcroft	Butterfield/ Rosemont (Brookside Elementary)	Butterfield/ Arroyo	Butterfield/ Woodside	Butterfield/ Caletta
Golden Gate Transit route 27	Serves general public.*	~6:30 AM	~6:30 AM	-	~6:30 AM	~6:30 AM
Marin Transit WH-6	Serves White Hill Middle School	-	-	-	-	7:20 AM
Marin Transit WH-5	Serves Brookside Elementary and White Hill Middle	7:20 AM	7:20 AM	7:20 AM	7:22 AM	-
San Domenico Shuttles	Serves San Domenico School**	-	7:45 AM	-	-	-
Marin Transit HV-1	Serves Brookside and Hidden Valley Elementaries	7:57 AM	-	-	8:00 AM	-
Marin Transit WH-8	Serves Brookside Elementary and White Hill Middle	8:10 AM	8:10 AM	8:10 AM	8:12 AM	8:12 AM
Marin Transit WH-14	Serves Brookside Elementary and White Hill Middle	3:45 PM MTThF 2:35 PM W	3:45 PM MTThF 2:35 PM W	3:45 PM MTThF 2:35 PM W	3:47 PM MTThF 2:37 PM W	-
Marin Transit WH-15	Serves Brookside Elementary and White Hill Middle	3:55 PM MTThF 2:55 PM W	3:55 PM MTThF 2:55 PM W	-	3:57 PM MTThF 2:57 PM W	3:57 PM MTThF 2:57 PM W
Marin Transit WH-12	Serves White Hill Middle School	-	-	-	-	3:32 PM MTThF 2:32 PM W
Golden Gate Transit route 27	Serves general public.*	~6:40 PM	~6:40 PM	-	~6:40 PM	~6:40 PM

*Golden Gate Transit has indicated that route 27 may be suspended during construction operations

** Seven Shuttles from various locations arrive at San Domenico School shortly before 8:00 AM. However, only one stops within project limits.

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Table 4: Southbound bus stops

Route	Route Details	Bus Stops and Times				
		Butterfield/ Caletta	Butterfield/ Woodside	Butterfield/ Arroyo	Butterfield/ Rosemont (Brookside Elementary)	Buttterfield/ Meadowcroft
Golden Gate Transit route 27	Serves general public.*	~6:40 AM	~6:40 AM	-	~6:40 AM	~6:40 AM
Marin Transit WH-6	Serves White Hill Middle School	7:27 AM	-	-	-	-
Marin Transit WH-5	Serves Brookside Elementary and White Hill Middle	-	7:28 AM	-	7:28 AM	7:28 AM
Marin Transit WH-8	Serves Brookside Elementary and White Hill Middle	8:25 AM	8:25 AM	-	8:28 AM	8:28 AM
Marin Transit HV-1	Serves Hidden Valley, Brookside, and White Hill	-	-	-	2:58 PM MTTHF 1:37 PM W	3:00 PM MTThF 1:40 PM W
San Domenico Shuttles	Serves San Domenico School **	-	-	-	3:35 PM	-
Marin Transit WH-12	Serves White Hill Middle School	3:45 PM MTThF 2:32 PM W	-	-	-	-
Marin Transit WH-14	Serves Brookside Elementary and White Hill Middle	-	-	-	4:00 PM MTThF 2:50 PM W	4:00 PM MTThF 2:50 PM W
Marin Transit WH-15	Serves Brookside Elementary and White Hill Middle	4:07 PM MTThF 3:07 PM W	4:07 PM MTThF 3:07 PM W	-	4:07 PM MTThF 3:07 PM W	4:07 PM MTThF 3:07 PM W
Golden Gate Transit route 27	Serves general public.*	~6:55 PM	~6:55 PM	-	~6:55 PM	~6:55 PM

*Golden Gate Transit has indicated that route 27 may be suspended during construction operations
** Seven Shuttles from various locations leave San Domenico School at 3:20 PM. However, only one stops within project limits.

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Attachment A

Phasing and Detour Exibits

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FY2016/17 Gravity Sewer Improvements Project

PROPOSED CONSTRUCTION PHASING

PHASE 1

SPRING 2018: APPROXIMATELY 5 WEEKS DURATION

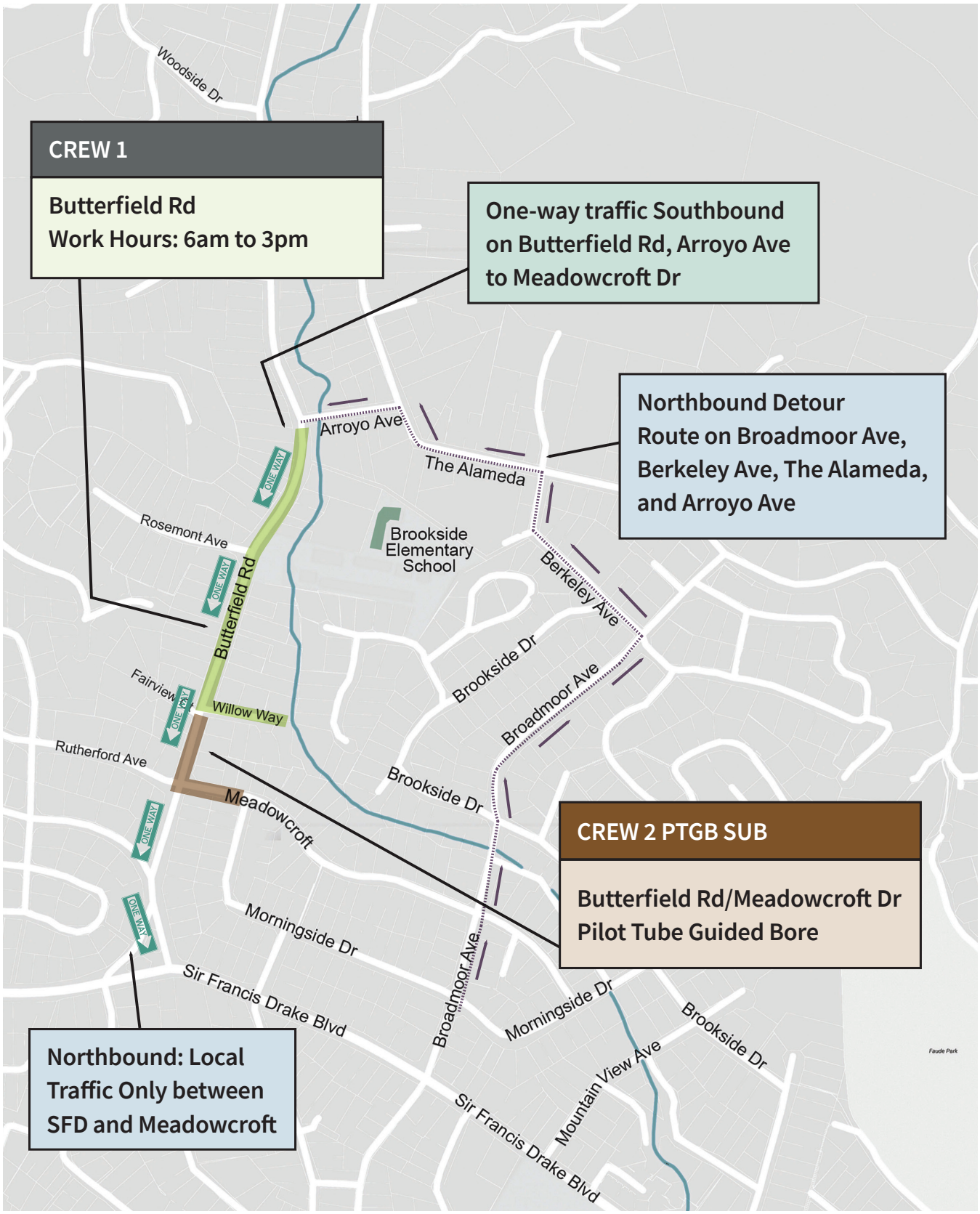
FY2016/17 Gravity Sewer Improvements Project

PROPOSED CONSTRUCTION PHASING

PHASE 2

NORTHBOUND BUTTERFIELD RD. DETOUR SOUTH OF ARROYO

SCHOOL BREAK 2018 (SUMMERTIME): *APPROXIMATELY 9 WEEKS DURATION*

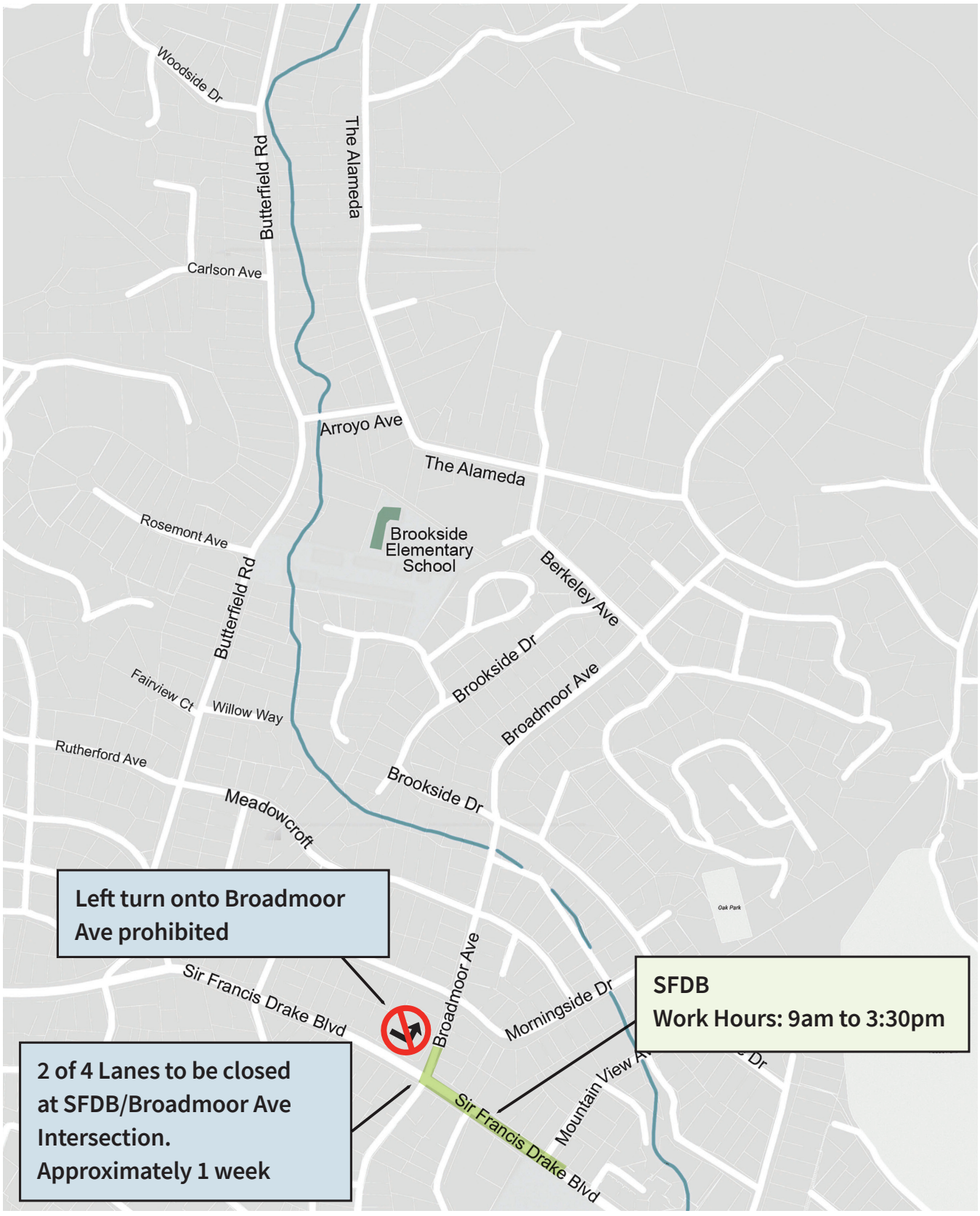


FY2016/17 Gravity Sewer Improvements Project

PROPOSED CONSTRUCTION PHASING

PHASE 3

FALL 2018: *APPROXIMATELY 4 WEEKS DURATION*



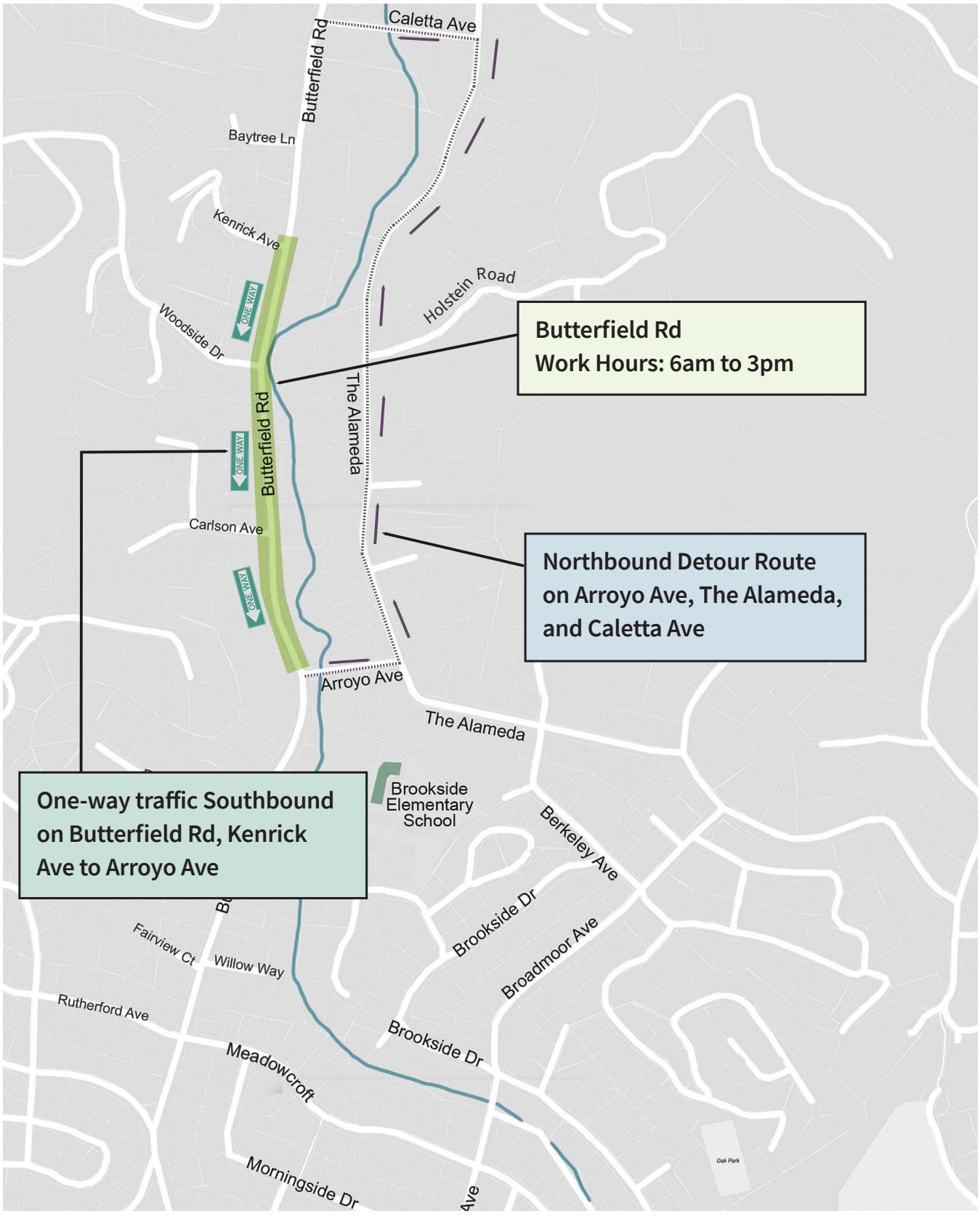
FY2016/17 Gravity Sewer Improvements Project

PROPOSED CONSTRUCTION PHASING

PHASE 4

NORTHBOUND DETOUR ARROYO TO CALETTA

TIMING TBD: APPROXIMATELY 8–12 WEEKS DURATION



Attachment B

Marin Transit Schedules and Maps for Buses Serving Public Schools

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WH-1 (AM)		
Stop	**Intersection**	**Time**
1	Memorial Park Lot	7:15
2	Sir Francis Drake Blvd & San Francisco Blvd	7:18
3	White Hill School	7:35

Ross Valley School District

WH-1 AM

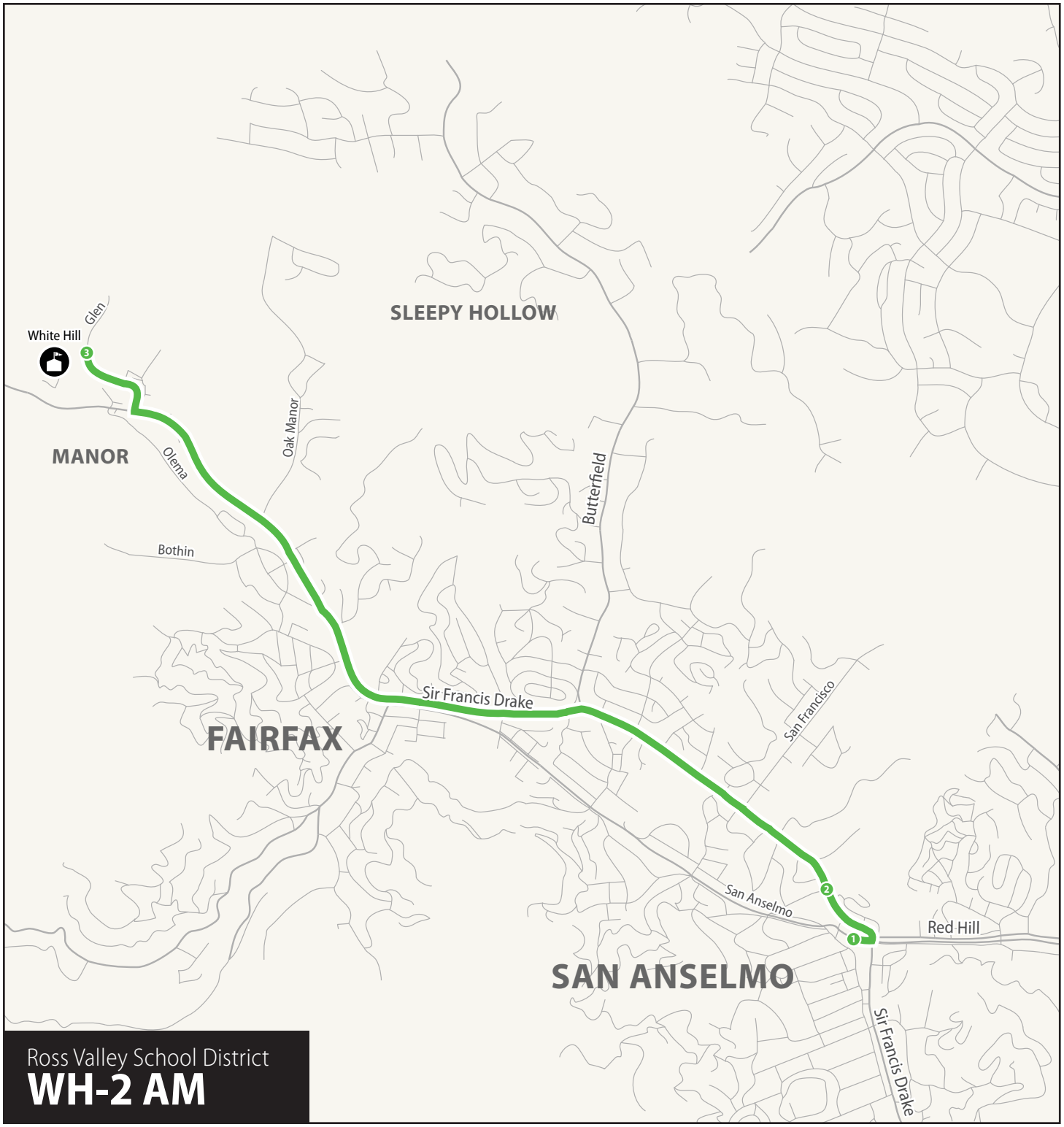
Times are estimated and subject to change. In the morning, please be at the stop 5 minutes before the scheduled departure time.

Ross Valley School District

HV-1 AM

HV-1 (AM)		
Stop	**Intersection**	**Time**
1	Sir Francis Drake Blvd & Claus Dr	7:40
2	Memorial Park Lot	7:55
3	Sir Francis Drake Blvd & San Francisco Blvd	7:55
4	Butterfield Rd & Meadowcroft Dr (East)	7:57
5	Butterfield Rd & Woodside Dr (East)	8:00
6	Hidden Valley School	8:05

Times are estimated and subject to change. In the morning, please be at the stop 5 minutes before the scheduled departure time.



Ross Valley School District

WH-2 AM

WH-2 (AM)

Stop	Intersection	Time
1	San Anselmo Hub (Center & Bridge)	7:25
2	Sir Francis Drake Blvd & Madrone Ave	7:28
3	White Hill School	7:40

Times are estimated and subject to change. In the morning, please be at the stop 5 minutes before the scheduled departure time.

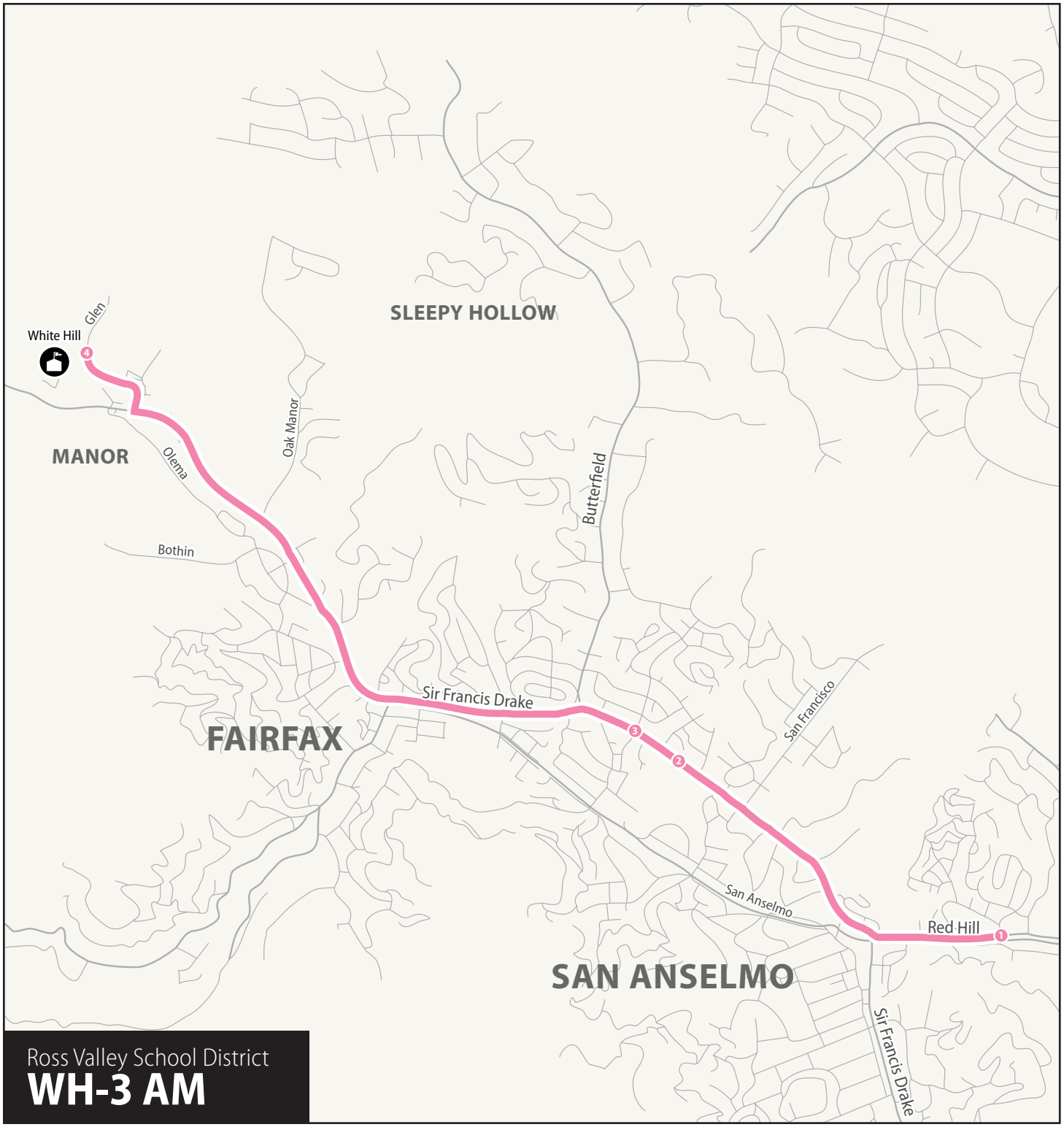
Ross Valley School District

WH-7 AM

WH-7 (AM)

Stop	Intersection	Time
1	San Anselmo Hub (Center & Bridge)	8:10
2	Red Hill Ave & Sequoia Dr	8:13
3	Memorial Park Lot	8:18
4	Sir Francis Drake Blvd & San Francisco Blvd	8:25
5	Sir Francis Drake Blvd & Aspen Ct	8:25
6	Sir Francis Drake Blvd & Broadmoor Ave	8:25
7	Sir Francis Drake Blvd & Butterfield Rd	8:25
8	Downtown Fairfax (Broadway & Bolinas)	8:30
9	Sir Francis Drake Blvd & Marinda Dr	8:33
10	White Hill School	8:40

Times are estimated and subject to change. In the morning, please be at the stop 5 minutes before the scheduled departure time.



Ross Valley School District

WH-3 AM

WH-3 (AM)

Stop	Intersection	Time
1	Red Hill Ave & Sequoia Dr	7:20
2	Sir Francis Drake Blvd & Aspen Ct	7:25
3	Sir Francis Drake Blvd & Broadmoor Ave	7:25
4	White Hill School	7:40

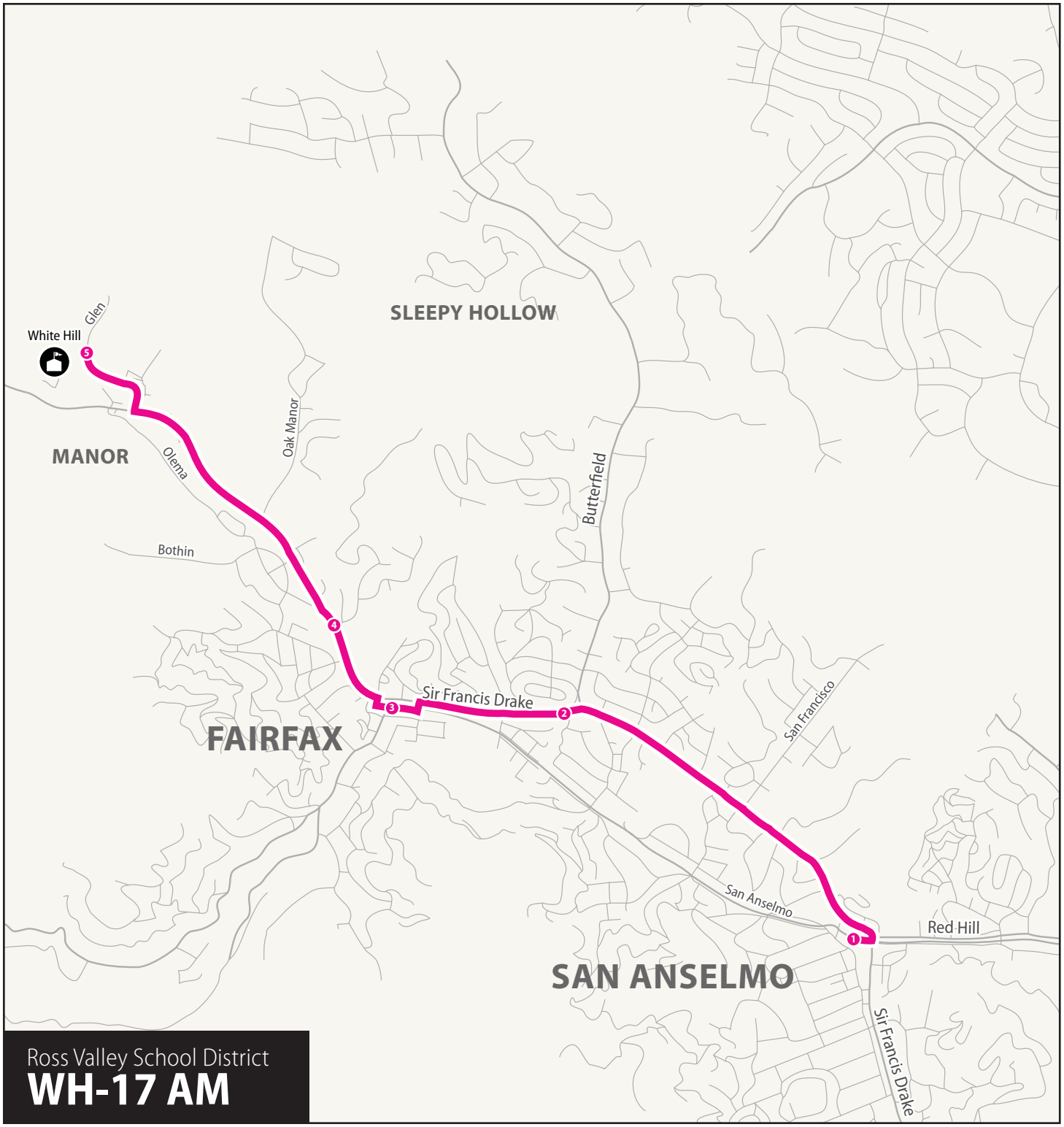
Times are estimated and subject to change. In the morning, please be at the stop 5 minutes before the scheduled departure time.

WH-4 (AM)		
Stop	**Intersection**	**Time**
1	Sir Francis Drake Blvd & Butterfield Rd	7:25
2	Sir Francis Drake Blvd & Willow Ave	7:25
3	Downtown Fairfax (Broadway & Bolinas)	7:28
4	Sir Francis Drake Blvd & Marinda Dr	7:30
5	Sir Francis Drake Blvd & Oak Manor Dr	7:30
6	White Hill School	7:40

Ross Valley School District

WH-4 AM

Times are estimated and subject to change. In the morning, please be at the stop 5 minutes before the scheduled departure time.



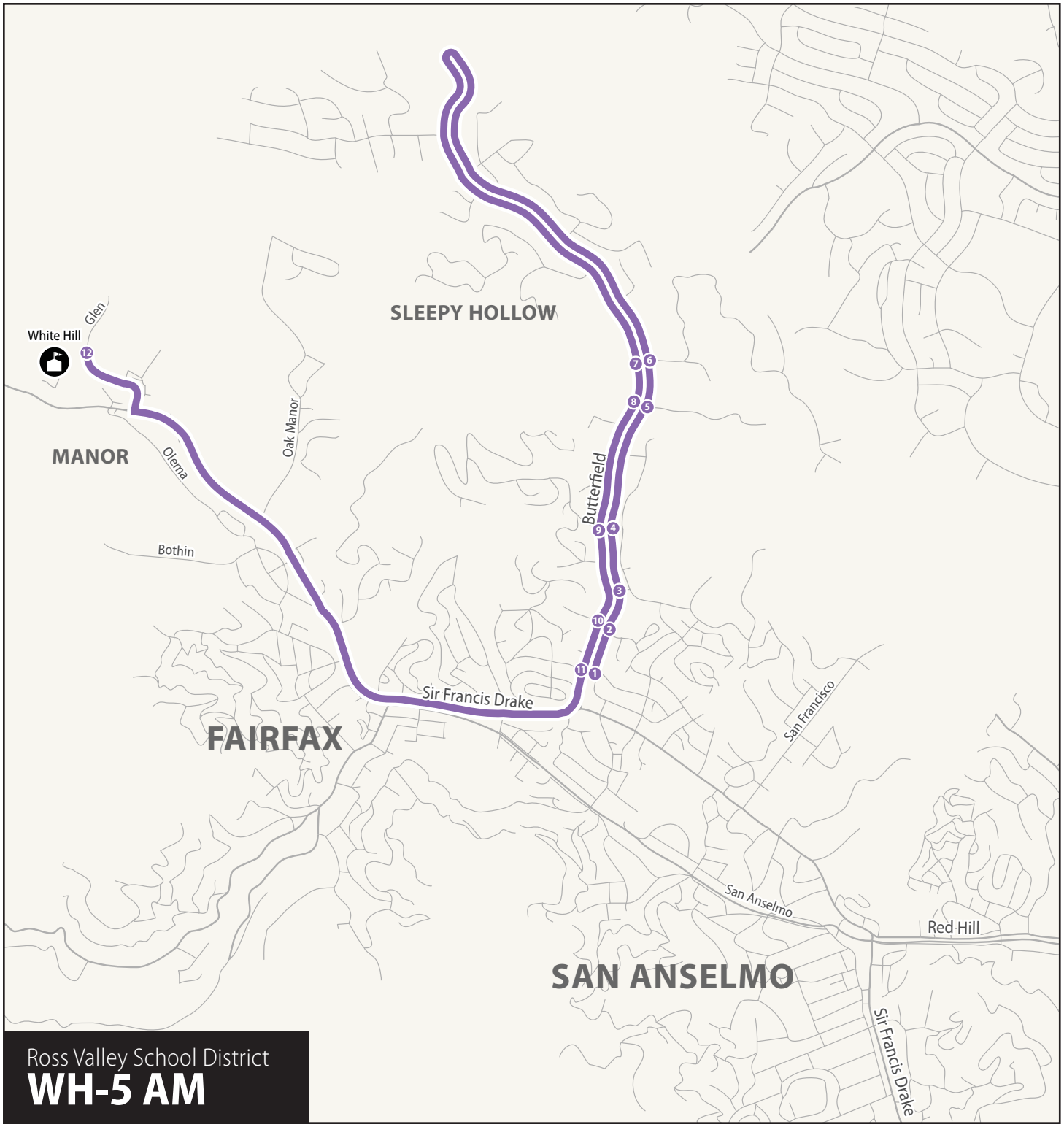
WH-17 (AM)

Stop	Intersection	Time
1	San Anselmo Hub (Center & Bridge)	8:00
2	Sir Francis Drake Blvd & Butterfield Rd	8:10
3	Downtown Fairfax (Broadway & Bolinas)	8:14
4	Sir Francis Drake Blvd & Marinda Dr	8:16
5	White Hill School	8:25

Ross Valley School District

WH-17 AM

Times are estimated and subject to change. In the morning, please be at the stop 5 minutes before the scheduled departure time.



Ross Valley School District

WH-5 AM

WH-5 (AM)		
Stop	**Intersection**	**Time**
1	Butterfield Rd & Meadowcroft Dr (East)	7:20
2	Butterfield Rd & Rosemont Ave (East)	7:20
3	Butterfield Rd & Arroyo Ave (East)	7:20
4	Butterfield Rd & Woodside Dr (East)	7:22
5	Butterfield Rd & Deer Hollow Rd (East)	7:22
6	Butterfield Rd & Fawn Dr (East)	7:22
7	Butterfield Rd & Fawn Dr (West)	7:25
8	Butterfield Rd & Oak Knoll Dr (West)	7:25
9	Butterfield Rd & Woodside Dr (West)	7:28
10	Butterfield Rd & Rosemont Ave (West)	7:28
11	Butterfield Rd & Rutherford Ave (West)	7:28
12	White Hill School	7:40

Times are estimated and subject to change. In the morning, please be at the stop 5 minutes before the scheduled departure time.

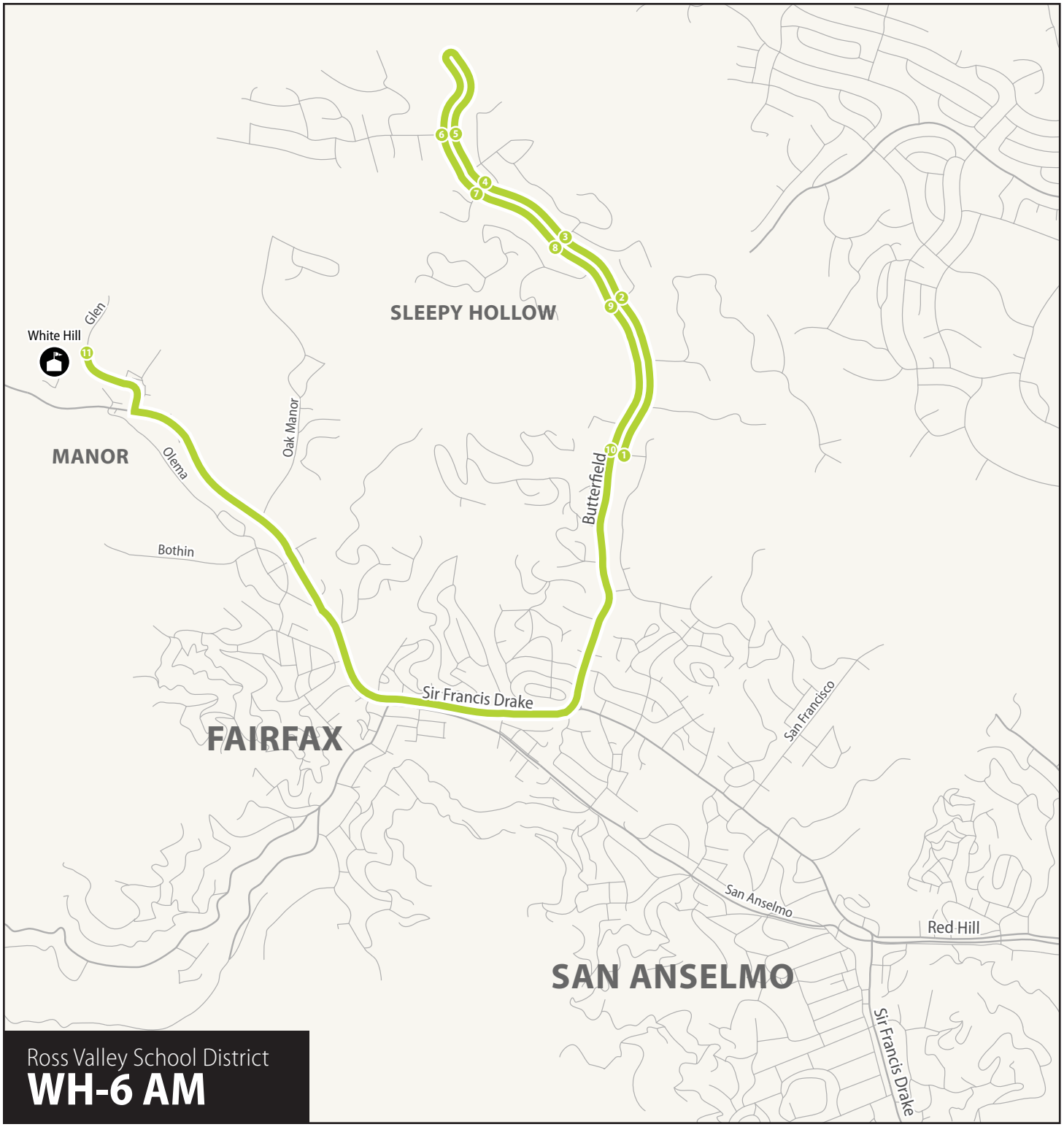
Ross Valley School District

WH-8 AM

WH-8 (AM)

Stop	Intersection	Time
1	Butterfield Rd & Meadowcroft Dr (East)	8:10
2	Butterfield Rd & Rosemont Ave (East)	8:10
3	Butterfield Rd & Arroyo Ave (East)	8:10
4	Butterfield Rd & Woodside Dr (Eest)	8:12
5	Butterfield Rd & Caletta Ave (East)	8:12
6	Butterfield Rd & Deer Hollow (East)	8:12
7	Butterfield Rd & Fawn (East)	8:15
8	Butterfield Rd & Green Valley Ct (East)	8:15
9	Butterfield Rd & Sleepy Hollow Dr (East)	8:15
10	Butterfield Rd & Katrina Ln (East)	8:18
11	Butterfield Rd & Van Winkle Dr (East)	8:18
12	Butterfield Rd & Van Winkle Dr (West)	8:20
13	Butterfield Rd & Katrina Ln (West)	8:20
14	Butterfield Rd & Sleepy Hollow Dr (West)	8:20
15	Butterfield Rd & Green Valley Ct (West)	8:22
16	Butterfield Rd & Fawn (West)	8:22
17	Butterfield Rd & Oak Knoll (West)	8:22
18	Butterfield Rd & Caletta Ave (West)	8:25
19	Butterfield Rd & Woodside Dr (West)	8:25
20	Butterfield Rd & Rosemont Ave (West)	8:28
21	Butterfield Rd & Rutherford Ave (West)	8:28
22	Sir Francis Drake Blvd & Willow Ave	8:32
23	White Hill School	8:40

Times are estimated and subject to change. In the morning, please be at the stop 5 minutes before the scheduled departure time.



Ross Valley School District

WH-6 AM

WH-6 (AM)

Stop	Intersection	Time
1	Butterfield Rd & Caletta Ave (East)	7:20
2	Butterfield Rd & Green Valley Ct (East)	7:22
3	Butterfield Rd & Sleepy Hollow Dr (East)	7:22
4	Butterfield Rd & Katrina Ln (East)	7:22
5	Butterfield Rd & Van Winkle Dr (East)	7:25
6	Butterfield Rd & Van Winkle Dr (West)	7:25
7	Butterfield Rd & Katrina Ln (West)	7:25
8	Butterfield Rd & Sleepy Hollow Dr (West)	7:25
9	Butterfield Rd & Green Valley Ct (West)	7:27
10	Butterfield Rd & Caletta Ave (West)	7:27
11	White Hill School	7:40

Times are estimated and subject to change. In the morning, please be at the stop 5 minutes before the scheduled departure time.

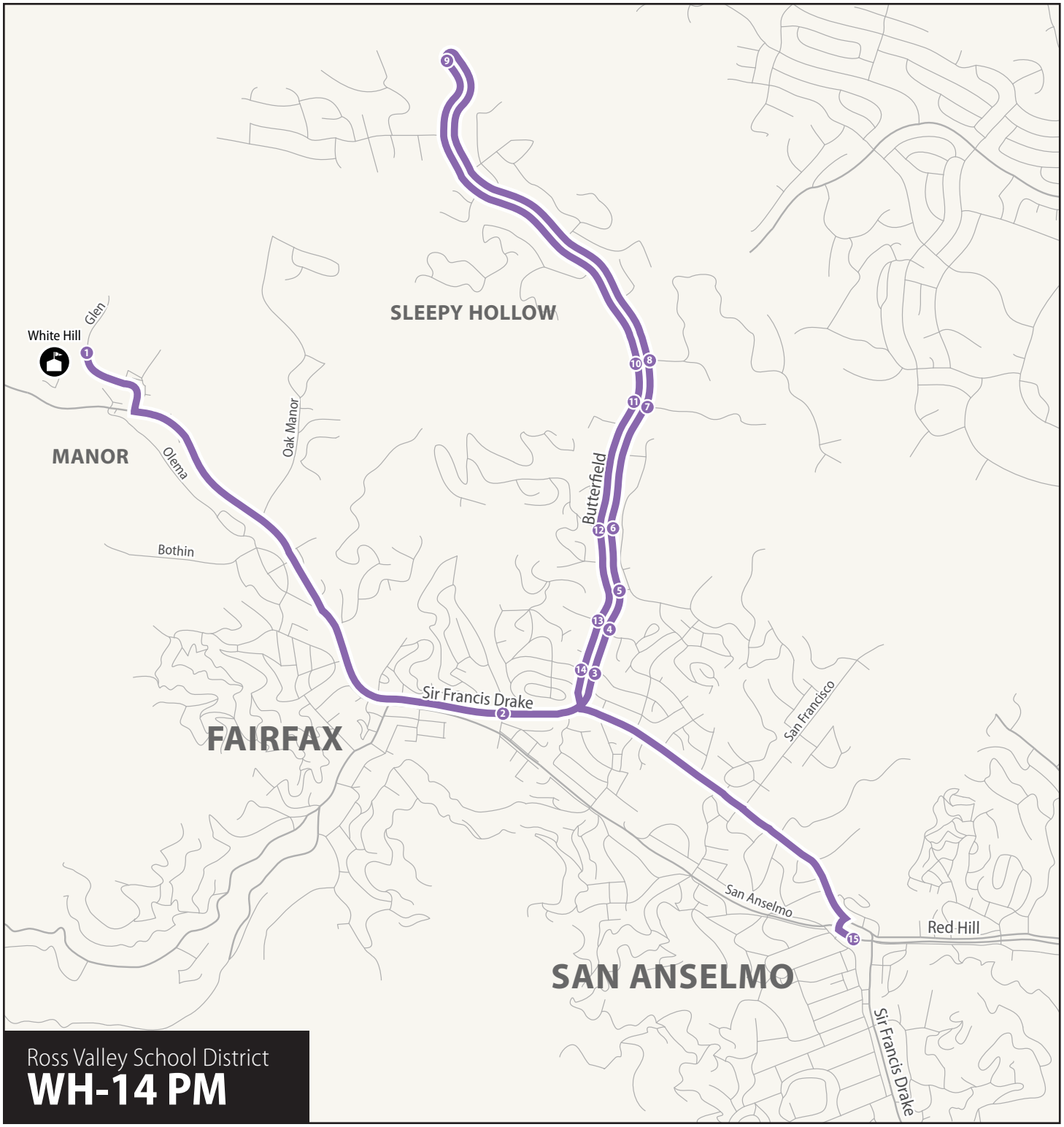
Ross Valley School District

HV-1 PM

HV-1 (PM)		
Stop	**Intersection**	**Time**
1	Hidden Valley	2:55
2	Butterfield Rd & Rosemont (West)	2:58
3	Butterfield Rd & Rutherford (West)	3:00
4	Memorial Park	3:05
5	Sir Francis Drake Blvd & San Francisco Blvd	3:10
6	Downtown Fairfax (Broadway & Bolinas)	3:20
7	White Hill School	3:30

HV-1 (PM - EARLY RELEASE)		
Stop	**Intersection**	**Time**
1	Hidden Valley	1:35
2	Butterfield Rd & Rosemont (West)	1:37
3	Butterfield Rd & Rutherford (West)	1:40
4	Memorial Park	1:50
5	Sir Francis Drake Blvd & San Francisco Blvd	1:55
6	Downtown Fairfax (Broadway & Bolinas)	2:00
7	White Hill School	2:10

Times are estimated and subject to change. In the morning, please be at the stop 5 minutes before the scheduled departure time.



Ross Valley School District

WH-14 PM

WH-14 (PM)		
Stop	**Intersection**	**Time**
1	White Hill School	3:35
2	Sir Francis Drake Blvd & Willow Ave	3:40
3	Butterfield Rd & Meadowcroft (East)	3:45
4	Butterfield Rd & Rosemont (East)	3:45
5	Butterfield Rd & Arroyo Ave (East)	3:45
6	Butterfield Rd & Woodside Dr (East)	3:47
7	Butterfield Rd & Deer Hollow Rd (East)	3:47
8	Butterfield Rd & Fawn Dr (East)	3:50
9	San Domenico School	3:55
10	Butterfield Rd & Fawn Dr (West)	3:57
11	Butterfield Rd & Oak Knoll Dr (West)	3:57
12	Butterfield Rd & Woodside Dr (West)	4:00
13	Butterfield Rd & Rosemont Ave (West)	4:00
14	Butterfield Rd & Rutherford Ave (West)	4:00
15	San Anselmo Hub	4:10

WH-14 (PM - EARLY RELEASE)		
Stop	**Intersection**	**Time**
1	White Hill School	2:25
2	Sir Francis Drake Blvd & Willow Ave	2:30
3	Butterfield Rd & Meadowcroft (East)	2:35
4	Butterfield Rd & Rosemont (East)	2:35
5	Butterfield Rd & Arroyo Ave (East)	2:35
6	Butterfield Rd & Woodside Dr (East)	2:37
7	Butterfield Rd & Deer Hollow Rd (East)	2:37
8	Butterfield Rd & Fawn Dr (East)	2:40
9	San Domenico School	2:45
10	Butterfield Rd & Fawn Dr (West)	2:47
11	Butterfield Rd & Oak Knoll Dr (West)	2:47
12	Butterfield Rd & Woodside Dr (West)	2:50
13	Butterfield Rd & Rosemont Ave (West)	2:50
14	Butterfield Rd & Rutherford Ave (West)	2:50
15	San Anselmo Hub	3:00

Times are estimated and subject to change. In the morning, please be at the stop 5 minutes before the scheduled departure time.

Ross Valley School District

WH-11 PM

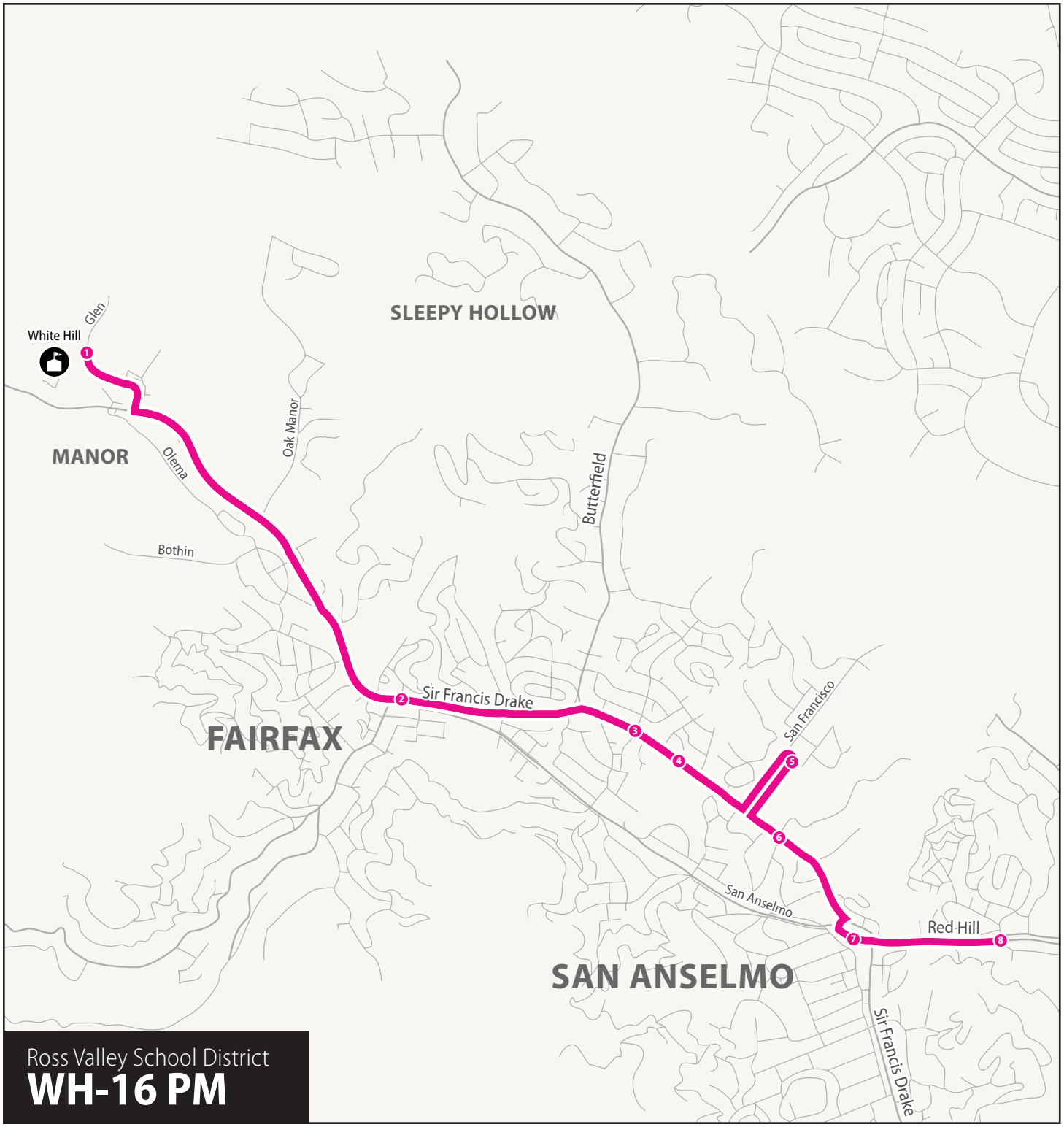
WH-11 (PM)

Stop	Intersection	Time
1	White Hill School	3:15
2	Sir Francis Drake Blvd & Marinda Dr	3:20
3	Sir Francis Drake Blvd & Claus Dr	3:25
4	Pastori Ave at Center Blvd	3:28

WH-11 (PM - EARLY RELEASE)

Stop	Intersection	Time
1	White Hill School	2:15
2	Sir Francis Drake Blvd & Marinda Dr	2:20
3	Sir Francis Drake Blvd & Claus Dr	2:25
4	Pastori Ave at Center Blvd	2:28

Times are estimated and subject to change. In the morning, please be at the stop 5 minutes before the scheduled departure time.



Ross Valley School District

WH-16 PM

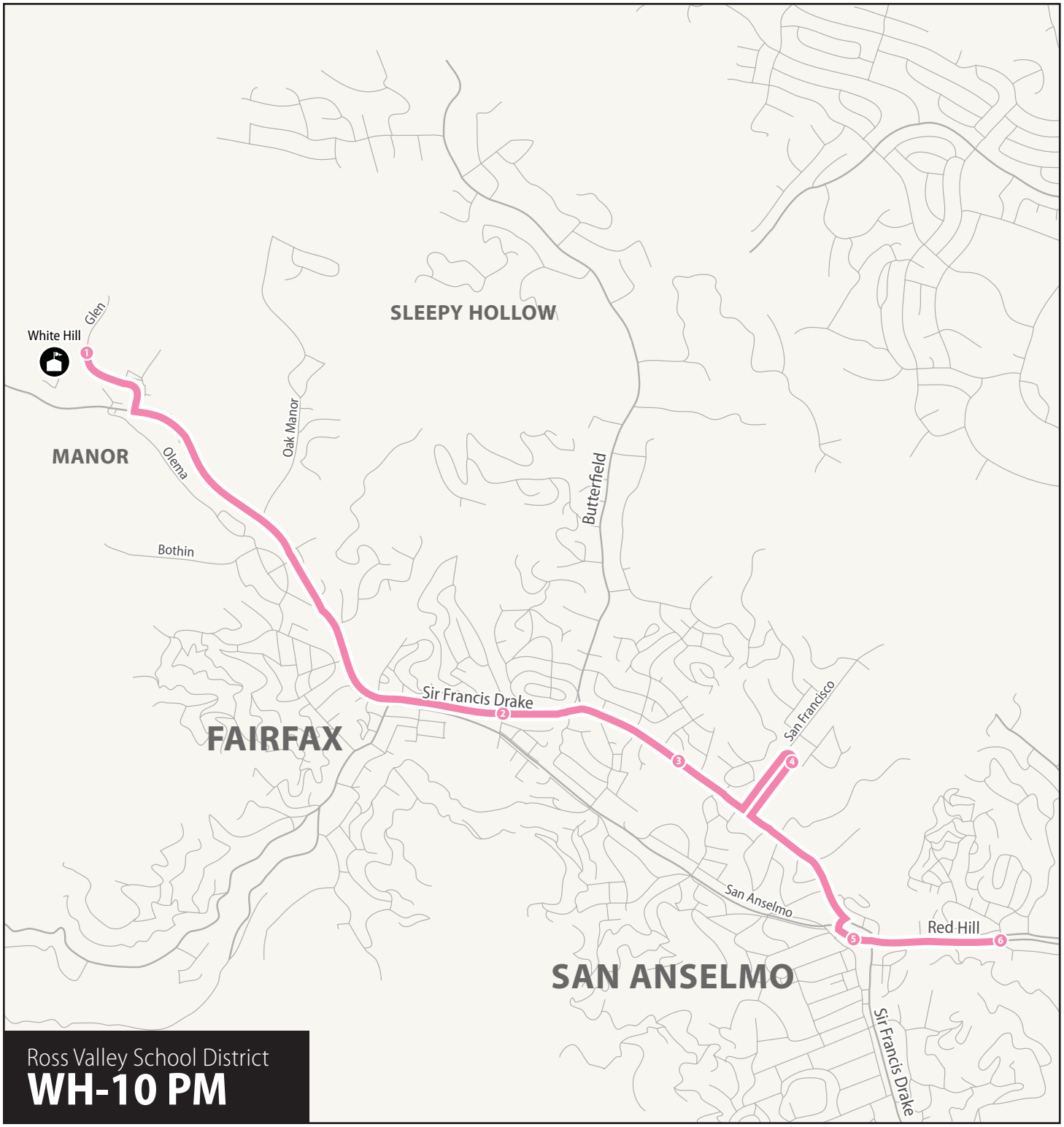
WH-16 (PM)

Stop	Intersection	Time
1	White Hill School	3:45
2	Sir Francis Drake Blvd & Claus	3:50
3	Sir Francis Drake Blvd & San Anselmo Ave	3:53
4	Sir Francis Drake Blvd & Ash Ave	3:55
5	Memorial Park Lot	4:03
6	Sir Francis Drake Blvd & Sais Ave	4:05
7	San Anselmo Hub (Center & Bridge)	4:08
8	Red Hill Ave & Sequoia Dr	4:10

WH-16 (PM - EARLY RELEASE)

Stop	Intersection	Time
1	White Hill School	2:45
2	Sir Francis Drake Blvd & Claus	2:50
3	Sir Francis Drake Blvd & San Anselmo Ave	2:53
4	Sir Francis Drake Blvd & Ash Ave	2:55
5	Memorial Park Lot	3:03
6	Sir Francis Drake Blvd & Sais Ave	3:05
7	San Anselmo Hub (Center & Bridge)	3:08
8	Red Hill Ave & Sequoia Dr	3:10

Times are estimated and subject to change. In the morning, please be at the stop 5 minutes before the scheduled departure time.



Ross Valley School District

WH-10 PM

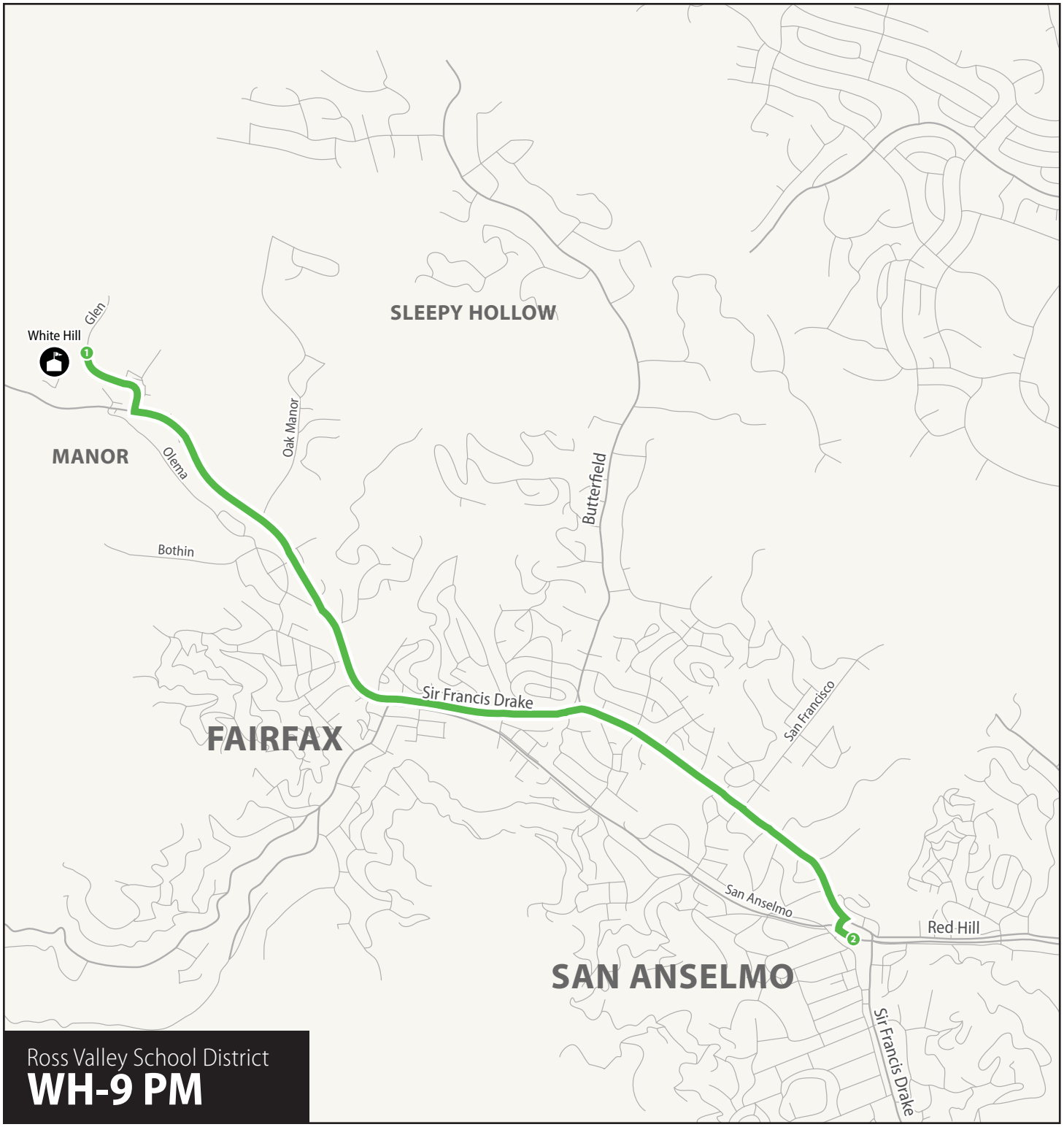
WH-10 (PM)

Stop	Intersection	Time
1	White Hill School	3:15
2	Sir Francis Drake Blvd & Willow Ave	3:23
3	Sir Francis Drake Blvd & Ash Ave	3:25
4	Memorial Park Lot	3:30
5	San Anselmo Hub (Center & Bridge)	3:37
6	Red Hill Av & Sequoia Dr	3:40

WH-10 (PM - EARLY RELEASE)

Stop	Intersection	Time
1	White Hill School	2:15
2	Sir Francis Drake Blvd & Willow Ave	2:23
3	Sir Francis Drake Blvd & Ash Ave	2:25
4	Memorial Park Lot	2:30
5	San Anselmo Hub (Center & Bridge)	2:37
6	Red Hill Av & Sequoia Dr	2:40

Times are estimated and subject to change. In the morning, please be at the stop 5 minutes before the scheduled departure time.



Ross Valley School District

WH-9 PM

WH-9 (PM)

Stop	Intersection	Time
1	White Hill School	3:15
2	San Anselmo Hub (Center & Bridge)	3:30

WH-9 (PM - EARLY RELEASE)

Stop	Intersection	Time
1	White Hill School	2:25
2	San Anselmo Hub (Center & Bridge)	2:40

Times are estimated and subject to change. In the morning, please be at the stop 5 minutes before the scheduled departure time.

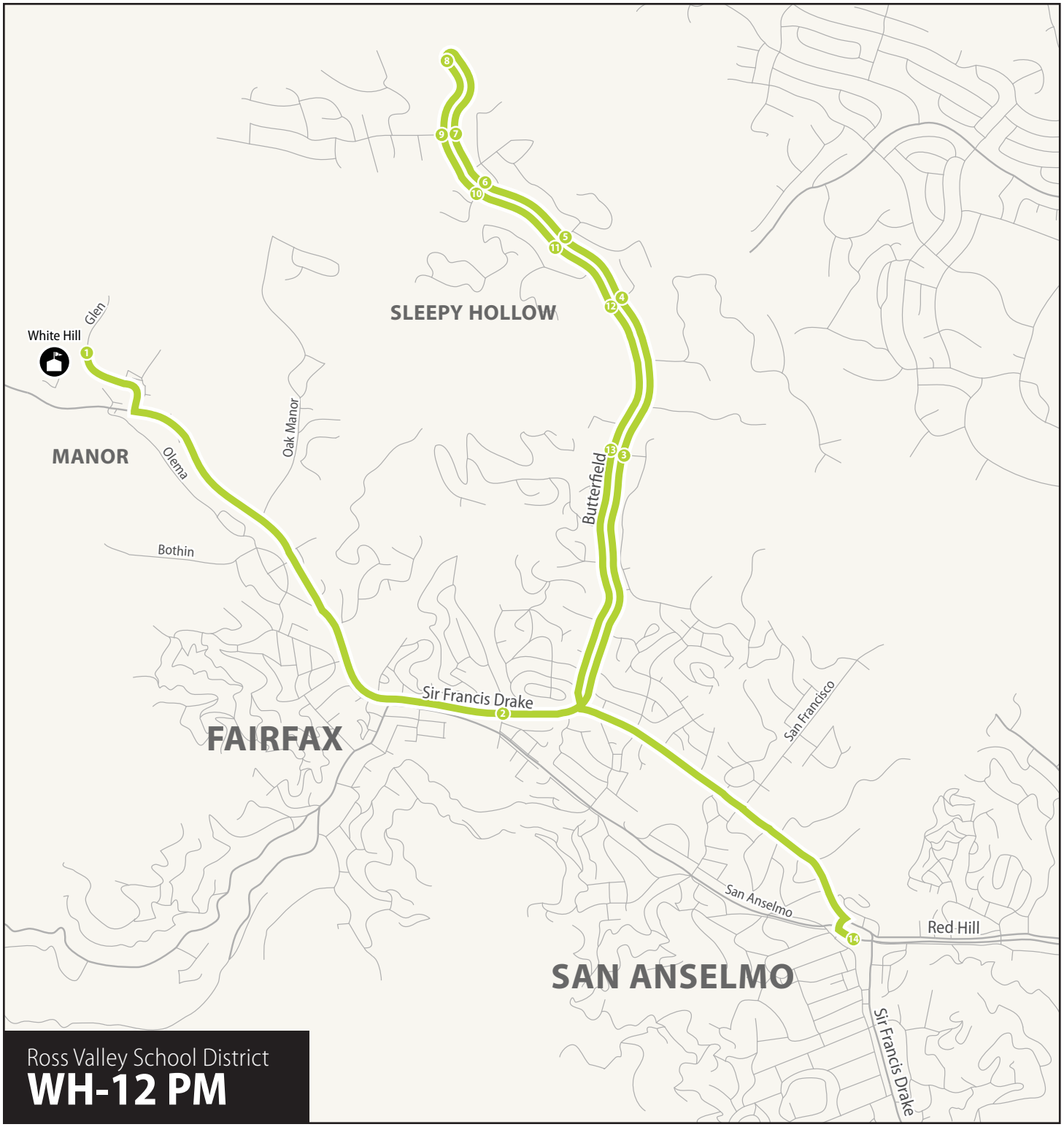
Ross Valley School District

WH-15 PM

WH-15 (PM)		
Stop	**Intersection**	**Time**
1	White Hill School	3:45
2	Sir Francis Drake Blvd & Willow Ave	3:52
3	Butterfield Rd & Meadowcroft (East)	3:55
4	Butterfield Rd & Rosemont (East)	3:55
5	Butterfield Rd & Woodside Dr (East)	3:57
6	Butterfield Rd & Caletta Ave (East)	3:57
7	Butterfield Rd & Green Valley Ct (East)	3:57
8	Butterfield Rd & Katrina Ln (East)	4:00
9	Butterfield Rd & Van Winkle Dr (East)	4:00
10	San Domenico School	4:02
11	Butterfield Rd & Van Winkle Dr (West)	4:02
12	Butterfield Rd & Katrina Ln (West)	4:02
13	Butterfield Rd & Green Valley Ct (West)	4:04
14	Butterfield Rd & Caletta Ave (West)	4:07
15	Butterfield Rd & Woodside Dr (West)	4:07
16	Butterfield Rd & Rosemont (West)	4:07
17	Butterfield Rd & Rutherford (West)	4:07
18	Sir Francis Drake Bvld & Sais Ave	4:10
19	San Anselmo Hub (Center & Bridge)	4:20

WH-15 (PM - EARLY RELEASE)		
Stop	**Intersection**	**Time**
1	White Hill School	2:45
2	Sir Francis Drake Blvd & Willow Ave	2:52
3	Butterfield Rd & Meadowcroft (East)	2:55
4	Butterfield Rd & Rosemont (East)	2:55
5	Butterfield Rd & Woodside Dr (East)	2:57
6	Butterfield Rd & Caletta Ave (East)	2:57
7	Butterfield Rd & Green Valley Ct (East)	2:57
8	Butterfield Rd & Katrina Ln (East)	3:00
9	Butterfield Rd & Van Winkle Dr (East)	3:00
10	San Domenico School	3:02
11	Butterfield Rd & Van Winkle Dr (West)	3:02
12	Butterfield Rd & Katrina Ln (West)	3:02
13	Butterfield Rd & Green Valley Ct (West)	3:04
14	Butterfield Rd & Caletta Ave (West)	3:07
15	Butterfield Rd & Woodside Dr (West)	3:07
16	Butterfield Rd & Rosemont (West)	3:07
17	Butterfield Rd & Rutherford (West)	3:07
18	San Anselmo Hub (Center & Bridge)	3:10
19	San Anselmo Hub (Center & Bridge)	3:20

Times are estimated and subject to change. In the morning, please be at the stop 5 minutes before the scheduled departure time.



Ross Valley School District

WH-12 PM

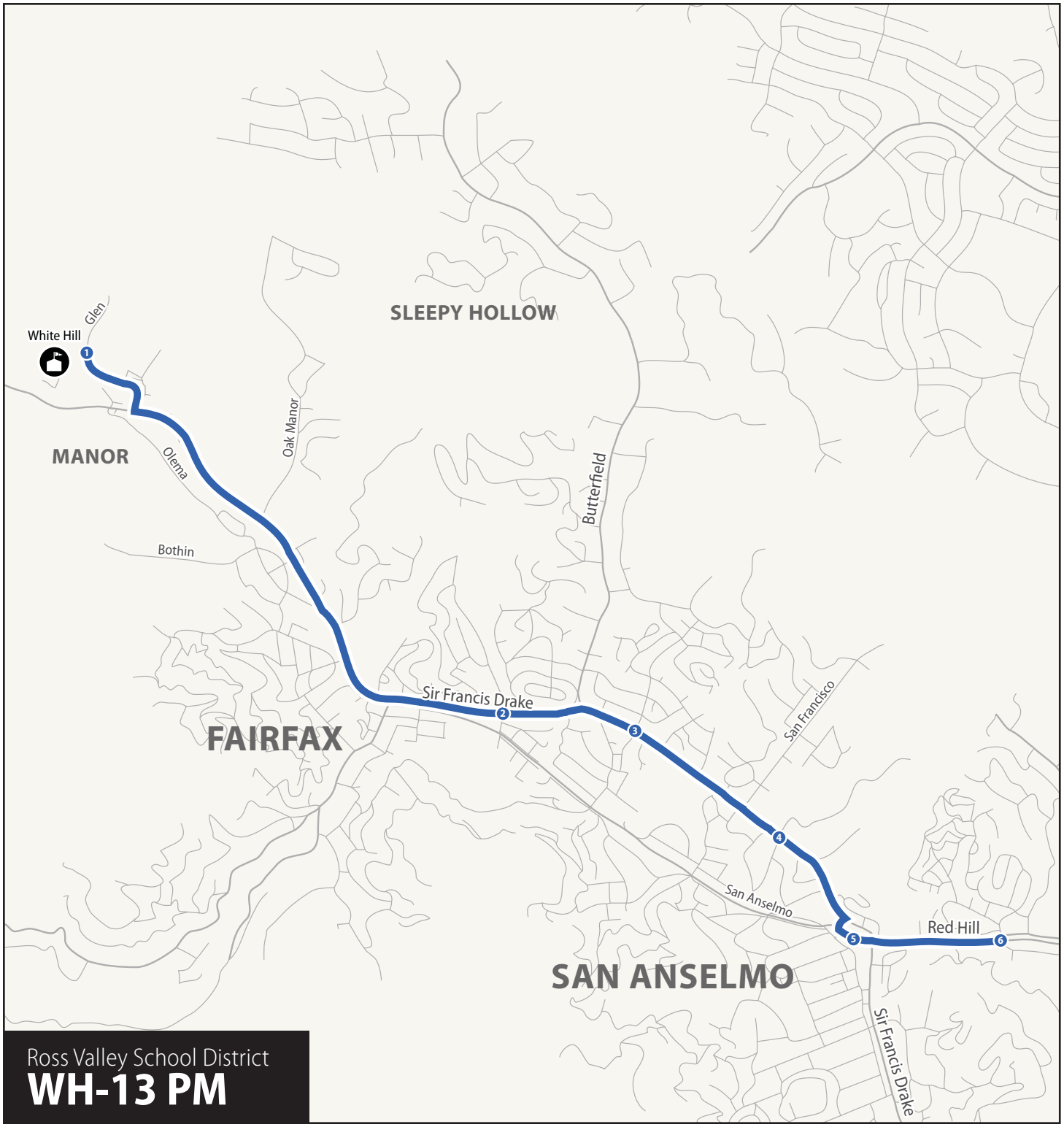
WH-12 (PM)

Stop	Intersection	Time
1	White Hill School	3:20
2	Sir Francis Drake Blvd & Willow Ave	3:25
3	Butterfield Rd & Caletta Ave (East)	3:32
4	Butterfield Rd & Green Valley Ct (East)	3:35
5	Butterfield Rd & Sleepy Hollow Dr (East)	3:35
6	Butterfield Rd & Katrina Ln (East)	3:38
7	Butterfield Rd & Van Winkle Dr (East)	3:38
8	San Domenico School	3:40
9	Butterfield Rd & Van Winkle Dr (West)	3:40
10	Butterfield Rd & Katrina Ln (West)	3:40
11	Butterfield Rd & Sleepy Hollow Dr (West)	3:40
12	Butterfield Rd & Green Valley Ct (West)	3:42
13	Butterfield Rd & Caletta Ave (West)	3:45
14	San Anselmo Hub	4:00

WH-12 (PM - EARLY RELEASE)

Stop	Intersection	Time
1	White Hill School	2:20
2	Sir Francis Drake Blvd & Willow Ave	2:25
3	Butterfield Rd & Caletta Ave (East)	2:32
4	Butterfield Rd & Green Valley Ct (East)	2:35
5	Butterfield Rd & Sleepy Hollow Dr (East)	2:35
6	Butterfield Rd & Katrina Ln (East)	2:38
7	Butterfield Rd & Van Winkle Dr (East)	2:38
8	San Domenico School	2:40
9	Butterfield Rd & Van Winkle Dr (West)	2:40
10	Butterfield Rd & Katrina Ln (West)	2:40
11	Butterfield Rd & Sleepy Hollow Dr (West)	2:40
12	Butterfield Rd & Green Valley Ct (West)	2:42
13	Butterfield Rd & Caletta Ave (West)	2:45
14	San Anselmo Hub	3:00

Times are estimated and subject to change. In the morning, please be at the stop 5 minutes before the scheduled departure time.



Ross Valley School District

WH-13 PM

WH-13 (PM)

Stop	Intersection	Time
1	White Hill School	3:15
2	Sir Francis Drake Blvd & Willow Ave	3:23
3	Sir Francis Drake Blvd & San Anselmo Ave	3:25
4	Sir Francis Drake Blvd & Sais Ave	3:33
5	San Anselmo Hub (Center & Bridge)	3:37
6	Red Hill Av & Sequoia Dr	3:40

WH-13 (PM - EARLY RELEASE)

Stop	Intersection	Time
1	White Hill School	2:15
2	Sir Francis Drake Blvd & Willow Ave	2:23
3	Sir Francis Drake Blvd & San Anselmo Ave	2:25
4	Sir Francis Drake Blvd & Sais Ave	2:33
5	San Anselmo Hub (Center & Bridge)	2:37
6	Red Hill Av & Sequoia Dr	2:40

Times are estimated and subject to change. In the morning, please be at the stop 5 minutes before the scheduled departure time.

Attachment C

San Domenico School Bus Schedules

1401 Willow Pass Rd, Suite 500 • Concord, California 94520 • (925) 827-4900

Central Marin
Bus Route Schedule 2017-2018

Drop Off/Pick Up Location	Morning Departure	Afternoon Drop Off
San Pedro & Marino	7:05am	4:05pm
Lagoon & Riviera	7:10am	3:58pm
Silk Oak Circle	7:15am	4:00pm
Lochinvar AM: San Pedro & Lochinvar PM: Across from Andy's Market	7:20am	3:56pm
Marin Beach & Tennis Club Pt. San Pedro & Summet; GGT sign	7:25am	3:54pm
Montecito AM: Mary St. near Whole Foods PM: Montecito Center Overflow lot east of center	7:30am	3:50pm
Sir Francis Drake & Sunny Hills	7:45am	
Sir Francis Drake and Tamal		3:35pm
San Domenico School	8:00am	3:20pm

Arrive to stops 5-10 minutes before the noted departure and drop off times. Students should be at the stop in line and waiting for the bus. Times above are "pull" times not loading times. Late arrivals will not be accommodated.

Express
Bus Route Schedule 2017-2018

	Drop Off/Pick Up Location	Morning Departure	Afternoon Drop Off
	TERRA LINDA AM: Far NW corner lot of Northgate parking lot PM: Las Galinas GGT stop by Macy's & Michael's	7:20am	3:57pm
	4th St.& G St.	7:35am	
	4th St. & Ida		3:42pm
*	**Butterfield & Deer Hollow**	7:50am	3:27pm
*	**Butterfield & Green Valley Ct.**	7:51am	3:26pm
*	**Butterfield & Katrina**	7:52am	3:25pm
	San Domenico	8:00am	3:20pm

Arrive to stops 5-10 minutes before the noted departure and drop off times. Students should be at the stop in line and waiting for the bus. Times above are "pull" times not loading times. Late arrivals will not be accommodated.

Fairfax

Bus Route Schedule 2017-2018

Drop Off/Pick Up Location	Morning Departure	Afternoon Drop Off
Forest Knolls Sir Francis Drake & Castro	7:10am	3:59pm
San Geronimo Post Office on San Geronimo Valley Rd	7:15am	3:54pm
Woodacre Woodacre Store	7:19am	3:51pm
Olema Road GGT stop on Sir Francis Drake	7:26am	3:46pm
Oak Manor GGT Stop by 7-11	7:27am	3:45pm
Fairfax Library/St. Rita's AM: GGT stop on Sir Francis Drake PM: St. Rita's Church	7:29am	3:44pm
Dailey Method/ODonnell's GGT Shelter @ Sir Francis Drake & Kent	7:35am	3:37pm
Greensburgh Lane & Tarry Road	7:43am	3:30pm
Tarry Road & Van Winkle	7:45am	3:30pm
Van Ripper & Van Winkle	7:47am	3:28pm
San Domenico School	8:00am	3:20pm

Arrive to stops 5-10 minutes before the noted departure and drop off times. Students should be at the stop in line and waiting for the bus. Times above are "pull" times not loading times. Late arrivals will not be accommodated.

Novato
Bus Route Schedule 2017-2018

Drop Off/Pick Up Location	Morning Departure	Afternoon Drop Off
Pacheco Plaza/Ignacio Blvd. In front of Marin Coffee Roasters	7:05am	4:20pm
Chapel Of the Hills Miracle Mile San Anselmo	7:38am	n/a
Ross Valley Dr. & 4th St. Miracle Mile San Rafael GGT Stop	n/a	3:45pm
Butterfield & Rosemont Ave. Brookside School	7:45am	3:35pm
San Domenico School	8:00am	3:20pm

Arrive to stops 5-10 minutes before the noted departure and drop off times. Students should be at the stop in line and waiting for the bus. Times above are "pull" times not loading times. Late arrivals will not be accommodated.

Ross/East Bay
Bus Route Schedule 2017-2018

Drop Off/Pick Up Location	Morning Departure	Afternoon Drop Off
Rockridge Bart Station Oakland/Berkeley PM ONLY	n/a	5:07pm
Marin Circle Berkeley @ mailbox PM ONLY	n/a	4:47pm
Del Norte Bart Station El Cerrito on Cutting Blvd under BART Tracks	6:25am	4:32pm
Pt. Richmond Transit Stop under 580 at Tewksbury Ave. facing Castro	6:40am	4:22pm
Greenbrae La Cuesta & Sir Francis Drake	7:31am	3:57pm
Ross AM: Marin Art & Garden GGT Stop PM: SFD & Lagunitas GGT Stop	7:40am	3:45pm
San Domenico School	8:00am	3:20pm

Arrive to stops 5-10 minutes before the noted departure and drop off times. Students should be at the stop in line and waiting for the bus. Times above are "pull" times not loading times. Late arrivals will not be accommodated.

San Francisco/Larkspur
Bus Route Schedule 2017-2018

Drop Off/Pick Up Location	Morning Departure	Afternoon Drop Off
San Francisco Palace of Fine Arts **AM ONLY**; PM is SF/MV Bus	6:58am	SF/MV Bus See schedule
Corte Madera AM: GGT Stop across street from Union Bank PM: GGT Stop in front of Union Bank	7:20am	4:00pm
Larkspur/Magnolia & Ward	7:25am	3:55pm
Larkspur/Magnolia & Dartmouth	7:28am	3:53pm
Kentfield/College & Woodland AM: GGT Stop near College Gym PM: GGT stop near Woodlands Market	7:32am	3:49pm
San Anselmo/ Bolinas Corner of Bolinas & SFD at GGT Stop	7:38am	3:46pm
San Anselmo /Barber & Ross SFD & Barber at GGT Stop	7:40am	3:43pm
San Anselmo Hub On Center across from Andronico's	n/a	3:40pm
San Domenico School	8:00am	3:20pm

Arrive to stops 5-10 minutes before the noted departure and drop off times. Students should be at the stop in line and waiting for the bus. Times above are "pull" times not loading times. Late arrivals will not be accommodated.

San Francisco/Mill Valley
Bus Route Schedule 2017-2018

Drop Off/Pick Up Location	Morning Departure	Afternoon Drop Off
San Francisco Palace of Fine Arts	SF/Larkspur See Schedule	
California & 14th Off Park Presidio	n/a	4:30pm
Mill Valley/Safeway on Camino Alto GGT Stop on Miller by Safeway	7:20am	4:05pm
Mill Valley/Strawberry Behind Safeway at Strawberry Shopping Center at GGT Stop	7:27am	3:55pm
San Domenico School	8:00am	3:20pm

Arrive to stops 5-10 minutes before the noted departure and drop off times. Students should be at the stop in line and waiting for the bus. Times above are "pull" times not loading times. Late arrivals will not be accommodated.

Attachment D

Golden Gate Transit (Public Bus) Map and Schedule

1401 Willow Pass Rd, Suite 500 • Concord, California 94520 • (925) 827-4900

Golden Gate Transit

DISTRICT
BRIDGE
FERRY
TRANSIT
Bus Schedules
Current
Updates
Fare Programs
Services
Accessibility
Research Library
News & Events
Contact Us

GO PLACES WITH US
Go Mobile!
Go With Clipper!
Going Green!
Search Golden Gate
Translations

Select another route... Go

ROUTE 27 ♦ COMMUTE BUS ROUTE ♦ Effective March 12, 2017

Show all | Hide all

To San Francisco - Southbound (MON - FRI EXCEPT HOLIDAYS) Show

To San Anselmo - Northbound (MON - FRI EXCEPT HOLIDAYS) Hide

Rider Alert Route 44 schedule included in timetable to show additional trips from the Financial District to the San Rafael Transit Center.

San Francisco - San Rafael - San Anselmo

Route	San Francisco (Perry & 3rd)	San Francisco Financial District (Fremont & Mission)	Golden Gate Bridge Toll Plaza	Spencer Ave Bus Pad	Seminary Dr Bus Pad (101 at Seminary)	Tiburon Wye Bus Pad (101 at Tiburon Blvd)	Paradise Drive Bus Pad	Lucky Drive Bus Pad	Arrive San Rafael Transit Center (3rd & Hetherton)	Leave San Rafael Transit Center (3rd & Hetherton)	Leave San Anselmo Hub (Center & Sir Francis Drake)	Sleepy Hollow (Butterfield at San Domenico School)
27	–	–	–	–	–	–	–	–	–	–	6 23 am	6 36 am
27	7 42 am	7 50 am	YES	8 23 am	8 27 am	8 28 am	8 30 am	8 32 am	8 40 am	–	–	–
27	8 44 am	8 52 am	YES	9 24 am	9 28 am	9 29 am	9 31 am	9 33 am	9 40 am	–	–	–
27	9 44 am	9 52 am	YES	10 24 am	10 28 am	10 29 am	10 31 am	10 33 am	10 40 am	–	–	–
27	10 44 am	10 52 am	YES	11 24 am	11 28 am	11 29 am	11 31 am	11 33 am	11 40 am	–	–	–
27	11 41 am	11 49 am	YES	12 24 pm	12 28 pm	12 29 pm	12 31 pm	12 33 pm	12 40 pm	–	–	–
27	12 39 pm	12 47 pm	YES	1 24 pm	1 28 pm	1 29 pm	1 31 pm	1 33 pm	1 40 pm	–	–	–
27	1 39 pm	1 47 pm	YES	2 24 pm	2 28 pm	2 29 pm	2 31 pm	2 33 pm	2 40 pm	–	–	–
27	2 33 pm	2 41 pm	YES	3 18 pm	3 23 pm	3 24 pm	3 28 pm	3 31 pm	3 40 pm	–	–	–
27	3 24 pm	3 34 pm	YES	–	–	–	–	–	4 34 pm	–	4 49 pm	–
27	3 57 pm	4 07 pm	YES	–	–	–	–	–	5 07 pm	–	5 22 pm	–
27	4 25 pm	4 36 pm	YES	–	–	–	–	–	5 37 pm	–	5 53 pm	–
27	4 51 pm	5 03 pm	YES	–	–	–	–	–	6 03 pm	–	6 19 pm	–
44	4 58 pm	5 10 pm	YES	–	–	–	–	–	–	6 09 pm	–	–
27	5 08 pm	5 20 pm	YES	–	–	–	–	–	6 21 pm	6 21 pm	6 36 pm	6 49 pm
27	5 37 pm	5 50 pm	YES	–	–	–	–	–	6 43 pm	–	6 57 pm	–
44	6 07 pm	6 17 pm	YES	–	–	–	–	–	–	7 06 pm	–	–
27	6 35 pm	6 46 pm	YES	–	–	–	–	–	7 35 pm	–	7 49 pm	–

Golden Gate Transit

Select another route...

ROUTE 27 ♦ COMMUTE BUS ROUTE ♦ Effective September 10, 2017

Map | To San Francisco South (MON-FRI) | To San Anselmo North (MON-FRI)

To San Francisco - Southbound (MON - FRI EXCEPT HOLIDAYS)

Rider Alert

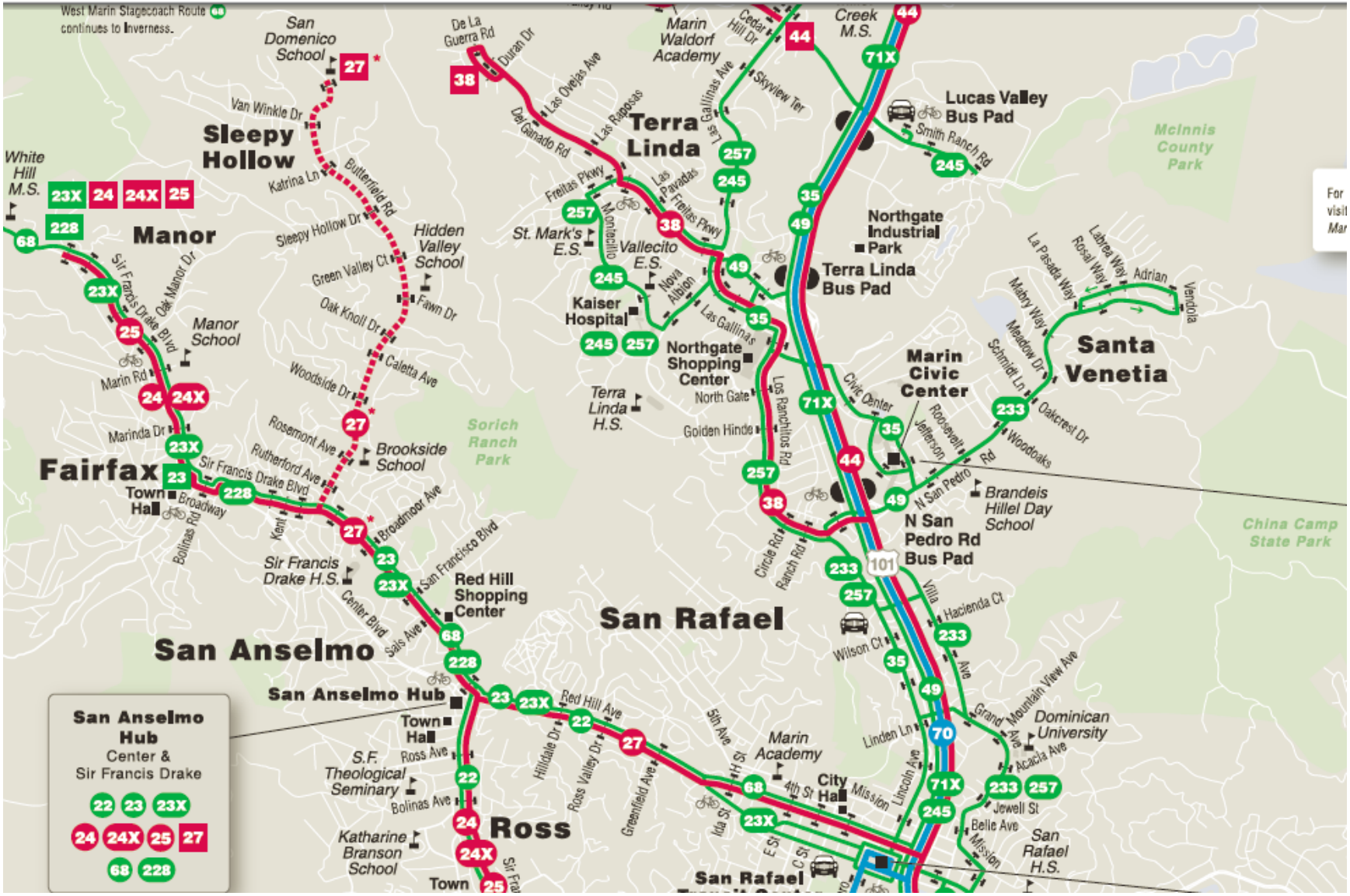
After 9 am, southbound trips operate on North Point Street in San Francisco, not Beach Street. After 10 am, southbound trips do not operate on Battery Street south of Clay Street. Instead, they serve Clay Street to Davis Street. Route 44 schedule included in timetable to show additional trips from the San Rafael Transit Center to the Financial District. Stop at Perry & 4th under construction and not served until further notice. Until then, last stop is 4th & Folsom.

San Anselmo - San Rafael - San Francisco

Notes	Route	Sleepy Hollow (Butterfield at San Domenico School)	Leave San Anselmo Hub (Center & Sir Francis Drake)	Marinwood (Lucas Valley & Las Gallinas)	Upper Lucas Valley (Mt McKinley & Idylberry)	Lucas Valley (Huckleberry & Idylberry)	Marinwood (Miller Creek & Marinwood Ave)	Lucas Valley Bus Pad (101 at Lucas Valley Rd)	Terra Linda Bus Pad (Hwy 101 at Freitas Pkwy)	North San Pedro Bus Pad	Leave San Rafael Transit Center (3rd & Hetherton)	Lucky Drive Bus Pad	Paradise Drive Bus Pad	Golden Gate Bridge Toll Plaza	Tiburon Wye Bus Pad (101 at E Blithedale)	Seminary Dr Bus Pad (101 at Seminary)	Spencer Ave Bus Pad	San Francisco Financial District (Battery & Pine)	San Francisco Financial District (Davis & California)	San Francisco (4th & Folsom)	San Francisco (Perry & 4th)	Route	Notes
T	27	-	-	-	-	-	-	-	-	-	4 30 am	4 33 am	4 35 am	YES	4 37 am	4 38 am	4 42 am	5 05 am	-	5 13 am	5 14 am	27	T
	27	-	5 50 am	-	-	-	-	-	-	-	6 03 am	-	-	YES	-	-	-	6 45 am	-	6 54 am	6 55 am	27	
	27	-	6 20 am	-	-	-	-	-	-	-	6 33 am	-	-	YES	-	-	-	7 15 am	-	7 24 am	7 25 am	27	
	27	6 36 am	6 49 am	-	-	-	-	-	-	-	7 03 am	-	-	YES	-	-	-	7 45 am	-	7 54 am	7 55 am	27	
	44	-	-	6 41 am	6 45 am	6 51 am	6 57 am	7 00 am	7 02 am	7 04 am	7 11 am	-	-	YES	-	-	-	7 55 am	-	8 06 am	8 07 am	44	
	27	-	7 20 am	-	-	-	-	-	-	-	7 33 am	-	-	YES	-	-	-	8 18 am	-	8 29 am	8 30 am	27	
	27	-	7 37 am	-	-	-	-	-	-	-	7 50 am	-	-	YES	-	-	-	8 37 am	-	8 48 am	8 49 am	27	
	44	-	-	7 33 am	7 37 am	7 43 am	7 49 am	7 52 am	7 54 am	7 56 am	8 03 am	-	-	YES	-	-	-	8 52 am	-	9 04 am	9 05 am	44	
	27	-	7 59 am	-	-	-	-	-	-	-	8 11 am	-	-	YES	-	-	-	9 00 am	-	9 11 am	9 12 am	27	
	27	-	8 23 am	-	-	-	-	-	-	-	8 35 am	-	-	YES	-	-	-	9 24 am	-	9 35 am	9 36 am	27	
	27	-	8 53 am	-	-	-	-	-	-	-	9 05 am	-	-	YES	-	-	-	9 54 am	-	10 05 am	10 06 am	27	
	27	-	-	-	-	-	-	-	-	-	9 45 am	9 52 am	9 54 am	YES	9 56 am	9 57 am	10 00 am	-	10 36 am	10 46 am	10 47 am	27	
	27	-	-	-	-	-	-	-	-	-	10 45 am	10 52 am	10 54 am	YES	10 56 am	10 57 am	11 01 am	-	11 36 am	11 46 am	11 47 am	27	
	27	-	-	-	-	-	-	-	-	-	11 45 am	11 52 am	11 54 am	YES	11 56 am	11 57 am	12 01 pm	-	12 36 pm	12 47 pm	12 48 pm	27	
	27	-	-	-	-	-	-	-	-	-	12 45 pm	12 52 pm	12 54 pm	YES	12 56 pm	12 57 pm	1 01 pm	-	1 36 pm	1 47 pm	1 48 pm	27	
	27	-	-	-	-	-	-	-	-	-	1 45 pm	1 52 pm	1 54 pm	YES	1 56 pm	1 57 pm	2 01 pm	-	2 36 pm	2 47 pm	2 48 pm	27	
	27	-	-	-	-	-	-	-	-	-	2 45 pm	2 52 pm	2 54 pm	YES	2 56 pm	2 57 pm	3 01 pm	-	3 39 pm	3 52 pm	3 53 pm	27	
	27	-	-	-	-	-	-	-	-	-	3 45 pm	3 52 pm	3 54 pm	YES	3 56 pm	3 57 pm	4 01 pm	-	4 41 pm	4 54 pm	4 55 pm	27	
	27	-	-	-	-	-	-	-	-	-	4 45 pm	4 54 pm	4 56 pm	YES	4 58 pm	4 59 pm	5 03 pm	-	5 43 pm	5 55 pm	5 56 pm	27	
	27	-	-	-	-	-	-	-	-	-	5 45 pm	5 55 pm	5 57 pm	YES	5 59 pm	6 00 pm	6 04 pm	-	6 40 pm	6 50 pm	6 51 pm	27	
	27	6 49 pm	6 58 pm	-	-	-	-	-	-	-	-	-	-	YES	-	-	-	-	-	-	-	27	

T This trip operates via the Broadway tunnel.

Golden Gate Transit



APPENDIX F

Analysis of Traffic Detour Plan

Memo

To: Jill Barnes, PE, Ross Valley Sanitary District

CC: Kyle Carbert and Jasmine Cuffee, Harris & Associates

From: Andrew Lee, PE, TE; Ramin Nikoui, EIT

Date: December 11, 2017

Subject: Analysis of traffic detour plan, Lower Butterfield Relief Project

This memorandum presents Parisi Transportation Consulting's (Parisi) analysis of the Ross Valley Sanitary District's (RVSD) proposed construction phasing and associated traffic detour on and near Butterfield Road for the Lower Butterfield Relief Project (Project). The construction plan proposes one-way traffic control and construction detours onto residential streets during construction.

1 WORK AREA SITE DESCRIPTION

Parisi performed a review of Butterfield Road and the streets comprising the proposed detour routes. We assessed the number of lanes, presence of on-street parking, typical width, and potential geometric constraints. The following is a description of the proposed detour route streets, including their cross-sectional width, presence of on-street parking and sidewalks, and other noteworthy features.

Broadmoor Avenue is a two-lane, 25-mph residential street that is 30 feet wide. On-street parking is allowed on both sides along the length of the corridor. The centerline is not marked between Brookside Drive and Berkeley Avenue, except near the intersections. There are no sidewalks, although the street has continuous raised curbs on both sides of the street.

Berkeley Avenue is a two-lane, 15-mph residential street. It has a width of 24 feet with unpaved shoulders. Parking is allowed on both sides of the road; most residents park on the unpaved shoulders or in the wider areas of the paved road. The street centerline is unmarked and there are no sidewalks. There are speed cushions installed to reduce vehicular speeds.

The Alameda is a two-lane, 25-mph residential street whose width varies from 10 feet to 24 feet. Parking is allowed on both sides of the road. Residents tend to park on the unpaved shoulders, if present; some residents park on-street where there are raised curbs. There is a short section of sidewalk north of Arroyo Avenue, but they largely do not exist between Berkeley Avenue and Caletta Avenue. There is a short section of The Alameda between

Holstein Road and Caletta Avenue that is identified as "Not a City Maintained Street". This section is approximately 10 to 12 feet wide, adjacent to steep slopes on both sides, and has horizontal and vertical curves that limit the sight lines of oncoming traffic. The centerline is not marked on the corridor.

Arroyo Avenue is a short residential street that connects Butterfield Road to The Alameda. It is approximately 24.5 feet wide. Parking is allowed on both sides of the road, except where prohibited by red painted curbs. The street centerline is not marked. There are existing sidewalks on both sides of the road.

Caletta Avenue is a short residential street that connects Butterfield Road to The Alameda. Its width varies between 25.5 feet and 27 feet. There are segments of sidewalk on both sides of the road, however, a continuous sidewalk only exists along the south side. Parking is allowed on both sides of the road and street centerline is unmarked.

Figures showing the daily traffic trends for the project area and detour roadways are shown in Appendix B. The daily traffic volumes are summarized in Table 1

Table 1 Existing Daily Vehicle Traffic Volumes

	Daily Vehicle Traffic Volumes		
Roadway Segment	**SB**	**NB**	**Two-Way**
Butterfield Road, between Rosemont and Willow, weekday average[1]	5,400	5,500	11,000
Butterfield Road, between Rosemont and Willow, Saturday	5,100	5,000	10,100
Broadmoor Avenue, north of Brookside Drive[2]	900	750	1,650
The Alameda, south of Arroyo Avenue[2]	500	300	800
The Alameda north of Arroyo Avenue[2]	400	300	700
Roadway Segment	**EB**	**WB**	**Two-Way**
Sir Francis Drake Boulevard, west of Broadmoor[4]	14,800	14,800	29,600

1. May 2016 weekday average
2. May 2016 count
3. November 15, 2017 traffic count
4. PASS San Anselmo 2013/2014 with factored increase to 2017 (4.6% increase)

The project proposes that Phase 2 construction on Butterfield Road occur during the summer months while schools are out of session (mid-June to mid-August). Phase 3 construction work on Sir Francis Drake Boulevard (SFDB) would occur in Fall 2018. Phase 4 construction would occur in Summer 2019 or 2020. Hidden Valley Elementary School and Brookside Elementary School, which are located near the project area, begin their school year in late August. There was no discount in the traffic analysis for the work planned during the summer months to maintain conservative estimates of the traffic impact.

2 PROJECT TRAFFIC DETOURS

The following section summarizes the proposed traffic detours associated with Phase 2, 3 and 4 of the project, the potential detour traffic volumes, and recommended circulation and parking strategies to facilitate the detour traffic.

2.1 PROPOSED PROJECT DETOUR ROUTES AND TIMES

Three construction phases that propose traffic detours are described below and illustrated in Appendix A.

Phase 2 proposes work on **Butterfield Road between Arroyo Avenue and Meadowcroft Drive**. During work hours (6 AM to 3 PM), Butterfield Road would be restricted to one-way southbound traffic. The construction plan proposes to detour northbound Butterfield Road traffic via Broadmoor Avenue, Berkeley Avenue, The Alameda, and Arroyo Avenue. Construction work on Saturday may be required depending on project progress; Saturday work hours would be restricted to 9AM to 5 PM.

Phase 3 proposes work on **Sir Francis Drake Boulevard (SFDB) at Broadmoor Avenue**. During work hours (9 AM to 3:30 PM), the construction work may require closing up to one lane on SFDB in each direction. However, two-way traffic will be maintained at all times on SFDB, i.e., there would not be closures of both lanes in a single direction.

Phase 4 proposes work on **Butterfield Road between Kenrick Avenue to Arroyo Avenue**. During work hours (6 AM to 3 PM on weekdays), Butterfield Road would be restricted to one-way southbound traffic. The construction plan proposes to detour northbound Butterfield Road traffic via Arroyo Avenue, The Alameda, and Caletta Avenue. Construction work on Saturday may be required depending on project progress; Saturday work hours would be restricted to 9AM to 5 PM.

2.2 POTENTIAL DETOUR TRAFFIC VOLUMES

Parisi collected daily traffic counts on Butterfield Road, Sir Francis Drake Boulevard, Broadmoor Avenue, and The Alameda (Table 1). We used these data to determine these streets' typical daily vehicular traffic demand, and to calculate the potential traffic volumes that could be diverted from Butterfield Road onto the detour route streets.

Phase 2 – Butterfield Road Closure

Table 2 summarizes the existing vehicle traffic volumes on Butterfield Road and the Phase 2 detour route streets, and forecasts potential traffic that the detour route streets would handle during construction.

Table 2 Phase 2 Butterfield Road Detour Vehicle Traffic Volumes

	Existing Conditions		With Detour	
Roadway Segment	**SB**	**NB**	**SB**	**NB**
Weekdays, 6 AM to 3 PM				
Butterfield Road, between Arroyo and SFDB	3,300	2,700	3,300	0
Broadmoor Ave./ Berkeley Ave., between SFDB and The Alameda	600	400	600	3,100
The Alameda, between Berkeley Ave. and Arroyo Ave.	400	200	0 / 400*	2,900

*One-way northbound traffic is recommended for The Alameda, south of Arroyo Avenue, assuming the existing roadway remains. Two-way traffic on The Alameda, south of Arroyo Avenue, is possible if the unpaved shoulders are paved to widen the roadway to between 18 and 22 feet. These options are discussed in a later section.

The hourly traffic volume detoured onto Broadmoor Avenue, Berkeley Avenue and The Alameda would average 400 vehicles per hour (VPH), with a maximum hourly demand of approximately 500 VPH (2 to 3 PM). The detoured traffic represents a significant increase in the traffic volumes handled by the detour route streets. Circulation and parking strategies to facilitate the detour traffic, including parking restrictions and limiting vehicle traffic to one-way circulation, are discussed in the following section.

Phase 3 – Sir Francis Drake Lane Closures

The existing vehicle traffic volumes on Sir Francis Drake Boulevard during the proposed work hours are approximately 5,000 to 6,000 vehicles in each direction (Table 3). The hourly traffic demand in each direction ranges between 700 and 1,000 VPH, with higher traffic demand in the eastbound direction in the morning; this pattern reverses to higher traffic demand in the westbound direction in the afternoon (Figure 3). The proposed work times of 9 AM to 3:30 PM largely avoid the peak travel demand along the SFDB corridor, which occur from 7-9 AM and 3-5 PM.

Table 3 Phase 2 Sir Francis Drake Boulevard Lane Closure Vehicle Traffic Volumes

	Existing Conditions	
Roadway Segment	**EB**	**WB**
Weekdays, 9 AM to 3:30 PM		
Sir Francis Drake Boulevard, west of Broadmoor[4]	5800	5200
Weekdays, 8:30 AM to 3:30 PM		
Sir Francis Drake Boulevard, west of Broadmoor[4]	6400	5600

The hourly vehicle demand on SFDB beginning at 9 AM is approximately 1,100 VPH eastbound and 700 VPH westbound. The hourly vehicle demand on SFDB beginning at 8:30 AM, which is a proposed alternative start time, is approximately 1200 VPH eastbound and 700 VPH westbound.

Phase 4 – Butterfield Road Closure

Phase 4's proposed work hours on Butterfield Road are 6 AM to 3 PM on weekdays, and potentially 9 AM to 5 PM on Saturdays. Table 4 summarizes the existing vehicle traffic volumes on Butterfield Road and the detour route streets, and forecasts potential traffic that the detour route streets would handle during construction.

Table 4 Phase 4 Detour Vehicle Traffic Volumes

	Existing Conditions		With Detour*	
Roadway Segment	**SB**	**NB**	**SB**	**NB**
Weekdays, 6 AM to 3 PM				
Butterfield Road, between Caletta and Arroyo	3,300	2,700	3,600	0
The Alameda, between Caletta and Arroyo	300	200	0	2,900
Saturdays, 9 AM to 5 PM				
Butterfield Road, between Caletta and Arroyo	3,100	2,800	3,300	0
The Alameda, between Caletta and Arroyo	200	150	0 / 100*	2,950

*One-way northbound traffic is recommended for The Alameda between Arroyo Avenue and Caletta Avenue due to the constrained roadway width, horizontal curves and limited sight distance in the non-Town maintained section. Two-way traffic on The Alameda, north of Arroyo Avenue, is possible if the roadway is widened to between 18 and 22 feet. This issue is discussed in a later section.

The peak hour demand would be approximately 500 vehicles per minute during both the AM and PM peak hours (7:30-8:30 AM, 2:00-3:30 PM) on The Alameda. The following section discusses recommended circulation and parking strategies to facilitate the detour traffic, including parking restrictions and limiting vehicle traffic to one-way circulation.

2.3 RECOMMENDED BUTTERFIELD ROAD DETOUR PARKING AND CIRCULATION RESTRICTIONS

As noted in Section 1, the proposed Butterfield Road detour route streets are narrow residential streets with varying paved widths and intermittent on-street parking. The detour traffic volumes presented in the previous section represent a substantial increase in the vehicle volumes typically experienced by these streets, and are anticipated to result in conflicts between oncoming traffic where the roadway widths and geometry are limited.

Parisi is recommending a combination of parking restrictions and limited areas of one-way traffic where necessary. Two-way traffic may be permitted if the Town and/or RVSD widen narrow sections of roadway and shoulder. Table 5 summarizes our recommendations for each detour route street, which are described in greater detail in the following section.

Table 5 Proposed Butterfield Road Detour Route Parking and Vehicle Traffic Circulation Strategies

	Existing Conditions			Proposed Detour Operations	
Roadway	**Roadway Width (ft)**	**Parking Allowed?**	**Estimated Vehicle Travel Way (ft)**	**Parking Allowed?**	**Estimated Vehicle Travel Way (ft)**
Broadmoor Ave.	30’	Allowed on both sides on the street	14’	Allowed in northbound direction only	22’, two-way traffic
Berkeley Ave.	24’	Allowed on unpaved shoulder	24’	Allowed on unpaved shoulder	24’, two-way traffic
The Alameda (s/o Arroyo Ave.)	13’ – 24’	Allowed on unpaved shoulders and at intermittent locations on the street	8’ – 13’	Option 1: Allowed on unpaved shoulder but not on the roadway	Option 1: 13’ – 24’ one-way NB traffic
				Option 2: Prohibited in widened roadway sections (existing unpaved shoulder)	Option 2: Widen narrow sections to 18-22’
The Alameda (north of Arroyo Ave.)	10’ – 24’	Allowed on unpaved shoulders and at 24’ wide sections	8’ – 10’	Option 1: On unpaved shoulder and in northbound direction at 24’-wide sections	Option 1: 10’ – 16’ one-way NB traffic
				Option 2: Prohibited in widened roadway sections	Option 2: Widen narrow sections to 18-22’
Arroyo Avenue	24.5’	Allowed on both sides on the street	8.5’	Prohibited on both sides	24.5’ two-way
Caletta Avenue	25.5’ – 27’	Allowed on both sides on the street	9.5’ – 11’	Prohibited on both sides	25.5’ – 27’ two-way

Broadmoor Avenue, from Meadowcroft Drive to Berkeley Avenue (Phase 2). Broadmoor Avenue provides approximately 14 feet for two-way vehicle travel when parking is present on both sides. Vehicles were frequently observed driving along the center of the road. Drivers must yield to oncoming vehicles when encountering opposing traffic. With the anticipated influx of northbound detour traffic in Phase 2, we recommend that on-street parking be prohibited on one side of the road, which would result in an effective 22 feet of vehicle travel way (two 11-foot lanes), and one eight-foot parking lane. We recommend parking be maintained on the northbound side of Broadmoor Avenue so that parked vehicles can act as a buffer for adjacent residences from vehicle traffic, and so that pedestrians can walk in the less-traveled southbound direction.

Berkeley Avenue, from Broadmoor Avenue to The Alameda (Phase 2). Most vehicles on Berkeley Avenue were observed parking on the unpaved shoulders, and very few, if any, parked on the paved road. Because the paved width is 24 feet, there is adequate width under existing conditions to facilitate bidirectional travel without further parking or circulation restrictions. However, the Town should provide notice to the neighborhood that parking on the paved sections of the street will not be allowed during Phase 2 construction.

The Alameda, from Berkeley Avenue to Arroyo Avenue (Phase 2). The Alameda varies in width from between 13 and 24 feet. The narrowest section occurs adjacent to the Brookside Elementary school field, where there is an unpaved shoulder. In the wider sections of The Alameda, residents tend to park on both sides of the street.

> **Option 1**: We recommend operating this section of The Alameda as a one-way road in the northbound direction if the existing roadway is unimproved. Parking would be allowed in the unpaved shoulder and largely prohibited from the paved portions of the road, except near Arroyo Avenue. Operating The Alameda one-way in the northbound direction may interfere with school drop-off / pick-up and school field access, which primarily occurs in the southbound direction.
>
> **Option 2**: Two-way traffic could be facilitated if the narrow sections of The Alameda are widened to between 18 and 22 feet. Parking would be prohibited for the full extents of this section. There are existing utility poles along the road that could constrain the ability to widen the roadway. Further study should be performed to determine this improvement's feasibility.

The Alameda, from Arroyo Avenue to Caletta Avenue (Phase 4). The Alameda varies in width from between 10 feet and 24 feet. The 10-foot portion of the corridor, which is not Town maintained, is constrained by adjacent grades on both sides.

> **Option 1**: Under existing conditions, the road is too narrow to allow bidirectional traffic at levels forecast with the construction detour. We recommend that this section of The Alameda operate as a one-way northbound street during Phase 4 construction. On-

street parking may be allowed in the northbound direction at the wider portions of the corridor.

Option 2: Two-way traffic could be permitted if the 10-foot wide sections of The Alameda are widened to between 18 and 22 feet. Parking would be prohibited for the full extents of this section. There are existing slopes, trees, and a creek that could constrain the ability to widen the roadway. Further study should be performed to determine this improvement's feasibility.

Arroyo Avenue, from Butterfield Road to The Alameda (Phase 2 and Phase 4). Arroyo Avenue serves as the connection to Butterfield under both detour plans, and is expected to experience queuing at the intersection as vehicles enter or exit the detour route. We recommend that parking be prohibited on Arroyo Avenue during both Phase 2 and Phase 4 construction to provide facilitate two-way vehicle traffic.

Caletta Avenue, from Butterfield Road to The Alameda (Phase 4). Caletta Avenue serves as the connection to Butterfield Road under the Phase 4 detour plan. Like Arroyo Avenue, Caletta is expected to experience queuing in the northbound direction as vehicles exit the detour route. We recommend that parking be prohibited on Caletta Avenue during Phase 4 construction.

Multiple Locations, Intersection control. Intersections affected by the detour route, especially where the detours begin and end, should be monitored by traffic control personnel to ensure that detour traffic does not experience excessive queues and does not result in excessive queuing.

2.4 RECOMMENDED SIR FRANCIS DRAKE BOULEVARD TRAFFIC MANAGEMENT STRATEGIES

The SFDB / Broadmoor Avenue intersection is signal controlled and left turns from SFDB onto Broadmoor Avenue are subject to permitted phasing, meaning eastbound left turning vehicles may turn only if afforded a gap in the opposing westbound traffic. High vehicle traffic demand along the SFDB corridor results in infrequent opportunities for left-turning traffic.

Phase 3 proposes lane closures of up to one lane in each direction of SFDB. We recommend prohibiting eastbound left turns onto Broadmoor Avenue for the duration of Phase 3. Eastbound vehicles on SFDB should receive advance notice to detour onto Suffield Avenue, which connects to Butterfield Road.

To the extent possible, lane closures on SFDB should be in the west direction in the morning, and in the eastbound direction in the evening. Parisi recommends providing two westbound lanes on SFDB beginning at 2 PM, when hourly vehicle volumes begin to exceed 1,000 VPH (Figure 3).

2.5 RECOMMENDED BUTTERFIELD ROAD TRAFFIC MANAGEMENT STRATEGIES

All northbound Butterfield Road vehicles and bicycle traffic should be routed through the detour route during Phase 2 and Phase 3 work. Construction work should maintain pedestrian access to the existing paved sidewalk on the east side of Butterfield Road.

Southbound Butterfield Road traffic will be routed through the construction area. The vehicle lanes through the construction area will be marked by cones or delineators. Bicycle traffic may need to share the southbound lanes with vehicle traffic where lane shifts occur with the construction area. "SHARE THE ROAD" signs should be placed at the beginning of the construction area to indicate to drivers that bicyclists may be present in the southbound lanes.

3 LARGE VEHICLE ROUTING

The construction work proposes to use two types of trucks: a 10-cubic yard triaxle truck and a 20-cubic yard trailer dump truck. These vehicles can be approximated as a SU-40 single unit truck and a WB-40 semitrailer standard design vehicle.[1]

PHASE 2 DETOUR AREA

The Phase 2 route for construction traffic proposes to route trucks via one of two options:

> Option 1: northbound onto Broadmoor Avenue – Berkeley Avenue – The Alameda – Arroyo Avenue.
>
> Option 2: northbound onto Broadmoor Avenue – Indian Rock Road – The Alameda – Arroyo Avenue.

Both construction traffic route options present challenges based on the existing horizontal and vertical roadway geometry. Option 1 (via Berkeley Avenue) has several narrow sections and sharp corners (near 12 Berkeley Avenue) that would be difficult for a large truck to navigate.

Indian Rock Road, which is proposed as part of Option 2, is wider than Berkeley Avenue and would allow trucks to avoid the narrow sections of Berkeley Avenue. However, Indian Rock Road is located on a slope and has challenging vertical curves at its intersections with Broadmoor Avenue and The Alameda. These slopes may present challenges for a fully loaded truck.

Based on our review of the proposed vehicles and the roadway geometry, we recommend that the 20-cubic yard trucks avoid traveling through the detour route. The 20-yard trucks should be routed to and from the construction area via SFDB and Butterfield Road, with traffic control provided as necessary. The 10-yard trucks may traverse either the Option 1 and Option 2 routes. RVSD should test both routes with Town staff and public safety personnel to determine whether either route is feasible with two-way traffic present, to confirm whether construction traffic could

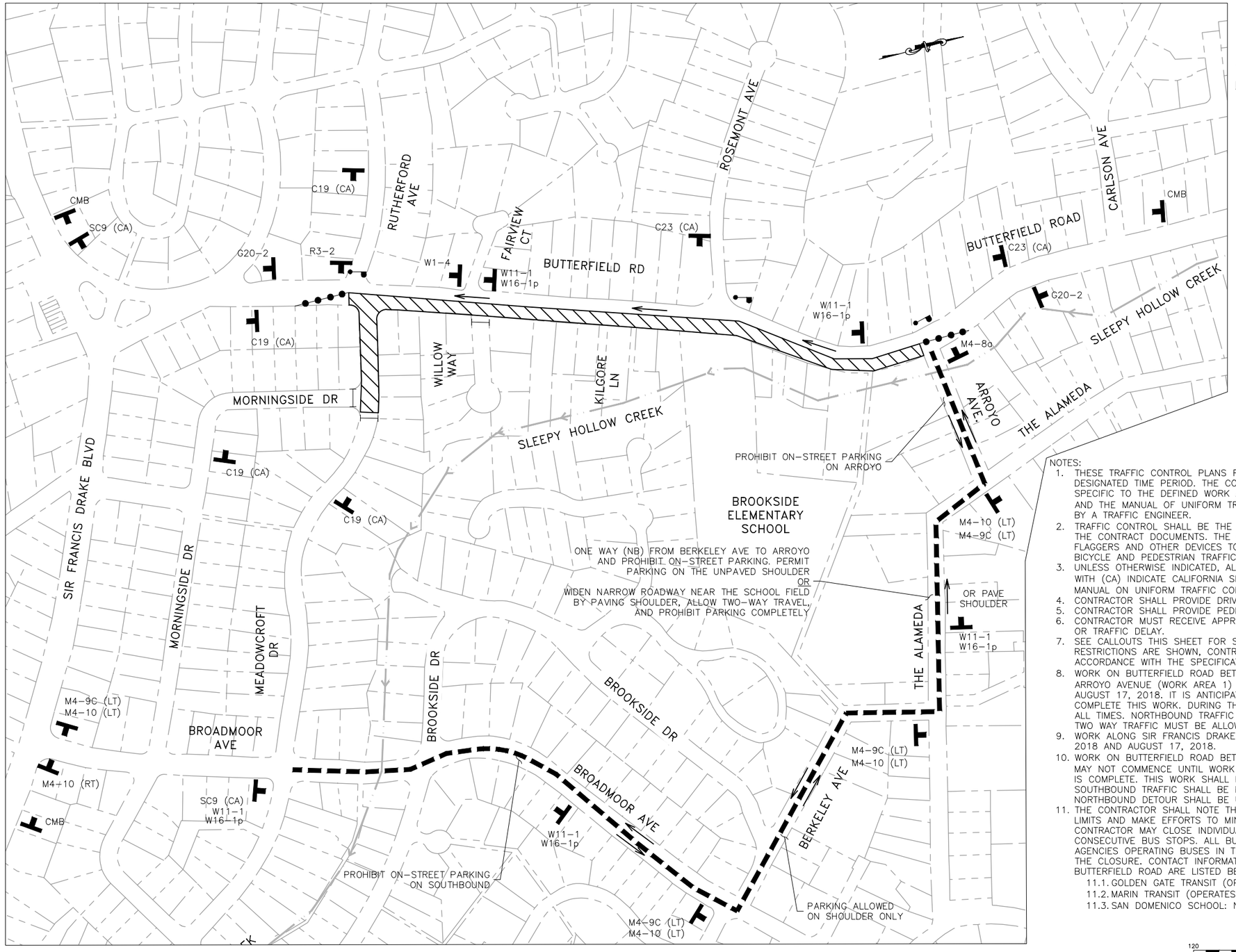
[1] American Association of State Highway Transportation Officials (2011) A Policy on Geometric Design of Highways and Streets.

obstruct emergency access, and identify areas requiring parking restrictions. If neither route is feasible for the 10-yard trucks, then the 10-yard trucks should limit their travel to SFDB and Butterfield Road, with traffic control provided as necessary.

PHASE 4 DETOUR AREA

As mentioned a previous section, the Phase 4 detour area would primarily traverse The Alameda between Arroyo Avenue to Caletta Avenue. This section of The Alameda contains a 10-foot wide section with grades on both sides. If RVSD and the Town maintain the existing roadway widths (Option 1), we recommend that the detour route be limited to the 10-ton trucks. These trucks would be limited to traveling one-way in the northbound direction with general vehicle traffic.

If RVSD or the Town widen The Alameda between Arroyo and Caletta to a total roadway width of between 18 and 22 feet, two-way traffic could be permitted on the road. RVSD should test the widened route with both the 10-ton and 20-ton trucks with Town staff and public safety personnel present. Areas for study should include whether trucks can safely navigate the route with two-way traffic present, whether construction traffic could obstruct emergency access, and whether there are areas requiring parking restrictions.



WORK HOURS: 6AM TO 3PM

LEGEND

- SLEEPY HOLLOW CREEK
- NORTHBOUND DETOUR ROUTE
- TRAFFIC SIGN, APPROXIMATE PLACEMENT
- WORK AREA
- TYPE II/III BARRICADE WITH R11-4 SIGN
- ARROW INDICATES ONE LANE, 10' MIN WIDTH IN DIRECTION AS INDICATED
- FLAGGER
- CHANNELING DEVICE

SIGN CODE / MESSAGE

C19 (CA)	ROAD CLOSED AHEAD
C23 (CA)	ROAD WORK AHEAD
C30 (CA)	LANE CLOSED
G20-2	END ROAD WORK
M4-8a	END DETOUR
M4-9C	BICYCLE DETOUR LEFT/RIGHT
M4-10	DETOUR LEFT/RIGHT
R3-1	RIGHT TURN PROHIBITED
R3-2	LEFT TURN PROHIBITED
R11-4	ROAD CLOSED TO THRU TRAFFIC
SC3 (CA)	DETOUR STRAIGHT
SC9 (CA)	DETOUR STRAIGHT
W1-4	REVERSE CURVE
W4-2	(LANE ENDS, MERGE LEFT/RIGHT)
W11-1	BICYCLE SYMBOL
W16-1p	"SHARE THE ROAD"
W20-5	LEFT/RIGHT LANE CLOSED 1/2 MILE
CMB	"BUTTERFIELD RD CLOSED _____ TO _____"

NOTES:

1. THESE TRAFFIC CONTROL PLANS REPRESENT GRAPHICAL GENERAL WORK AREAS WITHIN A DESIGNATED TIME PERIOD. THE CONTRACTOR SHALL SUBMIT THEIR OWN TRAFFIC CONTROL PLAN SPECIFIC TO THE DEFINED WORK AREAS IN ACCORDANCE TO THE LATEST EDITION OF CALTRANS AND THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) REGULATIONS AND SIGNED BY A TRAFFIC ENGINEER.
2. TRAFFIC CONTROL SHALL BE THE CONTRACTOR'S RESPONSIBILITY AND IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. THE CONTRACTOR SHALL PROVIDE ALL LIGHTS, SIGNS, BARRICADES, FLAGGERS AND OTHER DEVICES TO PROVIDE FOR THE SAFE PASSAGE OF PUBLIC VEHICULAR, BICYCLE AND PEDESTRIAN TRAFFIC.
3. UNLESS OTHERWISE INDICATED, ALL SIGN CODES SHOWN ARE MUTCD SIGN CODES. SIGN CODES WITH (CA) INDICATE CALIFORNIA SIGN CODES. ALL SIGNS SHALL BE IN CONFORMANCE WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) 2014 EDITION.
4. CONTRACTOR SHALL PROVIDE DRIVEWAY ACCESS WHENEVER POSSIBLE.
5. CONTRACTOR SHALL PROVIDE PEDESTRIAN THROUGH TRAFFIC AT ALL TIMES.
6. CONTRACTOR MUST RECEIVE APPROVAL FROM TOWN OF SAN ANSELMO FOR A ROAD CLOSURE OR TRAFFIC DELAY.
7. SEE CALLOUTS THIS SHEET FOR SPECIAL WORK HOUR RESTRICTIONS. IF NO WORK HOUR RESTRICTIONS ARE SHOWN, CONTRACTOR SHALL UTILIZE REGULAR WORK HOURS IN ACCORDANCE WITH THE SPECIFICATIONS.
8. WORK ON BUTTERFIELD ROAD BETWEEN RUTHERFORD AVENUE/MEADOWCROFT DRIVE AND ARROYO AVENUE (WORK AREA 1) MUST BE CONSTRUCTED BETWEEN JUNE 18, 2018 AND AUGUST 17, 2018. IT IS ANTICIPATED THAT TWO CONSTRUCTION CREWS WILL BE REQUIRED TO COMPLETE THIS WORK. DURING THIS PHASE, SOUTHBOUND TRAFFIC SHALL BE MAINTAINED AT ALL TIMES. NORTHBOUND TRAFFIC SHALL UTILIZE THE DETOUR SHOWN DURING WORK HOURS. TWO WAY TRAFFIC MUST BE ALLOWED ON BUTTERFIELD ROAD OUTSIDE OF WORK HOURS.
9. WORK ALONG SIR FRANCIS DRAKE BOULEVARD MUST BE CONSTRUCTED BETWEEN JUNE 18, 2018 AND AUGUST 17, 2018.
10. WORK ON BUTTERFIELD ROAD BETWEEN ARROYO AVENUE AND KENRICK DRIVE (WORK AREA 2) MAY NOT COMMENCE UNTIL WORK ON BUTTERFIELD SOUTH OF ARROYO AVENUE (WORK AREA 1) IS COMPLETE. THIS WORK SHALL BE COMPLETED BY OCTOBER 28, 2018. DURING THIS PHASE, SOUTHBOUND TRAFFIC SHALL BE MAINTAINED AT ALL TIMES. DURING WORK HOURS, THE NORTHBOUND DETOUR SHALL BE USED FOR NORTHBOUND TRAFFIC.
11. THE CONTRACTOR SHALL NOTE THE LOCATION OF EXISTING BUS STOPS WITHIN THE PROJECT LIMITS AND MAKE EFFORTS TO MINIMIZE THE CLOSURE OF EXISTING BUS STOPS. THE CONTRACTOR MAY CLOSE INDIVIDUAL BUS STOPS BUT MAY NOT SIMULTANEOUSLY CLOSE CONSECUTIVE BUS STOPS. ALL BUS STOP CLOSURES SHALL BE COORDINATED WITH THE AGENCIES OPERATING BUSES IN THE PROJECT VICINITY A MINIMUM TWO WEEKS IN ADVANCE OF THE CLOSURE. CONTACT INFORMATION FOR AGENCIES KNOWN TO OPERATE BUSES ON BUTTERFIELD ROAD ARE LISTED BELOW:
    - 11.1. GOLDEN GATE TRANSIT (OPERATES PUBLIC BUS): DAVID DAVENPORT, (415) 257-4546
    - 11.2. MARIN TRANSIT (OPERATES PUBLIC SCHOOL BUSES): KELLY ZALEWSKI, (415) 226-0872
    - 11.3. SAN DOMENICO SCHOOL: NANCY MEYER, (415) 210-2271

GRAPHIC SCALE:
120 0 120 240 360
1" = 120'-0"

PHASE 2: SCHOOL BREAK 2018 (SUMMERTIME)
NORTHBOUND DETOUR SOUTH OF ARROYO

NOT FOR CONSTRUCTION
100% SUBMITTAL

REGISTERED PROFESSIONAL ENGINEER
JASMINE G. CUFFEE
No. 59442
Exp. 12/31/17
CIVIL
STATE OF CALIFORNIA

NO.	BY	DATE	REVISION

TRAFFIC CONTROL & CONSTRUCTION PHASING PLAN PHASE 2

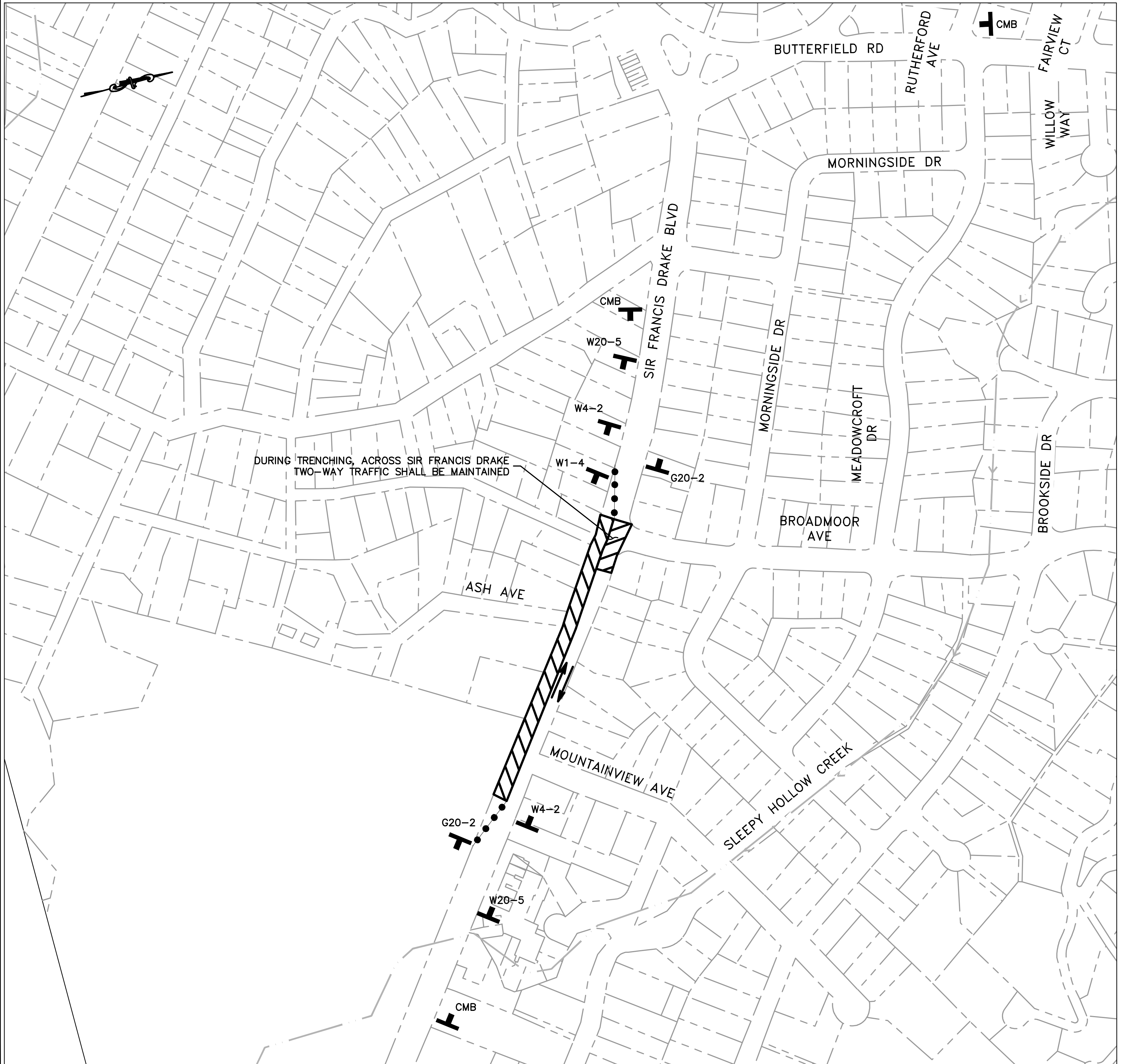
ROSS VALLEY SANITARY DISTRICT
FY2016/17 GRAVITY SEWER IMPROVEMENTS PROJECT

SANITARY DISTRICT NO. 1 ESTABLISHED 1899

Harris & Associates
1401 Willow Pass Rd, Suite 500 Concord, CA 94520
weareharris.com (925) 827-4900

DESIGNED BY	DCW
DRAWN BY	KLC
CHECKED BY	JGC
DATE ISSUED	NOVEMBER 29, 2017
JOB NO.	150-0661.01
DWG NO.	TC-02
SHEET	28 OF 30

H:\Ross Valley Sanitary District (RSVD)\FY 2017 Capacity Improvements\27-30 TC-01-04 TRAFFIC CONTROL PLANS.dwg Save Date: 11/29/2017 5:33 PM Plot Date: 11/29/2017 5:33 PM DWilkins



PHASE 3: FALL 2018
SIR FRANCIS DRAKE BLVD

WORK HOURS: 9AM TO 3:30PM

LEGEND

(line)	SLEEPY HOLLOW CREEK
(dashed heavy line)	NORTHBOUND DETOUR ROUTE
(sign symbol)	TRAFFIC SIGN, APPROXIMATE PLACEMENT
(hatched box)	WORK AREA
(barricade symbol)	TYPE II/III BARRICADE WITH R11-4 SIGN
(arrow)	ARROW INDICATES ONE LANE, 10' MIN WIDTH IN DIRECTION AS INDICATED
(flagger symbol)	FLAGGER
(dotted line)	CHANNELING DEVICE

SIGN CODE / MESSAGE

C19 (CA)	ROAD CLOSED AHEAD
C23 (CA)	ROAD WORK AHEAD
C30 (CA)	LANE CLOSED
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R3-2	LEFT TURN PROHIBITED
R11-4	ROAD CLOSED TO THRU TRAFFIC
SC3 (CA)	DETOUR STRAIGHT
SC9 (CA)	DETOUR STRAIGHT
W1-4	REVERSE CURVE
W4-2	(LANE ENDS, MERGE LEFT/RIGHT)
W11-1	BICYCLE SYMBOL
W16-1p	"SHARE THE ROAD"
W20-5	LEFT/RIGHT LANE CLOSED 1/2 MILE
CMB	"ROAD WORK AHEAD ON SFDB"

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9. WORK ALONG SIR FRANCIS DRAKE BOULEVARD MUST BE CONSTRUCTED BETWEEN JUNE 18, 2018 AND AUGUST 17, 2018.
10. WORK ON BUTTERFIELD ROAD BETWEEN ARROYO AVENUE AND KENRICK DRIVE (WORK AREA 2) MAY NOT COMMENCE UNTIL WORK ON BUTTERFIELD SOUTH OF ARROYO AVENUE (WORK AREA 1) IS COMPLETE. THIS WORK SHALL BE COMPLETED BY OCTOBER 28, 2018. DURING THIS PHASE, SOUTHBOUND TRAFFIC SHALL BE MAINTAINED AT ALL TIMES. DURING WORK HOURS, THE NORTHBOUND DETOUR SHALL BE USED FOR NORTHBOUND TRAFFIC.
11. THE CONTRACTOR SHALL NOTE THE LOCATION OF EXISTING BUS STOPS WITHIN THE PROJECT LIMITS AND MAKE EFFORTS TO MINIMIZE THE CLOSURE OF EXISTING BUS STOPS. THE CONTRACTOR MAY CLOSE INDIVIDUAL BUS STOPS BUT MAY NOT SIMULTANEOUSLY CLOSE CONSECUTIVE BUS STOPS. ALL BUS STOP CLOSURES SHALL BE COORDINATED WITH THE AGENCIES OPERATING BUSES IN THE PROJECT VICINITY A MINIMUM TWO WEEKS IN ADVANCE OF THE CLOSURE. CONTACT INFORMATION FOR AGENCIES KNOWN TO OPERATE BUSES ON BUTTERFIELD ROAD ARE LISTED BELOW:
    - 11.1. GOLDEN GATE TRANSIT (OPERATES PUBLIC BUS): DAVID DAVENPORT, (415) 257-4546
    - 11.2. MARIN TRANSIT (OPERATES PUBLIC SCHOOL BUSES): KELLY ZALEWSKI, (415) 226-0872
    - 11.3. SAN DOMENICO SCHOOL: NANCY MEYER, (415) 210-2271

GRAPHIC SCALE: 120 0 120 240 360
1" = 120'-0"

NOT FOR CONSTRUCTION

100% SUBMITTAL

REGISTERED PROFESSIONAL ENGINEER JASMINE G. CUFFEE No. 59442 Exp. 12/31/17 CIVIL STATE OF CALIFORNIA

NO. | BY | DATE | REVISION

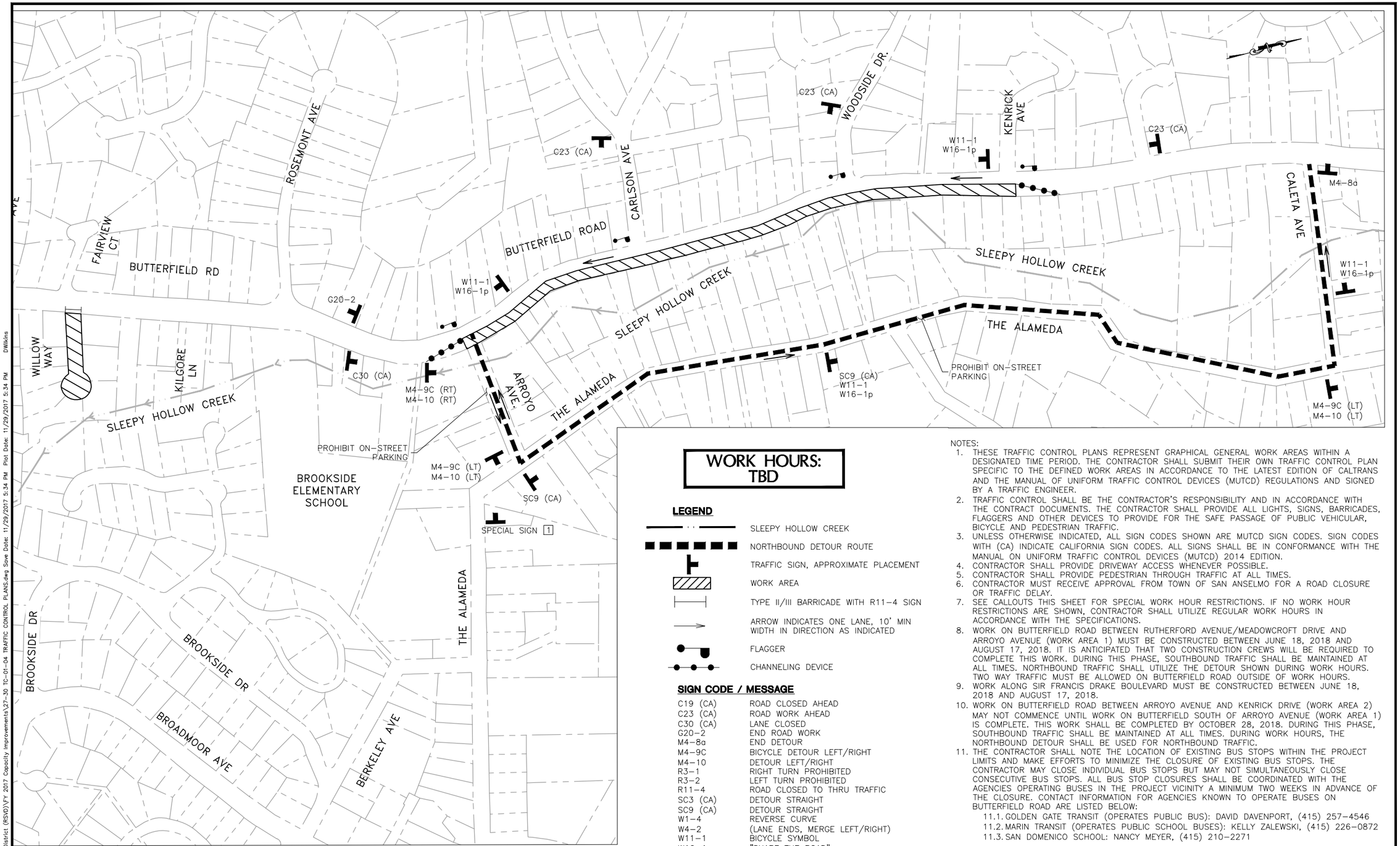
TRAFFIC CONTROL & CONSTRUCTION PHASING PLAN PHASE 3

ROSS VALLEY SANITARY DISTRICT FY2016/17 GRAVITY SEWER IMPROVEMENTS PROJECT

SANITARY DISTRICT NO. 1

Harris & Associates
1401 Willow Pass Rd, Suite 500 Concord, CA 94520 (925) 827-4900 weareharris.com

DESIGNED BY DCW
DRAWN BY KLC
CHECKED BY JGC
DATE ISSUED NOVEMBER 29, 2017
JOB NO. 150-0661.01
DWG NO. TC-03



PHASE 4: FALL 2018 OR SUMMER 2019
NORTHBOUND DETOUR ARROYO TO CALETTA

WORK HOURS: TBD

LEGEND

- SLEEPY HOLLOW CREEK
- NORTHBOUND DETOUR ROUTE
- TRAFFIC SIGN, APPROXIMATE PLACEMENT
- WORK AREA
- TYPE II/III BARRICADE WITH R11-4 SIGN
- ARROW INDICATES ONE LANE, 10' MIN WIDTH IN DIRECTION AS INDICATED
- FLAGGER
- CHANNELING DEVICE

SIGN CODE / MESSAGE

C19 (CA)	ROAD CLOSED AHEAD
C23 (CA)	ROAD WORK AHEAD
C30 (CA)	LANE CLOSED
G20-2	END ROAD WORK
M4-8a	END DETOUR
M4-9C	BICYCLE DETOUR LEFT/RIGHT
M4-10	DETOUR LEFT/RIGHT
R3-1	RIGHT TURN PROHIBITED
R3-2	LEFT TURN PROHIBITED
R11-4	ROAD CLOSED TO THRU TRAFFIC
SC3 (CA)	DETOUR STRAIGHT
SC9 (CA)	DETOUR STRAIGHT
W1-4	REVERSE CURVE
W4-2	(LANE ENDS, MERGE LEFT/RIGHT)
W11-1	BICYCLE SYMBOL
W16-1p	"SHARE THE ROAD"
W20-5	LEFT/RIGHT LANE CLOSED 1/2 MILE
1	BUTTERFIELD RD CLOSED _____ TO _____

GRAPHIC SCALE:
120 0 120 240 360
1" = 120'-0"

NOTES:
1. THESE TRAFFIC CONTROL PLANS REPRESENT GRAPHICAL GENERAL WORK AREAS WITHIN A DESIGNATED TIME PERIOD. THE CONTRACTOR SHALL SUBMIT THEIR OWN TRAFFIC CONTROL PLAN SPECIFIC TO THE DEFINED WORK AREAS IN ACCORDANCE TO THE LATEST EDITION OF CALTRANS AND THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) REGULATIONS AND SIGNED BY A TRAFFIC ENGINEER.
2. TRAFFIC CONTROL SHALL BE THE CONTRACTOR'S RESPONSIBILITY AND IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. THE CONTRACTOR SHALL PROVIDE ALL LIGHTS, SIGNS, BARRICADES, FLAGGERS AND OTHER DEVICES TO PROVIDE FOR THE SAFE PASSAGE OF PUBLIC VEHICULAR, BICYCLE AND PEDESTRIAN TRAFFIC.
3. UNLESS OTHERWISE INDICATED, ALL SIGN CODES SHOWN ARE MUTCD SIGN CODES. SIGN CODES WITH (CA) INDICATE CALIFORNIA SIGN CODES. ALL SIGNS SHALL BE IN CONFORMANCE WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) 2014 EDITION.
4. CONTRACTOR SHALL PROVIDE DRIVEWAY ACCESS WHENEVER POSSIBLE.
5. CONTRACTOR SHALL PROVIDE PEDESTRIAN THROUGH TRAFFIC AT ALL TIMES.
6. CONTRACTOR MUST RECEIVE APPROVAL FROM TOWN OF SAN ANSELMO FOR A ROAD CLOSURE OR TRAFFIC DELAY.
7. SEE CALLOUTS THIS SHEET FOR SPECIAL WORK HOUR RESTRICTIONS. IF NO WORK HOUR RESTRICTIONS ARE SHOWN, CONTRACTOR SHALL UTILIZE REGULAR WORK HOURS IN ACCORDANCE WITH THE SPECIFICATIONS.
8. WORK ON BUTTERFIELD ROAD BETWEEN RUTHERFORD AVENUE/MEADOWCROFT DRIVE AND ARROYO AVENUE (WORK AREA 1) MUST BE CONSTRUCTED BETWEEN JUNE 18, 2018 AND AUGUST 17, 2018. IT IS ANTICIPATED THAT TWO CONSTRUCTION CREWS WILL BE REQUIRED TO COMPLETE THIS WORK. DURING THIS PHASE, SOUTHBOUND TRAFFIC SHALL BE MAINTAINED AT ALL TIMES. NORTHBOUND TRAFFIC SHALL UTILIZE THE DETOUR SHOWN DURING WORK HOURS. TWO WAY TRAFFIC MUST BE ALLOWED ON BUTTERFIELD ROAD OUTSIDE OF WORK HOURS.
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    - 11.3. SAN DOMENICO SCHOOL: NANCY MEYER, (415) 210-2271

REGISTERED PROFESSIONAL ENGINEER
JASMINE G. CUFFEE
No. 59442
Exp. 12/31/17
CIVIL
STATE OF CALIFORNIA

NOT FOR CONSTRUCTION

100% SUBMITTAL

NO.	BY	DATE	REVISION

TRAFFIC CONTROL & CONSTRUCTION PHASING PLAN PHASE 4

ROSS VALLEY SANITARY DISTRICT FY2016/17 GRAVITY SEWER IMPROVEMENTS PROJECT

SANITARY DISTRICT NO. 1 MARIN

Harris & Associates
1401 Willow Pass Rd, Suite 500 Concord, CA 94520
weareharris.com (925) 827-4900

DESIGNED BY	DCW
DRAWN BY	KLC
CHECKED BY	JGC
DATE ISSUED	NOVEMBER 29, 2017
JOB NO.	150-0661.01
DWG NO.	**TC-04**
SHEET	30 OF 30

H:\Ross Valley Sanitary District (RSVD)\FY 2017 Capacity Improvements\27-30 TC-01-04 TRAFFIC CONTROL PLANS.dwg Save Date: 11/29/2017 5:34 PM Plot Date: 11/29/2017 5:34 PM DWilkins

Appendix B: Existing Project Area Traffic Volumes

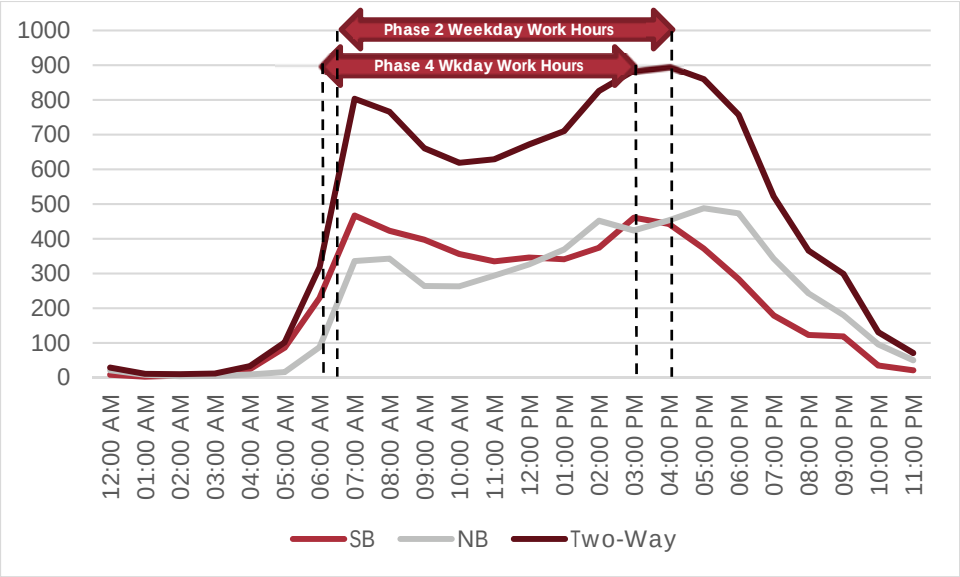

Figure 1 Butterfield Road, between Rosemont and Willow
Average Weekday Hourly Traffic Volumes (May 2016)

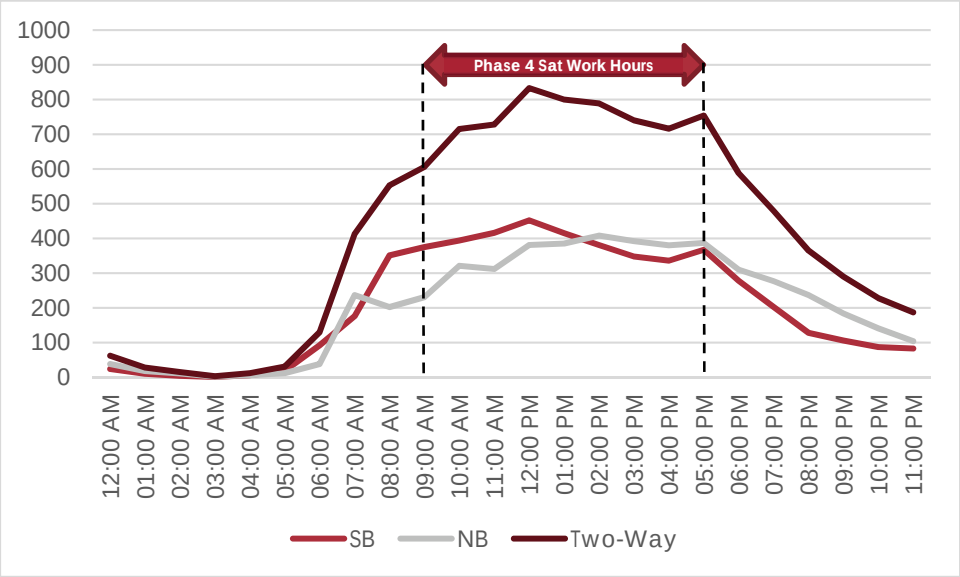

Figure 2 Butterfield Road, between Rosemont and Willow
Saturday Hourly Traffic Volumes (May 2016)

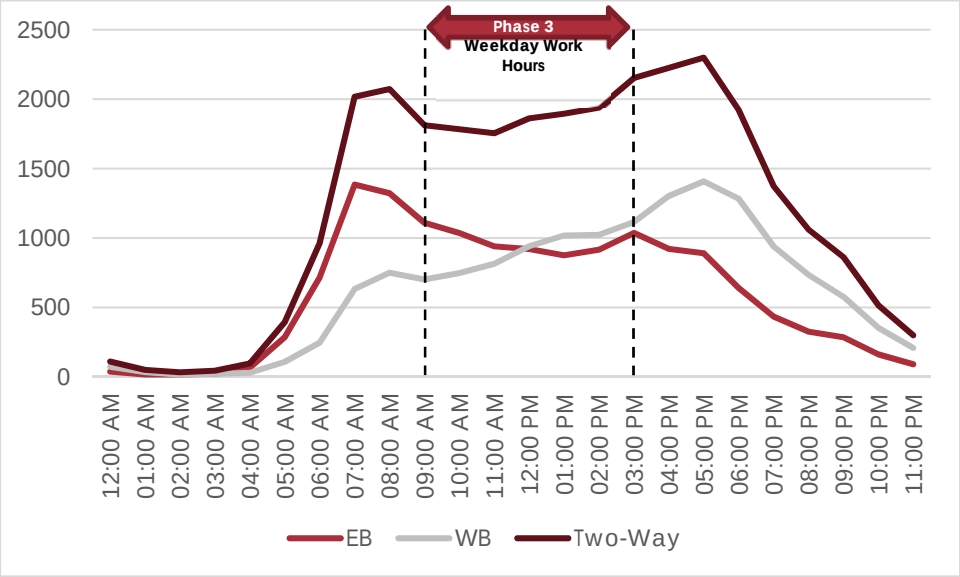

Figure 3 Sir Francis Drake Boulevard Weekday Hourly Traffic Volumes (Factored 2017 Volumes)

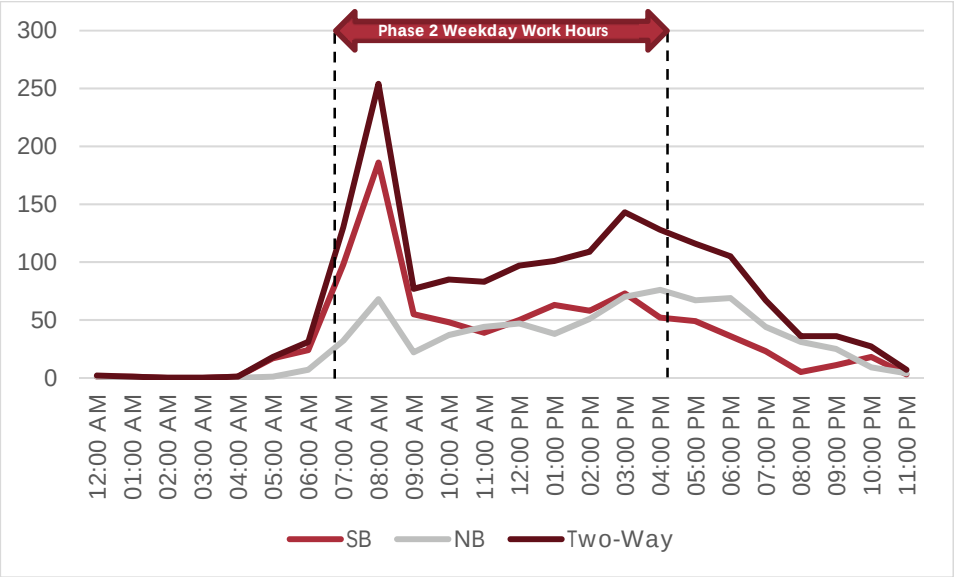

Figure 4 Broadmoor Avenue, north of Brookside Drive, Weekday Hourly Traffic Volumes (November 2017)

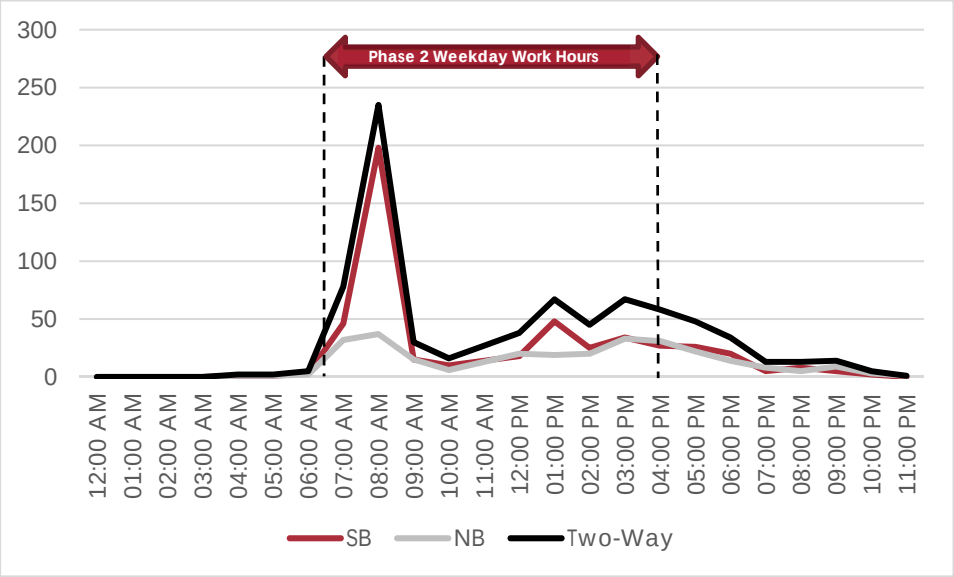

Figure 5 The Alameda, south of Arroyo Avenue, Weekday Hourly Traffic Volumes (November 2017)

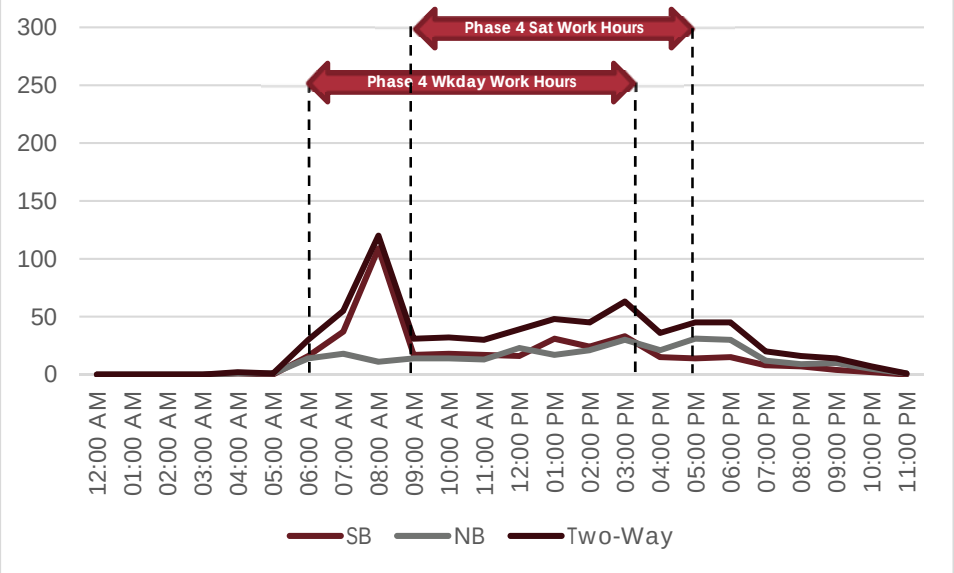

Figure 6 The Alameda, north of Arroyo Avenue, Weekday Hourly Traffic Volumes (November 2017)