# St. Mary's Double Roundabouts Project

# DRAFT AQUATIC RESOURCES DELINEATION REPORT

Town of Moraga, Contra Costa County, California

**August 2019**

Prepared for: Prepared by:

# Executive Summary

The Town of Moraga (Town) proposes to implement the St. Mary's Road Roundabouts Project (Project) in the Town of Moraga, Contra Costa County, California.

The purpose of the proposed Project is to provide congestion relief at the St. Mary's Road and Rheem Boulevard and to improve stopping sight distance and visibility at the Rheem Boulevard and Bollinger Canyon Road intersections. The Project is proposed to alleviate the current congestion, reduce intersection delays and queues, improve multimodal safety, and to better accommodate pedestrian and bicycle traffic safety. The proposed Project is needed because the roadway presently experiences inadequate intersection level of service (LOS) under cumulative build-out conditions with traffic queue lengths exceeding existing intersection geometry. Improvements at this intersection are also needed to accommodate projected growth of the St. Mary's College campus and to address safety issues at the intersection.

The Project area consists of residential housing developments with a mixture of grassland and oak woodlands surrounding the entire Project limits. The Project limits are bounded by the Las Trampas Ridge to the east, the Gudde Ridge to the west, the Town of Moraga to the south and the City of Lafayette to the north. The Project is located along St. Mary's Road. Las Trampas Creek crosses beneath St. Mary's Road via a box culvert flowing south to north. It is located approximately 30 ft below the road surface. Tributary 1 crosses beneath Bollinger Canyon Road via a culvert, flowing east to west into Las Trampas Creek. Tributary 2 crosses beneath Rheem Boulevard, flowing south to north and into Last Trampas Creek, north of the Study Area.

Aquatic resource delineations were conducted using U.S. Army Corps of Engineers' (USACE) guidance. Field surveys were performed on March 31, 2017 and June 18, 2019. For the purposes of the delineation, a Study Area was developed to evaluate potential jurisdictional areas that may be directly, indirectly, temporarily, or permanently impacted by construction and construction-related activities.

As summarized in Table 1S, the approximately 2.87-acre Study Area contains approximately 0.024 acre of potentially jurisdictional other waters of the U.S. (OWUS).

**Table 1S. Summary of Potential Jurisdictional Waters in the Study Area**

| Potential Other Waters of the U.S. | Area ($ft^2$) | Area (ac) | Length (lf) |
|---|---|---|---|
| Las Trampas Creek | 689 | 0.016 | 88 |
| Tributary 1 | 55 | 0.001 | 44 |
| Tributary 2 | 335 | 0.007 | 101 |
| **Total** | **1,079** | **0.024** | **233** |

No potential jurisdictional waters of the U.S. (wetlands) were identified and delineated within the Study Area.

The conclusions of this Aquatic Resources Delineation Report (ARDR) are based on conditions observed at the time of the field surveys conducted on March 31, 2017 and June 18, 2019. The findings of this document are considered preliminary until verified by the USACE and/or until any permits are issued by these agencies authorizing or exempting activities within or near these areas.

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# Acronyms

| | |
|---|---|
| ac | acre |
| CEQA | California Environmental Quality Act |
| CFR | Code of Federal Regulations |
| CIP | Capital Improvement Project |
| CMP | corrugated metal pipe |
| CWA | Clean Water Act |
| CY | cubic yards |
| du | dwelling unit |
| EPA | Environmental Protection Agency |
| ºF | degrees Fahrenheit |
| FAC | Facultative |
| FACU | Facultative Upland |
| FACW | Facultative Wetland |
| FHWA | Federal Highway Administration |
| ft | foot/feet |
| $ft^2$ | square feet |
| GPS | Global Position System |
| HSG | hydric soil group |
| in. | inch |
| IS/MND | Initial Study/Mitigated Negative Declaration |
| lf | linear feet |
| LOS | level of service |
| mi | mile(s) |
| MMRP | Mitigation and Monitoring Plan |
| MSL | mean sea level |
| NRCS | Natural Resources Conservation Service |
| NRPW | Non-relatively Permanent Water |
| OBL | Obligate |
| OHWM | ordinary high water mark |
| OWUS | Other Waters of the U.S. |
| RPW | Relatively Permanent Water |
| RSP | rock slope protection |
| RWQCB | Regional Water Quality Control Board |
| SSSC | side-street stop controlled |
| SSURGO | Soil Survey Geographic |
| SWRCB | State Water Resources Control Board |
| TDM | Transportation Demand Management |
| TNW | Traditional Navigable Water |
| Town | Town of Moraga |
| TSM | Transportation System Management |
| UPL/NL | Upland or Not Listed |
| USACE | United States Army Corps of Engineers |
| USFWS | United States Fish and Wildlife Service |
| USDA | United States Department of Agriculture |
| USGS | United States Geological Survey |

# 1.0 INTRODUCTION AND PROJECT DESCRIPTION

This Aquatic Resources Delineation Report was prepared to describe the methodology used and results of surveys performed to identify potential jurisdictional waters and wetlands regulated by the United States Army of Corps of Engineers (USACE) and Regional Water Quality Control Board (RWQCB) pursuant to Sections 404 (waters and other waters of the United States [OWUS]) and 401 of the Clean Water Act.

## 1.1 Project Description

The Town of Moraga (Town) proposes to provide improvements to a single-land roundabout corridor at the intersections of St. Mary’s Road/Rheem Boulevard and St Mary’s Road/Bollinger Canyon Road. The St. Mary’s Double Roundabouts Project (proposed project) would improve traffic operations and pedestrian and bicycle access and safety. The Project would construct two roundabouts on St. Mary’s Road at the Rheem Boulevard and Bollinger Canyon Road intersections, install green infrastructure, and create safer pedestrian and bicycle crossings. The Project would be implemented in the Town of Moraga, Contra Costa County, California. Figure 1, *Regional Location Map,* and Figure 2, *Vicinity Map*, shows the Project vicinity and location, respectively. The Town is the lead agency under the California Environmental Quality Act (CEQA).

The Project is included in the Town of Moraga Capital Improvement Project (CIP). The design concept and scope of the Project is consistent with the Project description in the CIP and is intended to meet the traffic needs in the area based on local land use plans. The Project is partially funded through Measure J 2013 Strategic Plan: Major Streets category.

**Project Purpose**

The purpose of the proposed project is to provide congestion relief at the St. Mary’s Road and Rheem Boulevard and to improve stopping sight distance and visibility at the Rheem Boulevard and Bollinger Canyon Road intersections. The Project is proposed to alleviate the current congestion, reduce intersection delays and queues, improve multimodal safety and to better accommodate pedestrian and bicycle traffic safety.

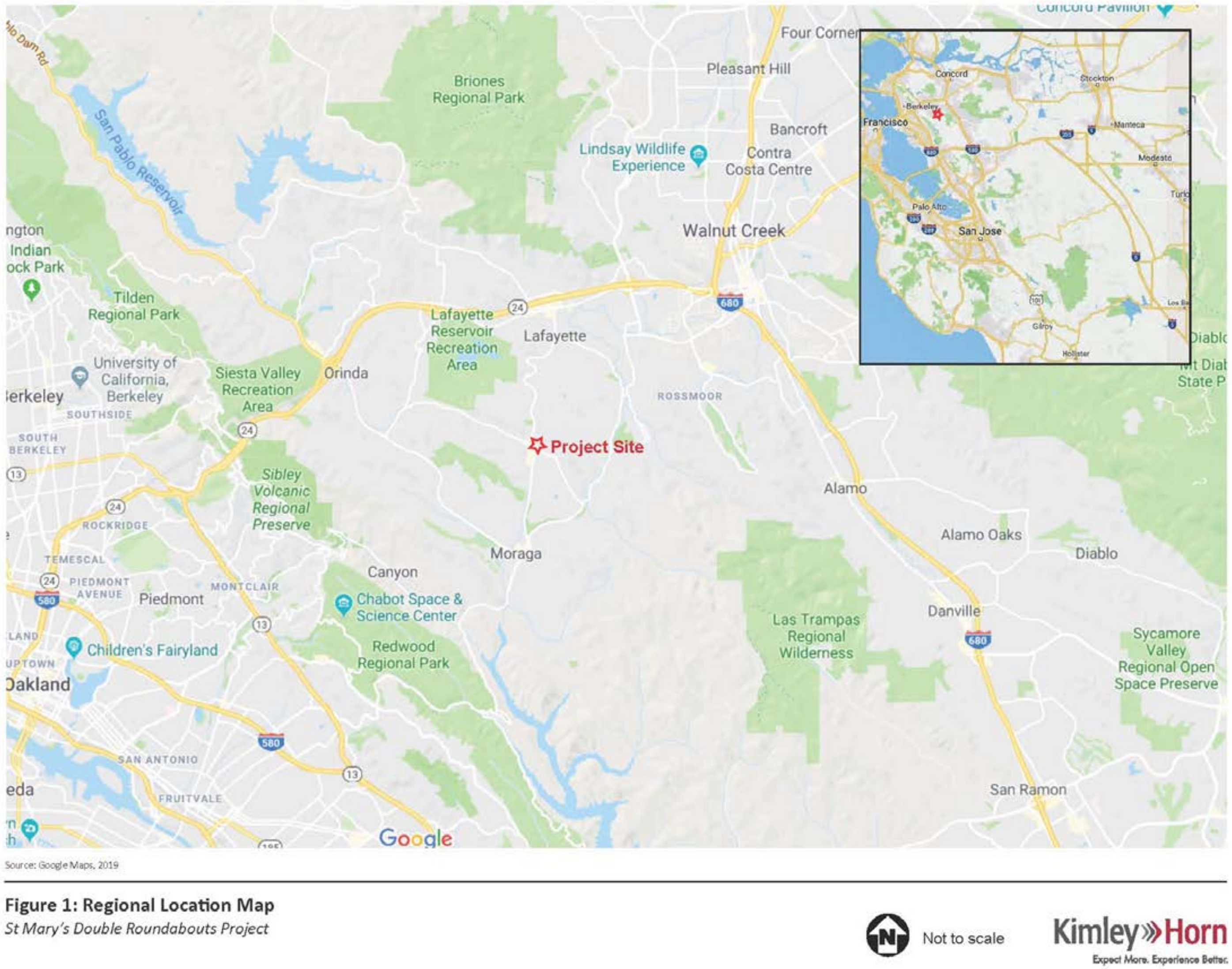



**Figure 1. Regional Location Map**


Source: ESRI World Imagery, 2019.

**Figure 1:** Vicinity Map

*St Mary's Double Roundabouts Project*

Kimley»Horn

**Figure 2. Vicinity Map**

**Project Need**

The proposed Project is needed because the roadway presently experiences inadequate intersection level of service (LOS) under cumulative build-out conditions with traffic queue lengths exceeding existing intersection geometry. Improvements at this intersection are also needed to accommodate projected growth of the St. Mary's College campus, and to address safety issues at the intersection. Additionally, the roadway geometry and topography at this closely spaced intersection has insufficient stopping sight distance with visibility issues approaching the Rheem Boulevard and Bollinger Canyon Road intersections, which in turn result in high accident rates and decreased safety.

Traffic collision data from 2010 through 2015 for the Rheem Boulevard and Bollinger Canyon Road intersections were provided by the Town of Moraga Police Department. Eight traffic related incidents were reported involving minor injuries and property damage. A majority of reported accidents occurred at the St. Mary's/Rheem stop controlled intersection with rear end and side impact collisions between motor vehicles due to limited visibility and sight distance. Two collisions involving bicyclists were also reported, one resulting in an injury. There was also a report of an overturned truck on the curve in between the intersections in 2012.

In December 2008, Fehr & Peers prepared a report titled *St. Mary's Road Improvement Evaluation at Rheem Boulevard and Bollinger Canyon Road*, which evaluated the physical and operation characteristics of the St. Mary's intersections at Rheem Boulevard and Bollinger Canyon Road to recommend near-term and long-term improvements. In May 2015, Omni-means prepared the *St. Mary's Road Roundabout Feasibility Study,* which analyzes the design features and safety assessment of a proposed single-lane roundabout corridor at the intersections of St. Mary's Road/Rheem Boulevard and St. Mary's Road/Bollinger Canyon Road in the Town of Moraga.

The heavy congestion along this roadway can be attributed to several regional destinations having access from St. Mary's Road, including the St. Mary's College campus, the shopping center on Moraga Way, and existing residential development.

In addition to vehicle traffic, the Project site contains pedestrian and bicycle traffic. The Lafayette/Moraga Regional Trail runs parallel to St. Mary's Boulevard and crosses the intersection of St. Mary's Road/Rheem Boulevard via an at-grade cross walk. The crossing is marked with white striping and does not have any lighting or sign features. Currently, there are gaps in the pedestrian network, with limited sidewalks along most of the Project corridor. This results in unsafe pedestrian movements through the Project site.

### 1.1.1 Build Alternative (Proposed Project)

The proposed Project would accommodate anticipated multimodal transportation increases by improving capacity for all travel modes, provide designated facilities separated from the vehicular traffic for pedestrians and bicycles, improve intersection capacity, and reduce overall delays and improve safety.

**Roadway Facilities**

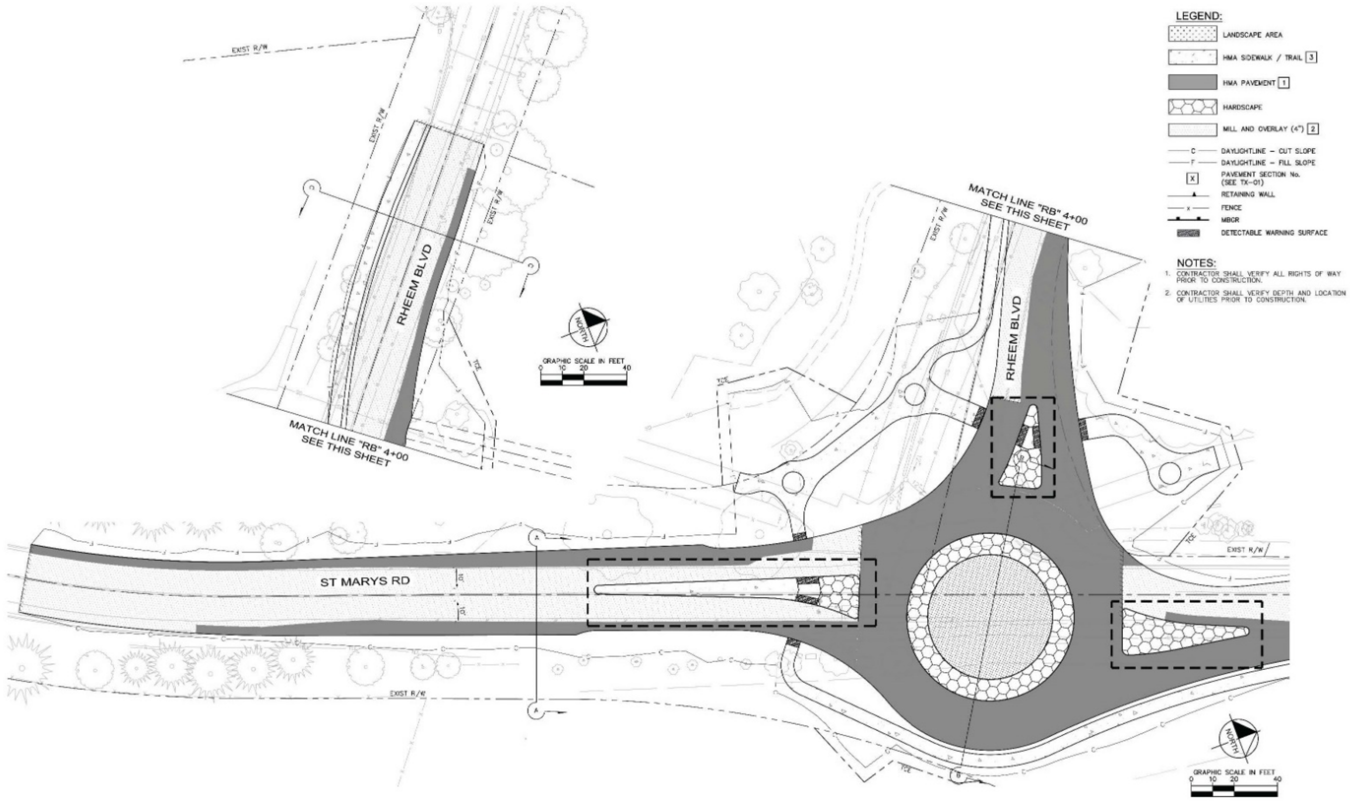
The Project would widen St. Mary's Road, Rheem Boulevard, and Bollinger Canyon Road to accommodate two new roundabouts and the approaches to the roundabouts. The existing two-lane roadways would remain as two-lane roadways. The roundabout geometry will be designed in a way to decrease approaching speeds at these intersections and improve visibility, subsequently improving traffic operations and safety. These improvements would require the roadway to be relocated, partially outside the existing right-of-way. The amount of potential cut and fill is included in the ranges of excavation provided for the various project components described below.

As show in Figure 3a, 3b, and 3c, *Proposed Roadway Design,* the vehicle travel lanes would be 12 feet (ft) wide. The proposed roundabouts would have single-lane entries on all intersection approaches and the central islands would be circular in shape with a symmetric diameter. The St. Mary’s Road/Rheem Boulevard roundabout would be approximately 120 ft in diameter, with landscaping in the center. The St. Mary’s Road/Bollinger Canyon roundabout would be a mini-roundabout, approximately 80 ft in diameter. The existing roadway would be excavated from between 4 to 16 inches where pavement would be replaced. The new relocated segments of roadway would require excavation of depths up to 2 ft. The two directions of traffic would be separated by road striping and medians approaching the roundabouts. The medians would be excavated to a maximum depth of six feet, measured from existing roadway surface, to provide room for import soil and roadway signs.

To accommodate the roadway widening, existing slopes would need to be excavated and laid back. This may result in a vertical difference between the existing slope surface and the new slope surface. Retaining walls would be needed at the north and south sides of the St. Mary’s Road/Bollinger Canyon Road intersection to avoid impacts to the creek. Retaining walls would range in height up to a maximum of 8 ft. Retaining walls would require excavation up to 10 ft from existing surface.

Native material from the Project site would be used to construct the proposed roadway embankment. Up to 480 cubic yards (CY) of native materials would need to be exported from the site during construction.

As shown in Figure 4a and 4b, *Proposed Roundabout Sections,* the existing intersections of St. Mary’s Road/Rheem Boulevard and St. Mary’s Road/Bollinger Canyon Road would be converted to roundabouts. The existing side-street stop controlled (SSSC) intersections of St. Mary’s Road/Rheem and St. Mary’s Road/Bollinger Canyon Road would be converted to ‘yield’ approaches. New yield sign pole foundations may be necessary at both intersections, requiring excavation of up to 6 ft deep.

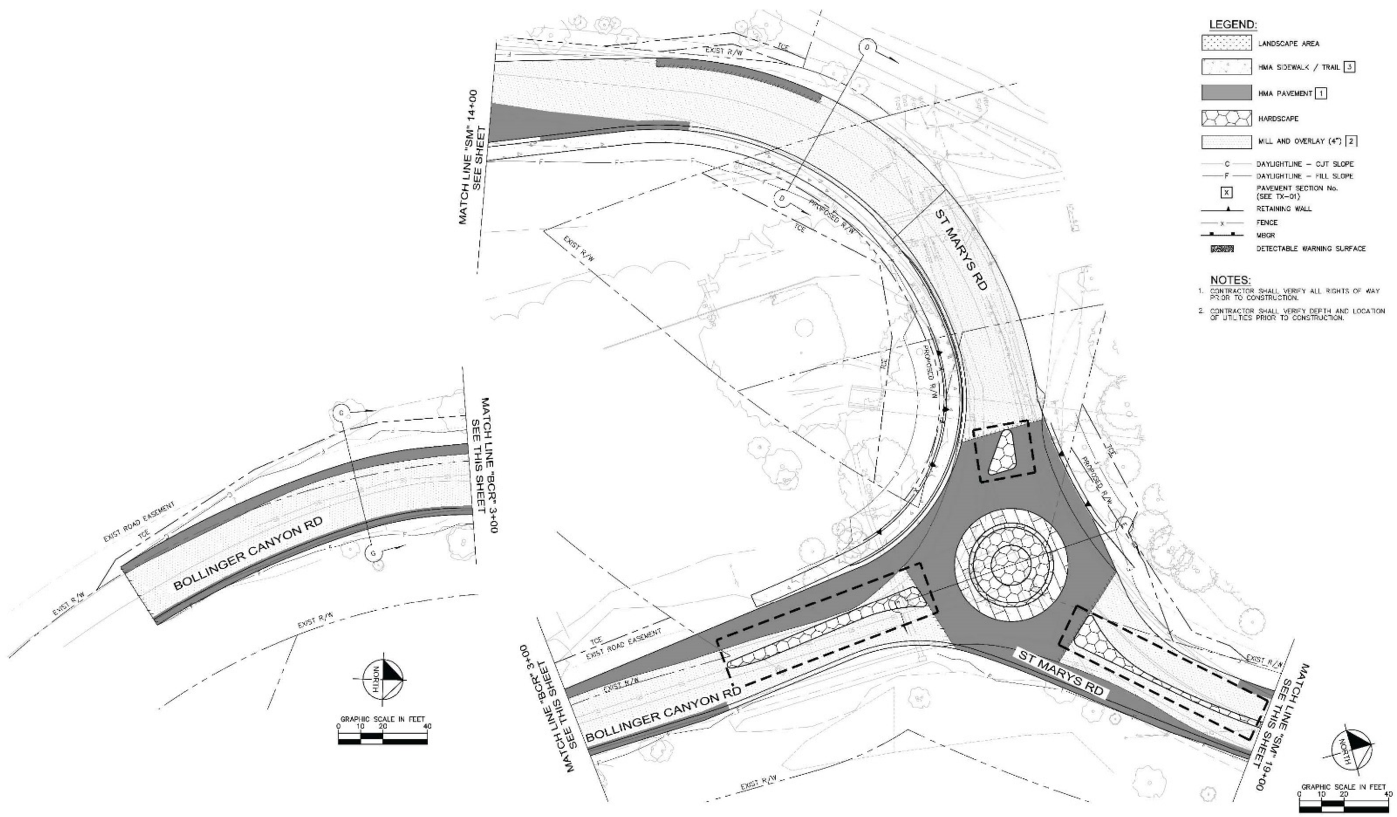



Source: Kimley-Horn, 2019

**Figure 3a: Proposed Roadway Design**
*St Mary's Double Roundabouts Project*

Expect More. Experience Better.

**Figure 3a. Proposed Roadway Design**




Source: Kimley-Horn, 2019

**Figure 3b: Proposed Roadway Design**
*St Mary's Double Roundabouts Project*

Kimley»Horn
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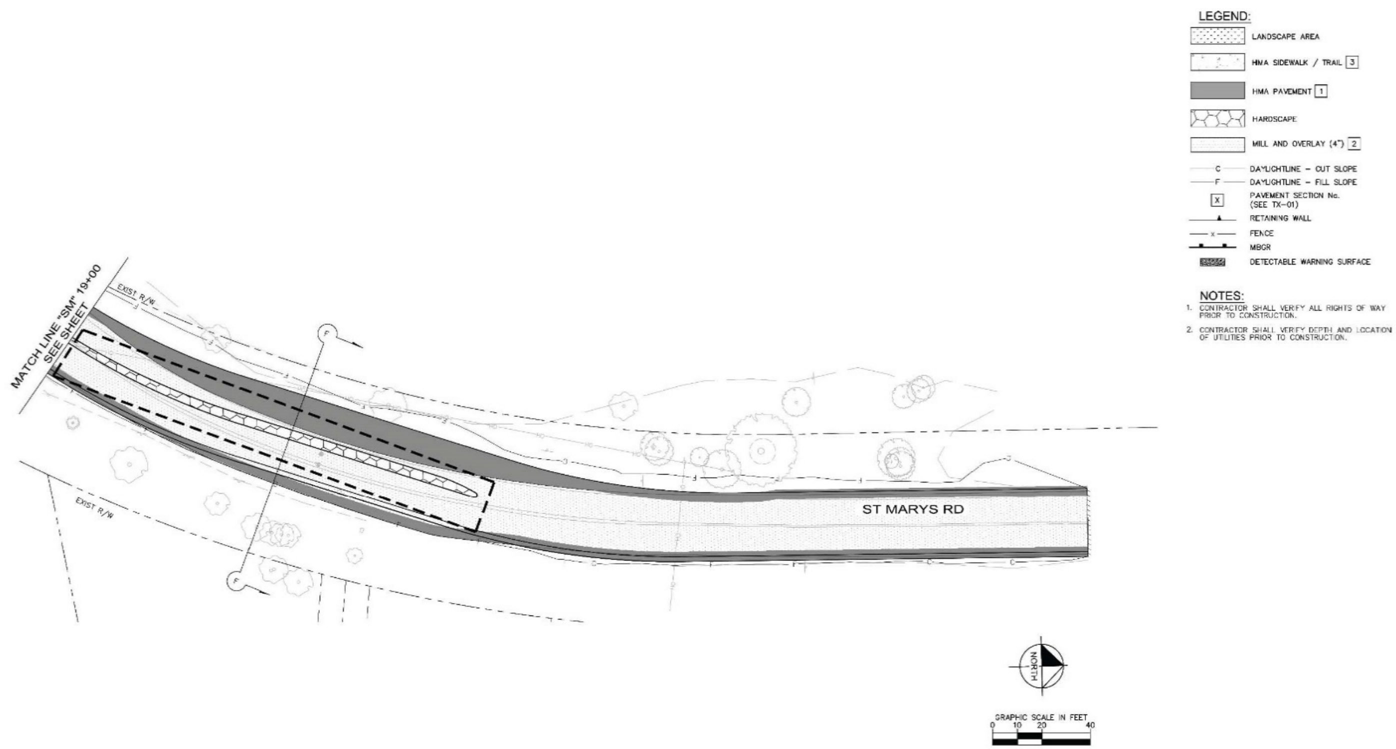
**Figure 3b. Proposed Roadway Design**




Source: Kimley-Horn, 2019

**Figure 3c: Proposed Roadway Design**
*St Mary's Double Roundabouts Project*

Kimley»Horn
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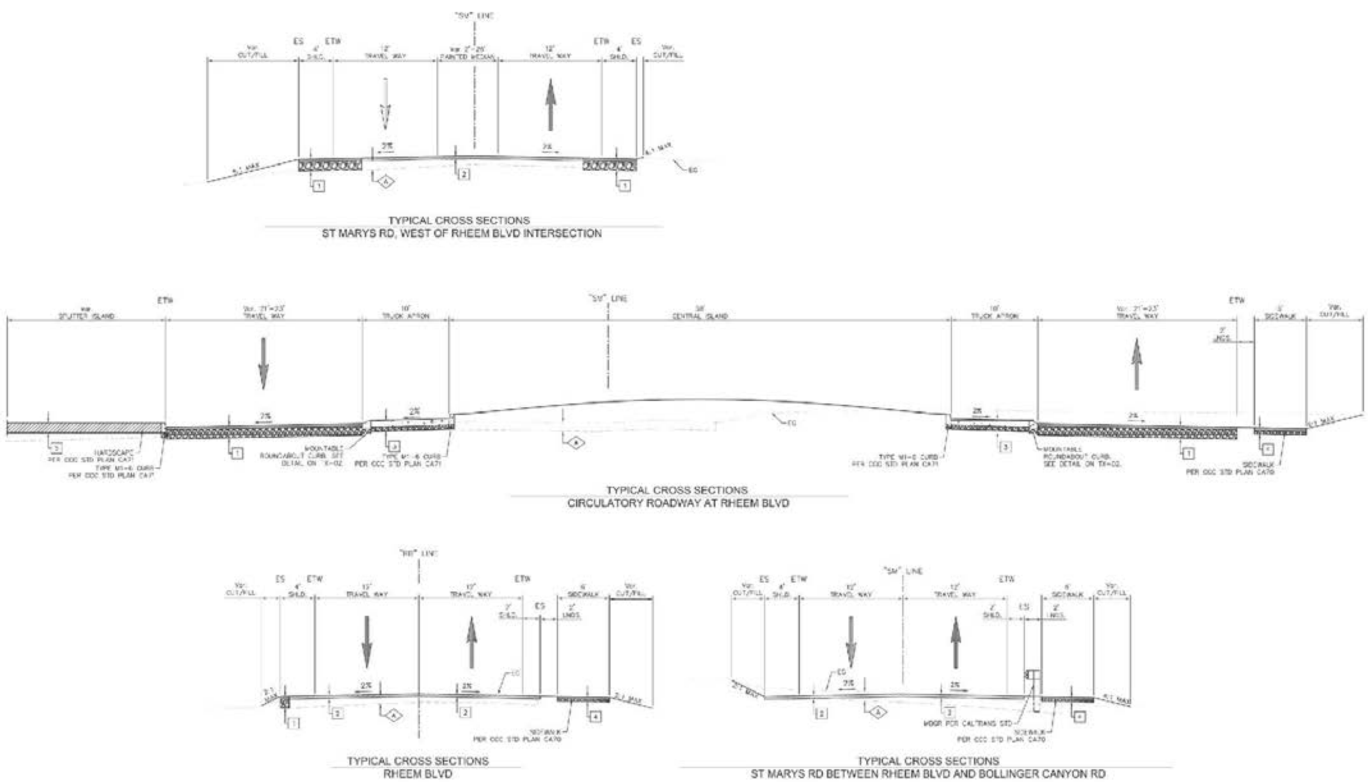
**Figure 3c. Proposed Roadway Design**




Source: Kimley-Horn, 2019

**Figure 4a: Proposed Roundabout Sections**

*St Mary's Double Roundabouts Project*

Not to scale

Kimley»Horn
Expect More. Experience Better.

**Figure 4a. Proposed Roundabout Sections**

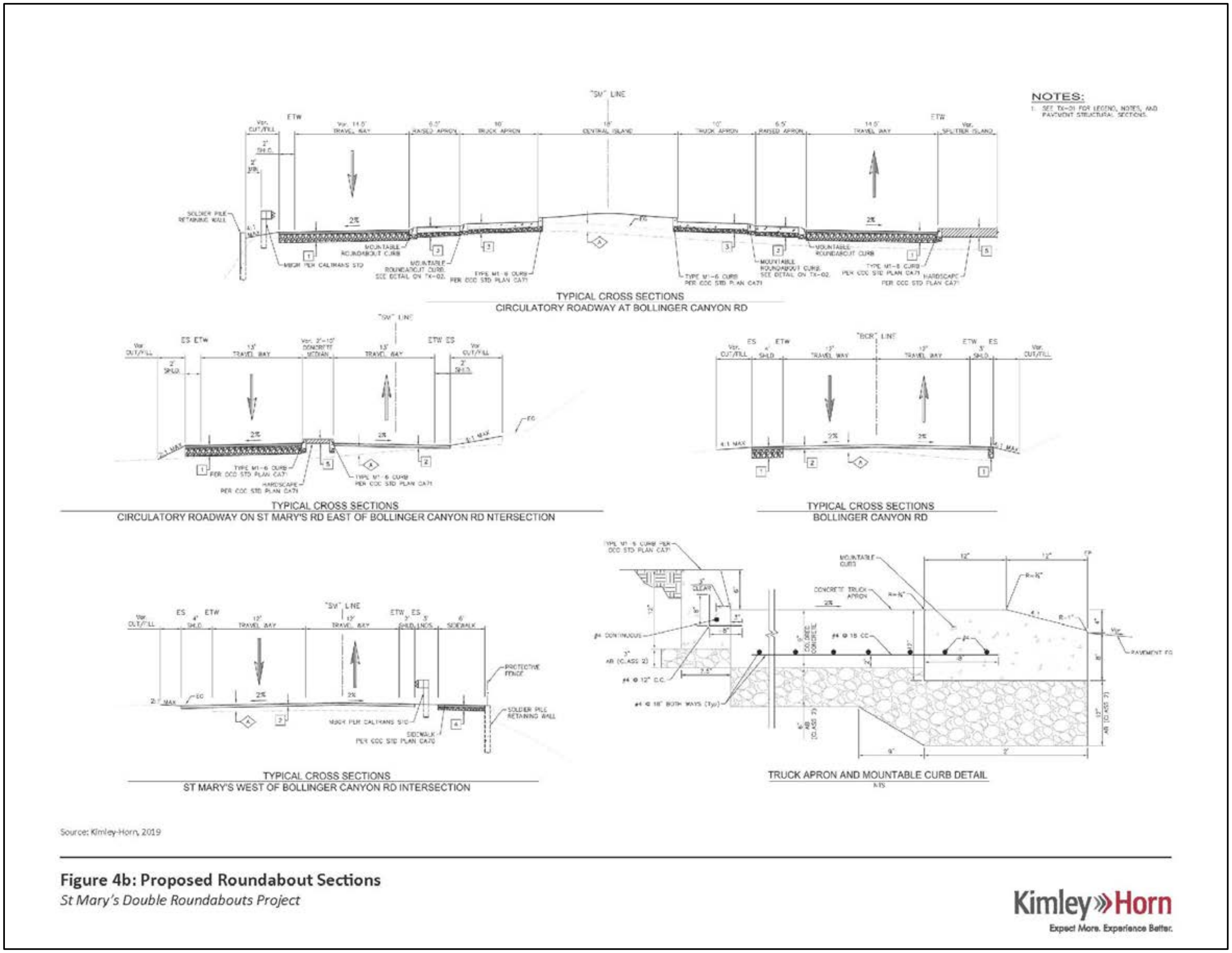



**Figure 4b. Proposed Roundabout Sections**

**Bicycle and Pedestrian Facilities**

The Lafayette/Moraga Regional Trail runs parallel and west of St. Mary’s road, crossing Rheem Boulevard via a cross walk in front of the SSSC intersection. A new trail crossing at Rheem Boulevard would realign the trail crossing to be located approximately 40 ft west of the existing trail crossing. The new crossing would connect to the existing trail. The new trail crossing would allow for safe pedestrian and bicycle crossings west of the proposed roundabout by improving visibility and decreasing approaching vehicular speed.

The roundabouts accommodate bicyclists by allowing users to choose their path of travel. Cyclists who have experience and confidence riding on the roadway can travel through the facility as a vehicle by merging with other vehicular traffic and occupying the lane within the roundabout itself. Other cyclists that may not feel comfortable riding within the travel lane can access the shared-use pathway with bike ramps and travel through the roundabout and cross as a pedestrian.

A new sidewalk is proposed along the east side of St. Mary’s Road, starting near the Bollinger Canyon Road intersection and would connect to the regional trail on the south side of the proposed roundabout at the Rheem Boulevard intersection. The new sidewalk installation would allow for safe pedestrian crossings for the users on Bollinger Canyon Road.

**Utilities**

There are existing street lights within the Project area along the St. Mary’s Road that would be relocated. A new streetlight would be constructed outside of the proposed roadway pavement area. These would require excavation up to 6 ft in depth.

Existing telephone and electrical poles and boxes are located along St. Mary’s Road. These telephone and electrical poles and boxes would be relocated outside of the proposed roadway. These would require excavation up to 6 ft in depth.

Several sanitary sewer manholes exist along St. Mary’s Road and one, located at the St. Mary’s Road/Bollinger Canyon Road intersection, would require relocation. The new sanitary sewer manhole will require excavation with maximum depths of 10 ft.

There are existing water lines with proposed Project limits. It is intended the water valves be adjusted to the proposed grade. An existing culvert crosses Rheem Boulevard, just north of the St. Mary’s Road/Rheem Boulevard intersection. The Project would realign a portion of the culvert, requiring excavation up to 2 ft in depth.

**Construction Activities**

Construction of the proposed Project is anticipated to take 12 months. St. Mary’s Road would remain open during construction; however, there may be temporary lane closures on St. Mary’s Road, Rheem Boulevard, and Bollinger Canyon Road during non-commute times, and there may be one-way traffic control at night during stage construction switchovers. Access to adjacent and adjoining properties would be maintained during the duration of construction activities. Bus access would also be maintained. Construction methods would include excavator trenching, pipe, valve and fitting installation, backfill, and compaction of backfill.

Construction limits are the limits of the proposed Project. A staging area would be located on the east side of St. Mary’s Road, between Rheem Boulevard and Bollinger Canyon Road intersections.

## 1.2 Surrounding Land Uses and Environmental Setting

**Project Location and Setting**

St. Mary’s Boulevard is located in the Town of Moraga within Contra Costa County. St. Mary’s Road and Rheem Boulevard are two of the major arterials in the Town of Moraga, providing access to the St. Mary’s College and connection to the surrounding Cities of Orinda and Lafayette. St. Mary’s Road is currently a two-lane divided roadway with stop-signaled intersections at Rheem Boulevard and Bollinger Canyon Road.

The Project area is undeveloped, apart from the roadways, and is characterized by roadside vegetation. The Lafayette/Moraga Regional Trail runs parallel and approximately 30 feet northwest of St. Mary’s Road. There is a gravel pull-out immediately west of the Bollinger Canyon Road/St. Mary’s Road intersection, with gate access to the Lafayette/Moraga Regional Trail and a private, gated residential road that provides access to two single-family dwellings.

Single-family residential dwellings are located immediately northwest of the Rheem Boulevard/St. Mary’s Road intersection on Rheem Boulevard. The St. Mary’s College is located approximately 0.25 miles southwest of the Rheem Boulevard/St. Mary’s Road intersection, with access along St. Mary’s Road.

The Project site is bordered by properties with the following land use designations in the Town of Moraga General Plan: Community Facilities, Residential (1 dwelling unit (du)/acre), Residential (2 du/acre), and MOSO Open Space.

**Existing Facility and Operations**

St. Mary’s Road is currently a two-lane undivided roadway with stop-signalized intersections at Rheem Boulevard and Bollinger Canyon Road. Table 1, *Existing (2017) Conditions – Intersection Level of Service,* provides the existing conditions at the intersections on Rheem Boulevard and Bollinger Canyon Road.

**Table 1. Existing (2017) Conditions ─ Intersection Level of Service**

| ID | Intersection | Traffic Control | AM Peak Hour | | PM Peak Hour | |
|---|---|---|---|---|---|---|
| | | | Delay | LOS | Delay | LOS |
| 1 | St. Mary’s Road / Rheem Boulevard | SSSC | 3.6 | A | 3.9 | A |
| | *Worst Approach* | | 18.5 | C | 20.4 | C |
| 2 | St. Mary’s Road / Bollinger Canyon Road | SSSC | 1.5 | A | 0.9 | A |
| | *Worst Approach* | | 16.5 | C | 16.2 | B |

According to the *Town of Moraga General Plan* (2002), the Town endeavors to maintain a target level of service (LOS) no worse than LOS C for all intersections. Therefore, LOS C or better for the study intersections on St. Mary’s Road is considered acceptable.

## 1.3 Discretionary Approvals

The Project Initial Study and proposed Mitigated Negative Declaration (IS/MND) are intended to serve as the primary environmental document for all actions associated with the Project and all discretionary approvals requested or required to implement the Project. In addition, this is the primary reference document for the formulation and implementation of the Project Mitigation Monitoring and Reporting Program (MMRP). This document is also intended to provide sufficient information to allow permitting agencies to evaluate the potential impacts from construction and operation of the Project. Anticipated discretionary approvals including the approving agencies are identified below.

**Town of Moraga**

- Adoption of the Initial Study/Mitigated Negative Declaration
- Approval of Roadway Design

**California Department of Fish and Wildlife**

- Incidental Take Permit for Alameda whipsnake
- 1602 Streambed Alteration Agreement

**U. S. Fish and Wildlife Service**

- Letter of Concurrence or Biological Opinion for Alameda whipsnake, and California red-legged frog.

**USACE**

- 404 Permit

**San Francisco Bay Regional Water Quality Control Board**

- 401 Water Quality Certification

# 2.0 LOCATION

The Project is located in Contra Costa County (USGS), California. Table 2 provides general location information for the study area, including the USGS 7.5-minute quadrangle, nearest town and intersection, and the latitude and longitude.

**Table 2. Project Location Summary**

| Location of Work | USGS Quadrangle | Nearest Town | Nearest Intersection | Latitude, Longitude |
|---|---|---|---|---|
| Along St. Mary's Road between Rheem Blvd. and Bollinger Canyon Rd. | Las Trampas | Moraga | Raheem Blvd. and Bollinger Canyon Rd. | 37.846740628, -122.108433253 |

# 3.0 FEDERAL AND STATE REGULATORY REQUIREMENTS

This Section describes the federal and State regulations that are applicable to the aquatic resources in the Project Area.

## 3.1 Clean Water Act, Section 404 (33 USC § 1344)

Wetlands and other water resources (e.g., rivers, streams, and natural basins) are a subset of "waters of the U.S." and receive protection under Section 404 of the Clean Water Act (CWA). The USACE has primary federal responsibility for administering regulations that concern waters and wetlands. The USACE acts under two statutory authorities: the Rivers and Harbors Act (Sections 9 and 10), which governs specified activities in "navigable waters," and the CWA (Section 404), which governs specified activities in "waters of the U.S.," including wetlands.

The USACE and the U.S. Environmental Protection Agency (EPA) define wetlands as "areas that are saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support a prevalence of vegetation typically adapted for the life in saturated soil conditions. Wetlands generally include swamps, marches, bogs, and similar areas." (Environmental Laboratory 1987).

The term "waters of the United States" is defined in 33 *Code of Federal Regulations* (CFR) Part 328.3(a) and 40 CFR Part 230.3(s) as:

1. All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
2. All interstate waters including interstate wetlands;
3. All other waters such as interstate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation of destruction of which could affect interstate or foreign commerce including any such waters:
    I. Which are or could be used by interstate or foreign travelers for recreational or other purposes; or
    II. From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or
    III. Which are used or could be used for industrial purpose by industries in interstate commerce;
4. All impoundments of waters otherwise defined as waters of the United States under the definition;
5. Tributaries of waters identified in paragraphs (a)(1)-(4) of this section;
6. The territorial seas;
7. Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (a)(1)-(6) of this section.

The term "other waters of the U.S." is used to characterize water bodies, such as intermittent streams, that do not meet the full criteria for wetlands designation.

### 3.1.1 Jurisdictional "Other Waters of the U.S"

The limits of USACE jurisdiction under Section 404 as given in 33 CFR Section 328.4 are as follows: a) territorial seas: 3 nautical miles (mi) in a seaward direction from the baseline; b) tidal waters of the U.S.: high tide line or to the limit of adjacent non-tidal waters; c) non-tidal waters of the U.S.: ordinary high water mark (OHWM) or to the limit of adjacent wetlands; and d) wetlands: to the limit of the wetland. The USACE jurisdiction in non-tidal areas extends to the OHWM, which is defined as:

> "*...that line on the shore established by the fluctuations of water and indicated by physical characteristics such as clear, natural line impresses on the bank, shelving, changes in the characteristics of the soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.*" (Federal Register Vol. 51, No. 219, Part 328.3 (e). November 13, 1986).

### 3.1.2 Jurisdictional Wetlands

Potential wetlands are evaluated for the presence or absence of indicators of the three parameters described in the *Corps of Engineers Wetland Delineation Manual* (USACE Manual [USACE 1987]) and *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (Version 2.0) (Arid West Region supplement [USACE 2008a]). The three parameters used to delineate wetlands are presence of: hydrophytic vegetation, wetland hydrology, and hydric soils. According to the USACE Manual, there must be evidence of at least one positive wetland indicator from each parameter under typical or unproblematic situations.

## 3.2 Waters of the State

The California Water Code defines "waters of the State" as "any surface water or groundwater, including saline waters, within the boundaries of the state" (Section 13050[e]). According to the State Water Resources Control Board (SWRCB), this includes all waters of the U.S. and is "broadly construed to include all waters within the state's boundaries, whether private or public, including waters in both natural and artificial channels" (SWRCB 2015).

The SWRCB protects the beneficial uses of surface water and groundwater in California under the Porter-Cologne Act, with a focus on water quality. The RWQCBs regulate all pollutant or nuisance discharges that may affect either surface water or groundwater. The San Francisco Bay RWQCB may exercise jurisdiction over discharges into waters of the state pursuant to the Porter-Cologne Act, in cases where the waters are excluded from regulation under the federal CWA.

The SWRCB jointly with the nine RWQCBs issued the State wetland definitions in 2019 to clarify what they consider as jurisdictional waters of the State (California Water Boards 2019). The Water Boards defines an area as wetland if, under normal circumstances:

1. The area has continuous or recurrent saturation of the upper substrate caused by groundwater, or shallow surface water, or both;
2. The duration of such saturation is sufficient to cause anaerobic conditions in the upper substrate; and

3. The area’s vegetation is dominated by hydrophytes or the area lacks vegetation.

The SWRCB determined that all waters of the U.S. are also waters of the state. For non-U.S. waters, an aquatic resource delineation shall be performed using the methods described in the following three federal documents: *U.S. Army Corps of Engineers Wetlands Delineation Manual* (1987); *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (Version 2.0) (2008); and *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region* (Version 2.0) (2010).

# 4.0 METHODS

This section describes the methods utilized to delineate waters of the U.S. There were no limitations encountered during the wetland delineation; however, the wetland delineation was conducted following an above-average rainy season.

## 4.1 Study Area

A Study Area was developed based upon the Project limits maps provided by the design team to define the limits of the aquatic resources delineation. The Study Area is defined as any potential jurisdictional areas that may be directly, indirectly, temporarily, or permanently impacted by construction and construction-related activities. Figure 5 includes a map of the Study Area boundaries.

## 4.2 Literature Review

Prior to conducting the field surveys, reference materials were reviewed. Soil data for Contra Costa County were downloaded from the Soil Survey Geographic (SSURGO) database ([United States Department of Agriculture] USDA 2019), and the data were imported to ArcGIS. Additional references consulted included the *Soil Survey of Contra Costa County* (USDA 1977); USGS 7.5' quadrangle maps for Las Trampas Ridge, Oakland East, Briones Valley, Walnut Creek, Clayton, Diablo, Dublin, Hayward; and San Leandro; the *National Wetlands Inventory* (United States Fish and Wildlife Service [USFWS] 2019); and aerial photos of the site.

## 4.3 Delineation of Waters of the United States

WRECO biologists performed field surveys of the study area on March 31, 2017 and June 18, 2019, for the purpose of delineating waters of the U.S., including wetlands and other waters.

### 4.3.1 Wetlands

The Study Area was visually inspected for any potential wetland areas and the approximate location of the wetland-upland boundary. Paired sample points were used to verify the exact location of the wetland-upland boundary (as necessary); each sample point was marked with a Trimble Model Geo7X sub-meter Global Positioning System (GPS) unit. Paired sample points consist of two locations; one in a suspected wetland area and another in a suspected upland area, where the three wetland parameters are evaluated for presence or absence as described in Sections 4.3.1.1, 4.3.1.2, and 4.3.1.3. If the wetland point displays indicators of each of the three wetland parameters and the upland point does not meet the three-parameter criteria, the wetland-upland boundary is located between the paired sample points. After completing the paired sample points, the wetland-upland boundary was delineated with the same sub-meter GPS unit.

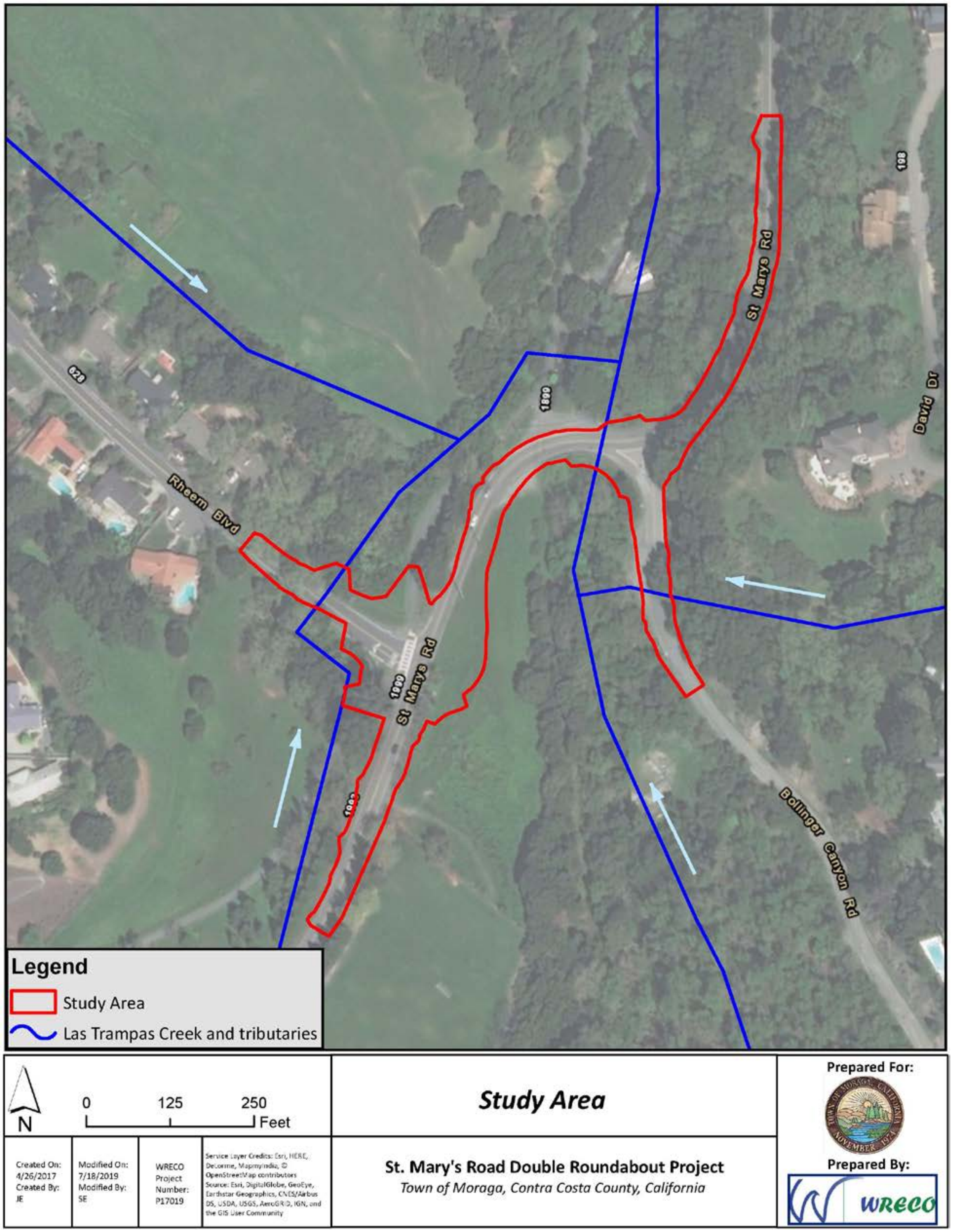



**Figure 5. Study Area**

The Study Area was also surveyed for problem areas and atypical situations that may result in wetlands lacking positive indicators of hydrophytic vegetation, hydric soils, and hydrology, as described in the Arid West Region supplement. Problem area wetlands may periodically lack wetland indicators due to the nature of the soils or plant species on the site. Atypical situations are defined as wetlands in which indicators are absent due to recent human activities, disturbances, or natural events. Atypical situations may also affect the normal circumstances of a site, or conditions and functions that are relatively permanent (USACE 2008a).

#### 4.3.1.1 Vegetation

WRECO biologists identified vegetation species in the vicinity of the sample points and estimated percent cover for each species within the wetland. Plant species observed in the study area were identified using the *Jepson Manual* (Baldwin et al. 2012). Plants were assigned a wetland indicator status according to the *Arid West 2016 Final Regional Wetland Plant List* (Lichvar 2016). The dominance or prevalence of hydrophytic vegetation at each sample point was then determined based on indicator tests described in the *1987 USACE Manual and Arid West Region supplement* (USACE 2008a). Table 3 provides the wetland vegetation indicator categories, indicator symbols, and the definition of each.

**Table 3. Definitions of Wetland Vegetation Indicator Status**

| Indicator Category | Indicator Symbol | Definition |
|---|---|---|
| Obligate Wetland Plants | OBL | Plants that occur almost always (estimated probability >99%) in wetlands under natural conditions, but which may also occur rarely (estimated probability <1%) in non-wetlands. Example: *Salicornia virginica L.* |
| Facultative Wetland Plants | FACW | Plants that occur usually (estimated probability >67% to 99%) in wetlands, but also occur (estimated probability 1% to 33%) in non-wetlands. Examples*: Eleocharis macrostachya; Polypogon monspeliensis* |
| Facultative Plants | FAC | Plants with similar likelihood (estimated probability 33% to 67%) of occurring in both wetlands and non-wetlands. Examples: *Rosa californica; Festuca pratensis* |
| Facultative Upland Plants | FACU | Plants that occur sometimes (estimated probability 1% to 33%) in wetlands, but also occur (estimated probability >67% to 99%) in non-wetlands. Examples: *Taraxacum officinale; Rubus ursinus* |
| Obligate Upland Plants | UPL/NL | Plants that occur rarely (estimated probability <1%) in wetlands under natural conditions, but which also occur (estimated probability >99%) in non-wetlands in natural conditions. Examples: *Avena sativa; Raphanus sativus*<br>If a plant species is not on the list, it is generally assumed that it is UPL (USACE 2008). |

#### 4.3.1.2 Hydrology

WRECO biologists surveyed the Study Area for primary and secondary indicators of wetland hydrology. Primary indicators of wetland hydrology that were surveyed for included but were not limited to visible surface water, soil saturation, water marks, surface soil cracks, aquatic invertebrates, oxidized root channels, and salt crusts. Secondary indicators that were surveyed for included the presence of a shallow aquitard or existing drainage patterns. The presence or absence of the primary or secondary indicators described in the Arid West Region supplement (USACE 2008a) was used to determine if sample points within the Study Area met the wetland hydrology criterion.

#### 4.3.1.3 Soils

WRECO biologists evaluated soil conditions at each sample point. At each sample point, WRECO excavated a 1 to 1.5-foot deep hole. Soil removed from the hole was examined for indicators of hydric soil, including but not limited to a hydrogen sulfide (rotten egg) odor, low chroma matrix color, presence of redox concentrations, gleyed or depleted matrix, and high organic matter content. Soil chroma and values were determined by using a standard Munsell soil color chart (Gretag Macbeth 2009). Hydric soils were determined to be present if the paired soil samples met any of the 23 indicators of hydric soil listed in the Arid West Region supplement (USACE 2008a). Soil from each test pit were photographed.

### 4.3.2 Other Waters of the United States

The location of OWUS along non-tidal riverine systems was delineated as the area between the OHWM and non-waters of the U.S. The OHWM was identified in the Study Area based on examination of the recent physical evidence of surface flow, including but not limited to: a clear natural line impressed on the bank (or coloration), evidence of scour, recent bank erosion, destruction of vegetation, sediment deposition, and the presence of litter and debris. Identification of the OHWM within the study area generally followed the procedures outlined in the USACE's *A Field Guide to the Identification of the Ordinary High Water Mark* (OHWM) *in the Arid Western Region of the Western United States* (2008b) and Regulatory Guidance Letter No. 05-05, *Ordinary High Water Mark Identification* (2005).

Preliminary identification of potentially jurisdictional OWUS was noted in the field on Project layouts and aerial photography and later digitized to ArcGIS format, and were surveyed using a Trimble Model Geo7X sub-meter GPS unit. The acreage and length of each feature was calculated using the ArcGIS program.

# 5.0 EXISTING CONDITIONS

This section provides more information on environmental factors that influence wetland formation and continuity such as location and topography, climate, soils, and hydrology.

## 5.1 Topography

The Study Area is bounded by the Las Trampas Ridge to the east, the Gudde Ridge to the west, the Town of Moraga to the south and the City of Lafayette to the north. The Study Area is located along St. Mary's Road, with Las Trampas Creek, approximately 30 ft below the road. Elevations within the Study Area range from approximately 523 ft to 586 ft above mean sea level (MSL). See Figure 6 for a topographic map.

## 5.2 Climate

According to the Köppen climate classification system, the study area has a Mediterranean climate, characterized by hot, dry summers and mild, moist winters. The Study Area generally experiences precipitation between mid-October and mid-April. A climate summary for the nearest National Oceanic and Atmospheric Administration (NOAA) weather station with similar elevation and topography to the Project reports the following precipitation and temperature information (Western Regional Climate Center 2019):

*Saint Mary's College Station 047661 (1942-1981)*

- Average annual rainfall for Moraga is 27.48 inches (in.)
- Average temperatures range seasonally from 44.4 to 68.4 degrees Fahrenheit (ºF)

The maximum average temperature reported for the Moraga area was 81.9ºF in July, and the lowest average temperature is 53.1ºF in January. The wettest month of the year is January with an average rainfall of 6.12 in., and the driest month is July with an average of 0.05 in. Winter storms are usually of moderate duration and intensity (Western Regional Climate Center 2019).

## 5.3 Land Cover and Vegetation Communities

Residential housing developments with a mixture of grassland and oak woodlands surround the entire study area. Las Trampas Creek crosses below St. Mary's Road via a box culvert, flowing south to north.

## 5.4 Soil

Originally published by the U.S. Department of Agriculture, soil data for Contra Costa County were downloaded from the Soil Survey Geographic (SSURGO) database (USDA 2019), and the data were imported to ArcGIS, as shown in Figure 7. Additional soil information was obtained from the NRCS and Soil Conservation Service's soil surveys for the listed counties. The *Soil Survey of Contra Costa County, California* (USDA 1977) was reviewed for the Project. Two soil types are mapped in the Study Area, as described below.

**Clear Lake clay, 0 to 15 percent slopes, Major Land Resource Area (MLRA) 15**

This soil type is the only Clear Lake soil mapped in the Contra Costa County. Its drainage has been improved by natural stream cutting, and the water table is below a depth of 6 inches in most places. Runoff is very slow, and there is no hazard of erosion where the soil is tilled and exposed. The soil is subject to flooding once every 7 to 10 years unless surface drainage is provided. This soil is used for dryland small grain and volunteer hay and for homesites. This soil type is hydric (USDA 1977).

**Cropley clay, 2 to 5 percent slopes**
This soil type is typically found on gently sloping terrain, in small upland valleys. Runoff for this soil type is slow, and the hazard of erosion is slight where the soil is tilled and exposed. This soil is used for dryland grain and range and for homesites. This soil type is hydric (USDA 1977). (USDA 1977).

Table 4 summarizes soil types and Figure 5 provides a map of the soils within the Study Area.

**Table 4. Soil Types Occurring within the Study Area**

| Map Unit Symbol | Map Unit Name (slope) | Drainage | Land Form | Hydric Soil |
|---|---|---|---|---|
| Cc | Clear Lake clay, 0 to 15 percent slopes, MLRA 15 | Poorly drained | Depressions | Yes |
| CkB | Cropley clay, 2 to 5 percent slopes | Moderately well drained | Depressions | Yes |

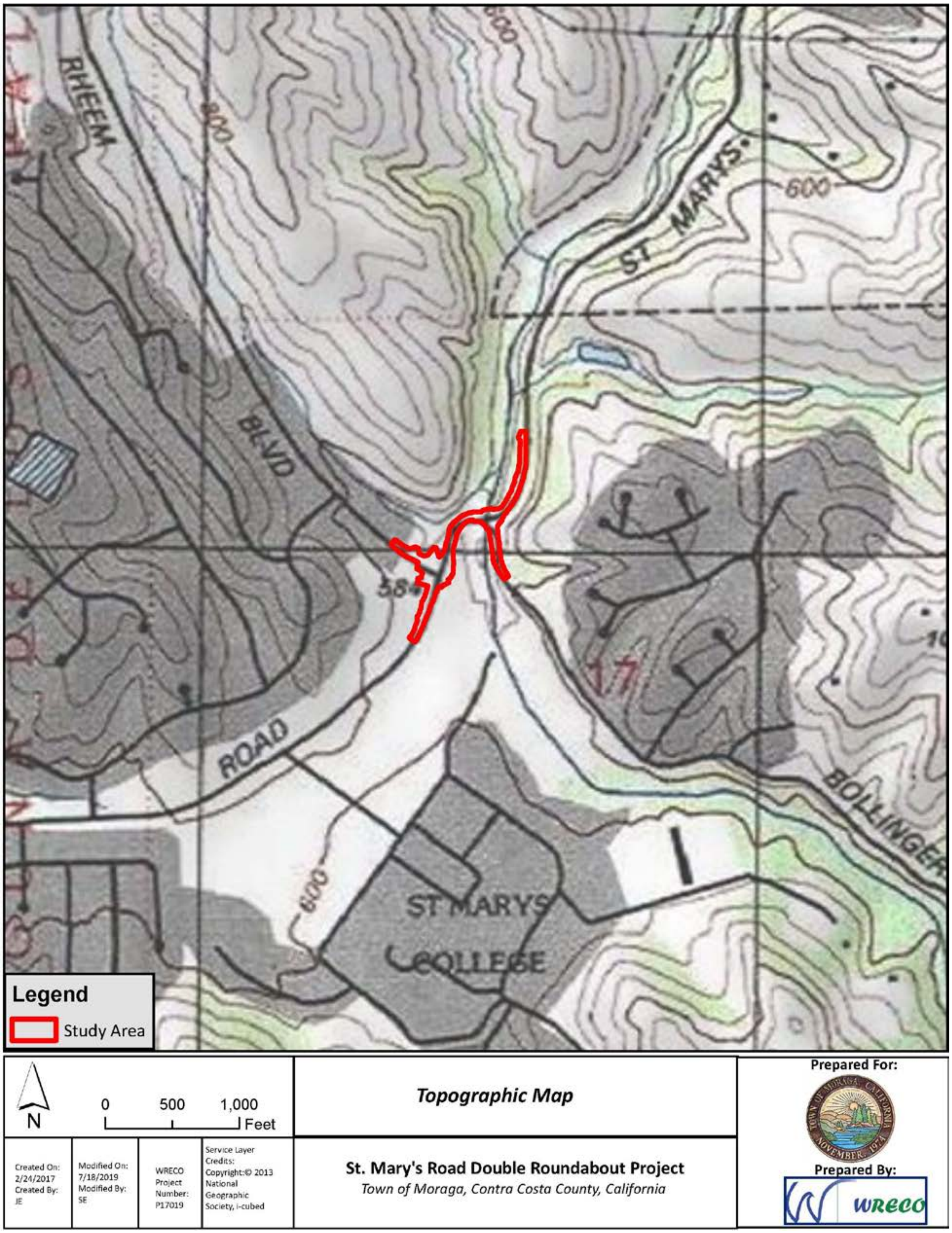



**Figure 6. Topographic Map**

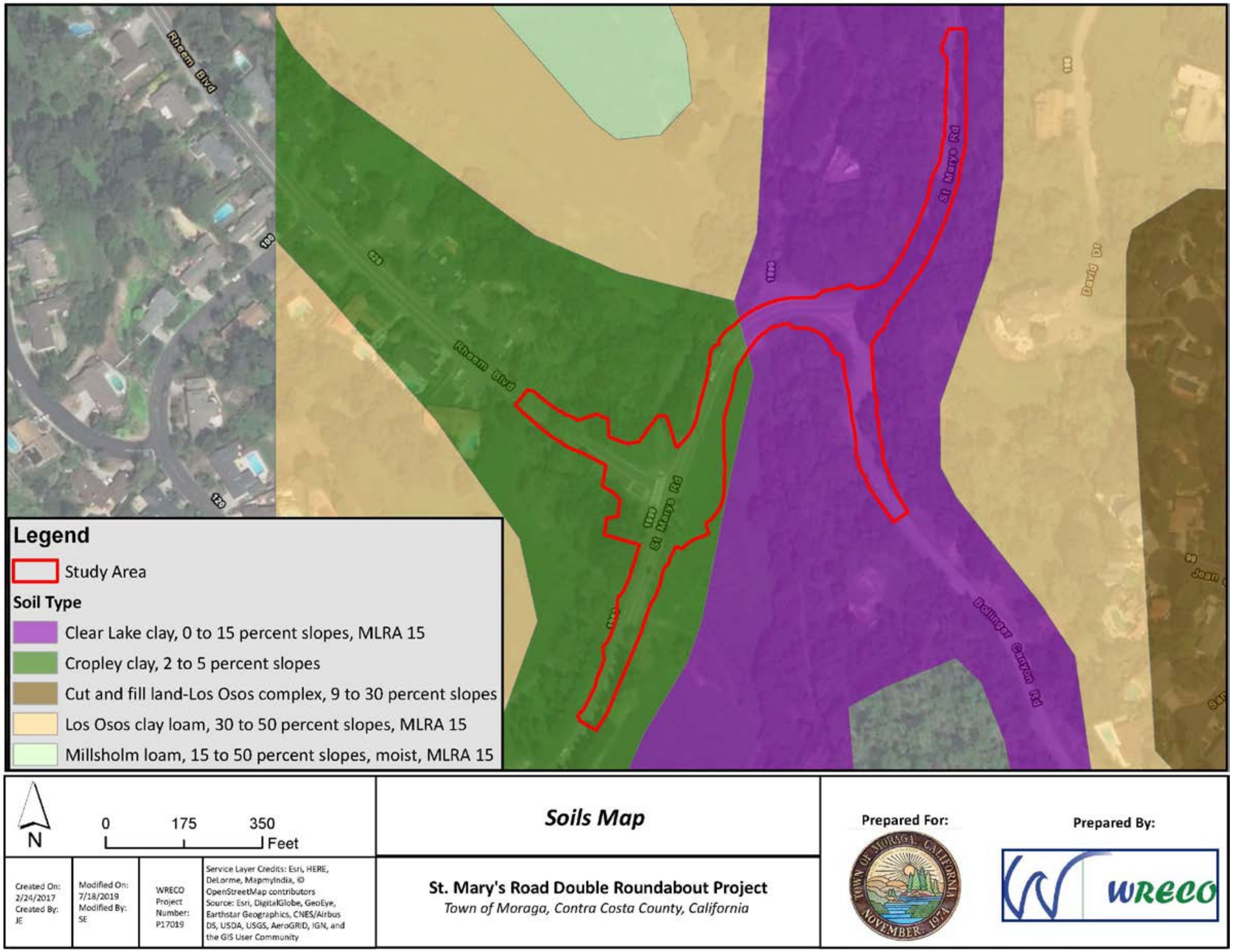



**Figure 7. Soils Map**

## 5.5 Hydrology

The Project is located within the Las Trampas watershed which originates from the hills southeast of the Town of Moraga, along Las Trampas Ridge. The watershed drains on a northerly course to the City of Walnut Creek, where it drains into Walnut Creek. The creek flows primarily in an open natural channel, with some flows through underground culverts and concrete open channels through the City of Walnut Creek until it reaches Suisun Bay, approximately 17 miles north of the Project. See Figure 8 for a hydrology map.

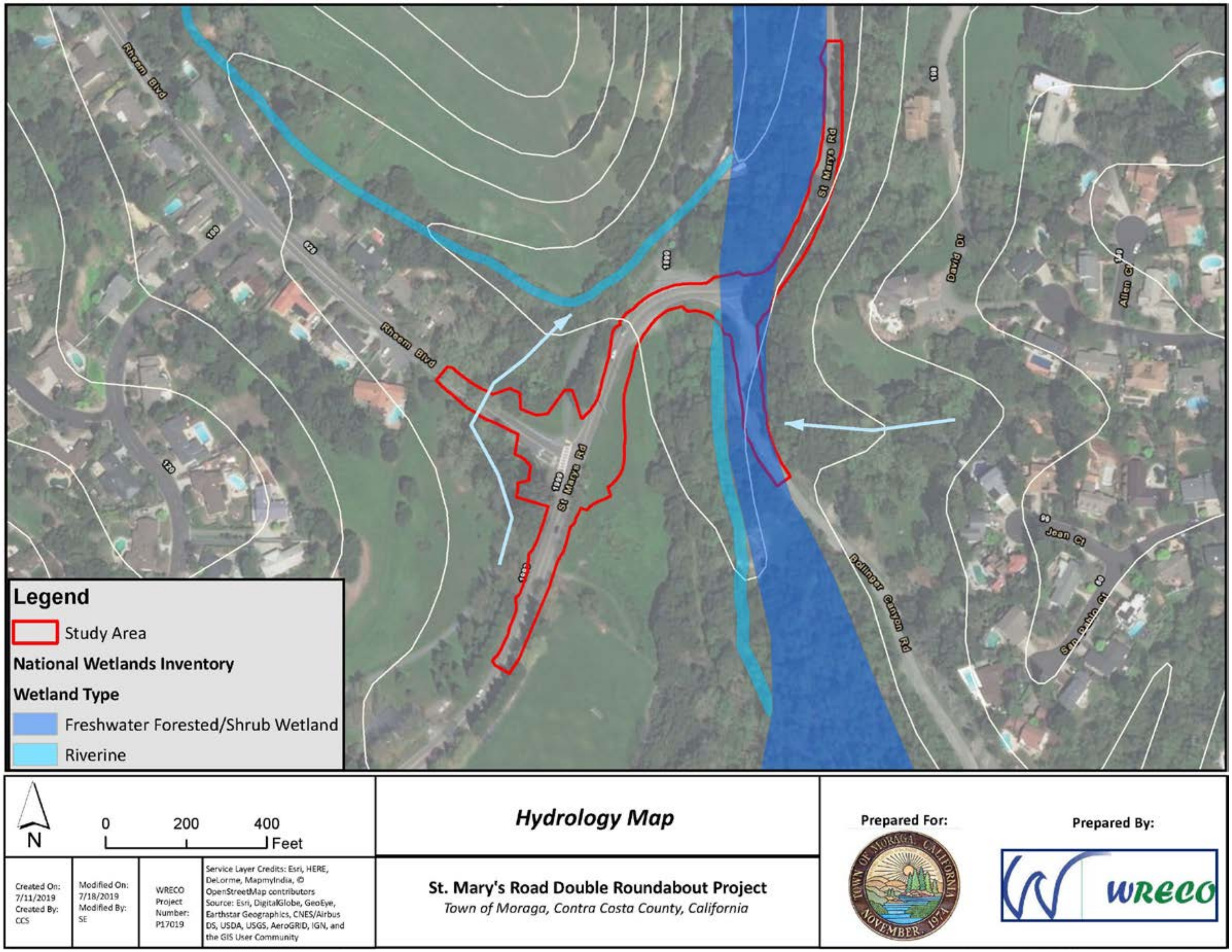



**Figure 8. Hydrology Map**

# 6.0 RESULTS

This section presents the results of the aquatic resource delineation and are detailed in this section. All estimates of resources are subject to change, pending USACE official review and final jurisdictional determination. See Figure 9 for the potential waters of the U.S. delineation map. Appendix A contains Wetland Determination Data Forms. Appendix B contains representative photographs of the Study Area.

## 6.1 Potential Jurisdictional Waters

This section is organized by feature type and includes a discussion of potential wetlands in Section 6.1.1 and OWUS in Section 6.1.2 that would be subject to USACE jurisdiction under Section 404 of the Clean Water Act.

### 6.1.1 Waters of the U.S. (Wetlands)

No potential jurisdictional waters of the U.S. (wetlands) were identified and delineated within the Study Area.

#### 6.1.1.1 Vegetation

The streambanks of Las Trampas Creek are dominated by California blackberry (*Rubus ursinus*), periwinkle (*Vinca major*), California buckeye (*Aesculus californica*), big leaf maple (*Acer macrophyllum*), California bay trees (*Umbellularia californica*), wood fern (*Dryopteris arguta*), and non-native grasses. Vegetation along Tributary 1 included California buckeye, coast live oak (*Quercus agrifolia*), California Bay tree, Italian thistle (*Carduus pycnocephalus*), ripgut brome (*Bromus diandrus*), tall flatsedge (*Cyperus eragrostis*), field sowthistle (*Sonchus arvensis)*, burclover (*Medicago polymorpha*), and cutleaf geranium (*Geranium dissectum*). Vegetation along Tributary 2 included coast live oak (*Quercus agrifolia*) and poison oak (*Toxicodendron diversilobum*), in addition to the species mentioned above. Table 5 includes a list of all vegetation species observed during the survey, the indicator status of the plants (see Table 3), and whether the plants are native or non-native. Wetland Determination Data Forms for the Arid West Region are included in Appendix A.

**Table 5. Vegetation Observed**

| Scientific Name | Common Name | Hydrophytic | Native/ Non-Native |
|---|---|---|---|
| *Acer macrophyllum* | Big leaf maple | FAC | Native |
| *Aesculus californica* | California buckeye | N/L | Native |
| *Alnus* ssp. | Alder tree | N/L | Native |
| *Aristolochia californica* | California pipe vine | N/L | Native |
| *Baccharis pilularis* | Coyote brush | N/L | Native |
| *Bromus diandrus* | Ripgut brome | N/L | Invasive non-native |
| *Carduus pycnocephalus* | Italian thistle | N/L | Invasive non-native |
| *Claytonia perfoliata* | Miner’s lettuce | FAC | Native |

| Scientific Name | Common Name | Hydrophytic | Native/ Non-Native |
|---|---|---|---|
| *Conium maculatum* | Poison hemlock | FACW | Invasive non-native |
| *Cyperus eragrostis* | Tall flatsedge | FACW | Native |
| *Dryopteris arguta* | California wood fern | N/L | Native |
| *Equisetum arvense* | Common horsetail | FAC | Native |
| *Erodium* ssp. | filaree ssp. | FACU | Non-native |
| *Geranium dissectum* | cutleaf geranium | Upland | Non-native |
| *Medicago polymorpha* | bur clover | FACU | Non-native |
| *Plantago lanceolata* | narrow leaved plantain | FAC | Invasive non-native |
| *Phoradendron leucarpum* | American mistletoe | N/L | Native |
| *Quercus agrifolia* | coast live oak | Upland | Native |
| *Quercus lobata* | valley oak | FACU | Native |
| *Quercus* ssp. | scrub oak | N/L | Native |
| *Rosa californica* | California wild rose | FAC | Native |
| *Rubus ursinus* | California blackberry | FAC | Native |
| *Rumex crispus* | curly dock | FAC | Non-native |
| *Salix lasiolepis* | Arroyo willow | FACW | Native |
| *Solanum nigrum* | Black nightshade | FACU | Non-native |
| *Sonchus arvensis* | Field sowthistle | FACU | Non-native |
| *Symphoricarpos albus* | snowberry | FACU | Native |
| *Toxicodendron diversilobum* | poison oak | FACU | Native |
| *Umbellularia californica* | California bay | FAC | Native |
| *Urtica dioica* | Stinging nettle | FAC | Native |
| *Vicia benghalensis* | Purple vetch | N/L | Non-native |
| *Vinca major* | periwinkle | N/L | Non-native |

Notes:
FAC Facultative; equally found in wetlands and non-wetlands
FACU Facultative Upland; usually found in non-wetlands
FACW Facultative Wetland; usually found in wetlands
N/L Not Listed

#### 6.1.1.2 Hydrology

Figure 8 displays wetland types using a biological definition of wetlands. To produce these maps, the USFWS makes no attempt 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 (USFWS 2019).

#### 6.1.1.3 Soil

No soil sample test pits were performed along Las Trampas Creek or Tributary 2 because the banks consisted of rocks, cobbles, concrete debris and other fill material. One soil sample test pit was performed within the bed of Tributary 1. This test pit did not contain hydric soil identifiers; however, flowing surface water 2 in. deep was present in the channel. No upland test pit was performed near Tributary 1. The data sheet for this sample point is located in Appendix B. Soil Sample Pit 1 is shown in Photo 1 and Photo 2 in Appendix B.

### 6.1.2 Other Waters of the U.S.

Three potential jurisdictional OWUS were identified and delineated within the Study Area: Las Trampas Creek, Tributary 1, and Tributary 2. These are shown in Figure 9. Common physical characteristics that indicate the presence of an OHWM, which were observed within the Study Area include, but are not limited to:

- A clear natural line impressed on the bank (or coloration),
- Evidence of scour,
- Recent bank erosion,
- Destruction of native terrestrial vegetation,
- Sediment deposition, and
- The presence of litter and debris.

#### 6.1.2.1 Las Trampas Creek

Las Trampas Creek flows through the Study Area in a northerly direction, traveling below St. Mary’s Road through a concrete box culvert. Upstream of the culvert, the bed of Las Trampas Creek is approximately 16 ft wide, with flowing water at a depth of approximately 2 ft. The channel is incised with steep banks, approximately 30 ft tall from the channel bed, with a 1:1 (horizontal:vertical) slope. The bed of the channel contains primarily sand and gravel. Downstream of the culvert, the bed of Las Trampas Creek is approximately 20 ft wide, with flowing water at a depth of approximately 3 ft. The bed of the channel contains primarily sand, with gravel and large rocks greater than 8 in.

Las Trampas Creek is a perennial stream (Relatively Permanent Water [RPW]) subject to USACE jurisdiction, pursuant to Section 404 of the CWA. Las Trampas Creek was determined to be an OWUS, because it meets the USACE definition under the criteria that it has a defined bed, bank, and OHWM (USACE 2015). Las Trampas Creek is considered a “water of the U.S.” because it meets the USACE definition under the criteria that it is an RPW water with a defined OHWM and an indirect tributary to a Traditional Navigable Water (TNW) (USACE 2015). Las Trampas Creek has an OHWM of approximately 12.6 feet above the thalweg. Because of the clear boundaries of this RPW feature and material substrate, soil pits were not taken for this feature. See Photo 3, Photo 4 and Photo 5 in Appendix B for upstream and downstream conditions of Las Trampas Creek.

#### 6.1.2.2 Tributary 1

Tributary 1 is located adjacent to Bollinger Canyon Road, approximately 270 feet south of the St. Mary’s Road intersection. This aquatic feature originates from the hillside east of the Study

Area along Bollinger Canyon Road, which consists of a residential community. The bankfull width ranged from 8 ft wide to 3 ft wide, and flowing water was observed during the site visit conducted on March 31, 2017. Several pools were also observed, with water depths ranging from 3 to 8 in. The tributary enters an 18-in. corrugated plastic pipe and travels west below Bollinger Canyon Road, where it outlets approximately 50-ft down the embankment into Las Trampas Creek.

Tributary 1 is a non-RPW hillside drainage feature, likely subject to USACE jurisdiction as other waters of the U.S. under the significant nexus test. Tributary 1 was determined to be an OWUS, because it meets the USACE definition under the criteria that it has a defined bed, bank, and OHWM (USACE 2015). Tributary 1 failed to meet the USACE three-parameter approach for wetlands because of a lack of hydrophtic vegetation along with a lack of hydric soils at Sample Point 1. However, Tributary 1 appears to convey flowing water and possesses a significant nexus to Las Trampas Creek (RPW) and therefore, this feature is a potential other water of the U.S. It is classified as a non-RPW per EPA and USACE (2007) because it conveys flow for short durations, primarily after precipitation events. This feature is connected to Las Trampas Creek, an RPW. See Photo 6, Photo 7 and Photo 8 in Appendix B for Tributary 1 conditions.

#### 6.1.2.3 Tributary 2

Tributary 2 is located adjacent to Rheem Boulevard, approximately 160 feet northwest of the St. Mary’s Road and Rheem Boulevard intersection. This aquatic feature originates from a roadside drainage swale south of the Study Area along St Mary’s Road. Water flows through a culvert underneath the Lafayette/Moraga Regional Trail and outlets into a naturally formed channel, with an established bed and bank. The bankfull width ranges from approximately 45 to 65 ft and minimal flowing water was observed during the site visit conducted on June 18, 2019. Tributary 2 enters a 24-in. corrugated metal pipe (CMP) and travels north below Rheem Boulevard, and continues to flow adjacent to the Lafayette/Moraga Regional Trail, until it flows into another culver and outlets into Las Trampas Creek downstream of the Study Area. For this section of Tributary 2, the bankfull width ranges from approximately 50 to 30 ft and flowing water was observed, along with a pool just downstream of the culvert outlet, approximately 1 to 2 ft deep.

Tributary 2 is an RPW subject to USACE jurisdiction, pursuant to Section 404 of the CWA. Tributary 2 was determined to be an OWUS, because it meets the USACE definition under the criteria that it has a defined bed, bank, and OHWM (USACE 2015). Tributary 2 is considered a water of the U.S. because it meets the USACE definition under the criteria that it is an RPW water with a defined OHWM (USACE 2015). Tributary 2 is also a direct tributary to Las Trampas Creek, therefore being an indirect tributary to a TNW. Tributary 2 has an OHWM that is approximately 6 ft wide. Because of the clear boundaries of this RPW feature and material substrate, soil pits were not taken for this feature. See Photo 9 in Appendix B for Tributary 2.

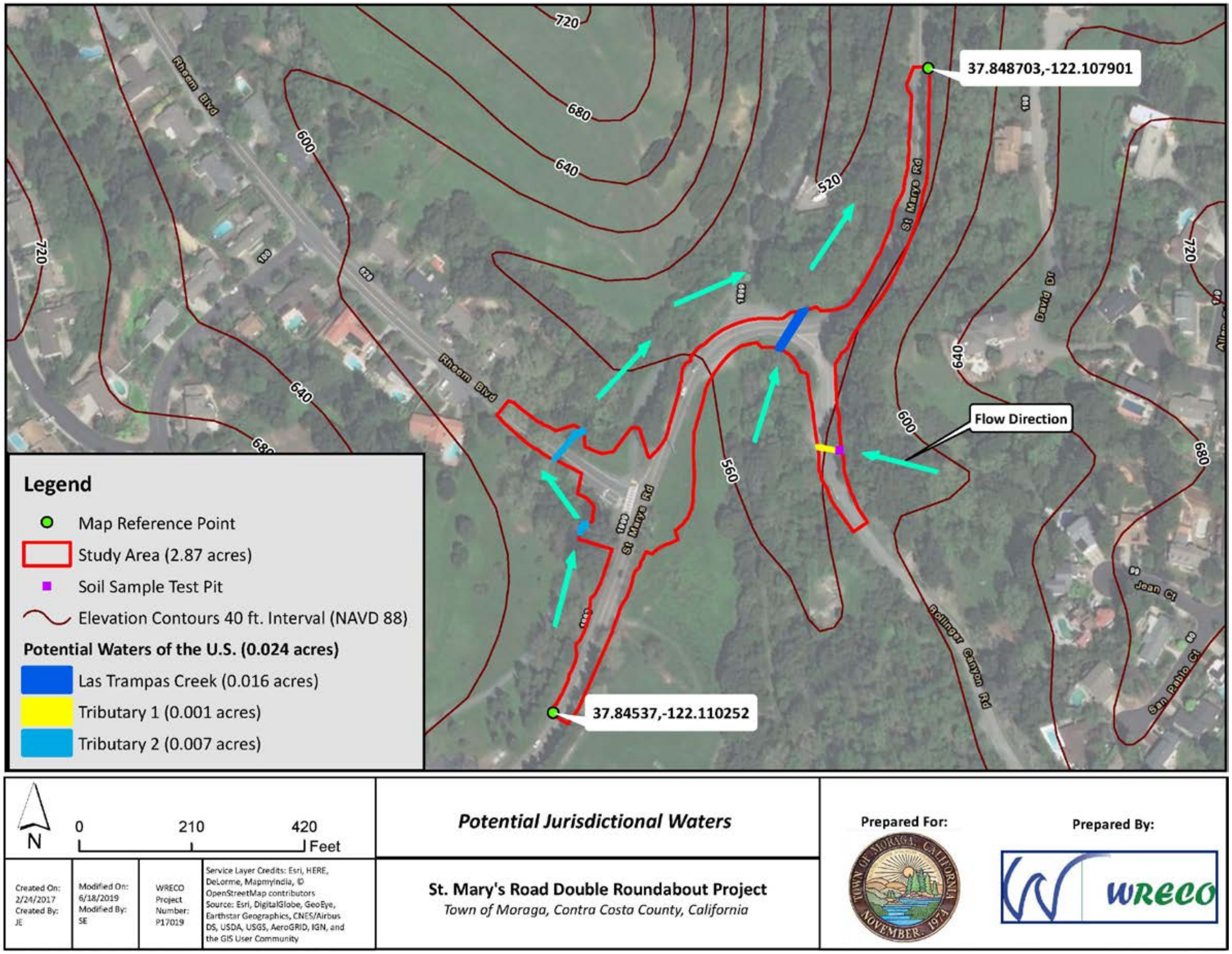



**Figure 9. Potential Jurisdictional Waters**

# 7.0 SUMMARY OF DELINEATED FEATURES

As summarized in Table 6, the approximately 2.87-acre Study Area contains approximately 0.024 acre of potentially jurisdictional OWUS.

**Table 6. Summary of Potential Jurisdictional Waters in the Study Area**

| Potential Other Waters of the U.S. | Area ($ft^2$) | Area (ac) | Length (lf) |
|---|---|---|---|
| Las Trampas Creek | 689 | 0.016 | 88 |
| Tributary 1 | 55 | 0.001 | 44 |
| Tributary 2 | 335 | 0.007 | 101 |
| **Total** | **1,079** | **0.024** | **233** |

No potential jurisdictional waters of the U.S. (wetlands) were identified and delineated within the Study Area.

The conclusions of this aquatic resources delineation are based on conditions observed at the time of the field surveys conducted on March 31, 2017 and June 18, 2019. The findings of this document are considered preliminary until verified by the USACE and/or until any permits are issued by these agencies authorizing or exempting activities within or near these areas.

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# Appendix A **Wetland Determination Data Forms**

## WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: St. Mary's Rd. Double Roundabout City/County: Town of Moraga Sampling Date: 3/31/17

Applicant/Owner: Town of Moraga State: CA Sampling Point: 1

Investigator(s): J. Elia, S. Elder (WRECO) Section, Township, Range: S17, T1S, R2W

Landform (hillslope, terrace, etc.): Hillside drainage Local relief (concave, convex, none): concave Slope (%): 0-2

Subregion (LRR): Mediterranean Lat: 37.846740628 Long: -122.108433253 Datum: WGS84

Soil Map Unit Name: Clear lake Clay, 0-15% slopes NWI classification: Non-RPW

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

### SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | |
|---|---|---|
| Hydrophytic Vegetation Present? | Yes ☐ No ☒ | Is the Sampled Area within a Wetland? Yes ☐ No ☒ |
| Hydric Soil Present? | Yes ☐ No ☒ | |
| Wetland Hydrology Present? | Yes ☒ No ☐ | |

Remarks:

### VEGETATION – Use scientific names of plants.

| Tree Stratum (Plot size: 30 ft.) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. Buckeye | 15 | Yes | NL |
| 2. Coast live oak | 20 | Yes | UPL |
| 3. CA Bay tree | 15 | Yes | FAC |
| 4. | | | |
| | 50 | = Total Cover | |
| **Sapling/Shrub Stratum** (Plot size: _____) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | | = Total Cover | |
| **Herb Stratum** (Plot size: 5 ft.) | | | |
| 1. Italian thistle | 1 | | NL |
| 2. Bromus ssp. | 20 | yes | NL |
| 3. tall flatsedge | 3 | | FACW |
| 4. Sow thistle | 1 | | FACU |
| 5. Burclover | 10 | Yes | FACU |
| 6. Geranium ssp. | 5 | | UPL |
| 7. | | | |
| 8. | | | |
| | 40 | = Total Cover | |
| **Woody Vine Stratum** (Plot size: _____) | | | |
| 1. | | | |
| 2. | | | |
| | | = Total Cover | |

% Bare Ground in Herb Stratum 60 % Cover of Biotic Crust _______

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.2 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: |
|---|---|---|
| OBL species | 0 | x 1 = 0 |
| FACW species | 3 | x 2 = 6 |
| FAC species | 15 | x 3 = 45 |
| FACU species | 11 | x 4 = 44 |
| UPL species | 25 | x 5 = 125 |
| Column Totals: | 54 (A) | 220 (B) |

Prevalence Index = B/A = 4.07

**Hydrophytic Vegetation Indicators:**

- ☐ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks:
Point taken directly adjacent to the roadway. There are signs in the soil and veg, as well as pavement that the culvert might have been recently replaced.

## SOIL

Sampling Point: 1

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth (inches) | Matrix Color (moist) | Matrix % | Redox Features Color (moist) | Redox % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-16 | 10YR 3/4 | 99 | 10YR 4/6 | 1 | CS | M | Sandy loam w/ gravel (angular < .8" | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: ______

Depth (inches): ______

**Hydric Soil Present?** Yes ☐ No ☒

Remarks:

• Possibly new soil due to culvert replacement

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

- ☒ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Non riverine**)
- ☐ Sediment Deposits (B2) (**Non riverine**)
- ☐ Drift Deposits (B3) (**Non riverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☒ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

**Field Observations:**

Surface Water Present? Yes ☒ No ☐ Depth (inches): ~3"

Water Table Present? Yes ☐ No ☐ Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ☒ No ☐ Depth (inches): ______

**Wetland Hydrology Present?** Yes ☒ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

roadside drainage

Remarks:

Water initiates from an uphill area consisting of residential housing development. No rain within past 24 hrs.

# Appendix B **Site Photographs**

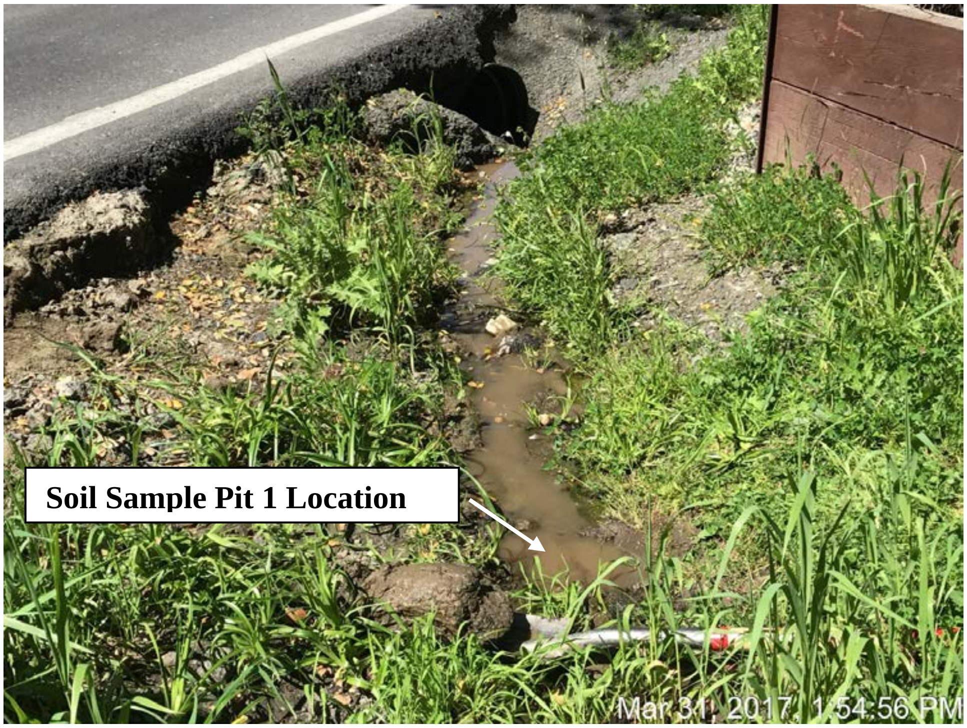


**Photo 1. Soil Sample Pit 1 Location within Bed of Channel, Adjacent to Bollinger Canyon Road**


**Photo 2. Soil Test Pit 1 Soil Type**


**Photo 3. Las Trampas Creek Upstream of Culvert, Facing Downstream (North)**


**Photo 4. Las Trampas Creek, Upstream of Culvert, Facing Upstream (South)**

**Photo 5. Las Trampas Creek Downstream of Culvert, Facing Upstream (South)**

**Photo 6. Tributary 1 Culvert Inlet Along Bollinger Canyon Road**


**Photo 7. Tributary 1 Facing Downstream Toward Bollinger Canyon Road**


**Photo 8. Tributary 1 Culvert Outlet into Las Trampas Creek, Facing East**


**Photo 9. Tributary 2 Culvert Outlet, Downstream of Rheem Boulevard, Facing North.**