ANNUAL NOTICE OF PROPOSED WORK FOR 2022 STREAM MAINTENANCE PROJECTS

CITY OF LIVERMORE STREAM MAINTENANCE PROGRAM

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East Alameda County Conservation Strategy Programmatic Biological Opinion

Appendices

Tables

Acronyms and Abbreviations

ACRCD	Alameda County Resource Conservation District
BMP	Best Management Practices
CASQA	California Stormwater Quality Association
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
City	City of Livermore
CRLF	California red-legged frog
CTS	California tiger salamander
CY	Cubic Yards
EACCS	East Alameda County Conservation Strategy
FP	Fully Protected
FE/FT	Federally Endangered/Threatened
DBH	Diameter at breast height (4.5-feet)
LARPD	Livermore Area Regional Parks District
LF	Linear Feet
MND	Mitigated Negative Declaration
Project	Stream Maintenance Projects
RWQCB	Regional Water Quality Control Board
SF	Square Feet

SMP	Stream Maintenance Program
SSC	Species of Special Concern (California)
SE	State Endangered
ST	State Threatened (California)
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service

Introduction

The Livermore Stream Maintenance Program (SMP) was developed by the City of Livermore (City) to improve and define the management and maintenance of engineered and modified flood control channels and basins, and non-modified natural creeks within the City's SMP Area. The SMP establishes programmatic guidance to conduct maintenance activities and avoid and minimize environmental impacts. The SMP also provides the organizational framework to oversee routine creek and channel maintenance activities and ensure the program is compliant with the terms and conditions of its permits. Appendix D contains the complete SMP manual, which describes all elements of the program in detail. Pursuant to the California Environmental Quality Act (CEQA), a Mitigated Negative Declaration (MND) was prepared for the SMP. Pursuant to the Regional Water Quality Control Board General Order Item 68, a channel inventory was prepared and updated annual quantitative assessments are provided on an annual basis.

The management and operation of the SMP occurs as an annual cycle of activities called the *work cycle*. The work cycle begins each year with a field-based creek and channel reconnaissance and assessment to determine the most critical stream maintenance projects.

The 2022 SMP work cycle includes nineteen (19) projects at ten (10) site locations – eleven (11) projects that involve a combination of sediment, vegetation, and debris management projects, three (3) projects that involve sediment and vegetation management and five (5) projects that involve vegetation and debris management. Additionally, 5 yearly maintenance projects are proposed at 5 locations This notification has been prepared for the City of Livermore's proposed 2022 Stream Maintenance Projects (project). Proposed stream maintenance activities are described in the sections below.

The activities proposed in 2022 were identified and further prioritized based on the following.

- Guidance provided by SMP Maintenance Principles (Chapter 4, *Pre-Maintenance Planning Approach and Impact Avoidance*, of the SMP).
- The relative severity of reach conditions and need for maintenance.
- SMP framing considerations, management goals, and management triggers, as described under the corresponding approach in Chapter 4.
- Consideration of past/recent flooding conditions.
- Benefits to water quality, habitat, and recreation.
- Available funding.

Background

The 2022 SMP projects consists of a total of 19 projects at 10 site locations and an additional five (5) yearly maintenance projects at five (5) locations where site-specific investigation has determined that maintenance activities are necessary to restore stormwater conveyance capacity, reduce flood and fire hazards, and improve habitat value. All the proposed projects lie within the modified flood control channels and unmodified natural creeks within the City's SMP Area.

Of the total 19 SMP Projects, 11 projects will involve a combination of sediment, vegetation, and debris management, 3 projects will involve sediment and vegetation management and 5 projects will involve vegetation and debris management. The 5 Yearly Maintenance projects will involve 1 sediment removal project, two (2) vegetation management projects and 2 debris/trash removal projects. A discussion of the general project types and a list of specific projects is provided below, with summary descriptions of the work to be implemented at each site. Best Management Practices (BMP) will be implemented, as appropriate, at each project site to avoid and minimize adverse impacts. BMPs for the project activities are identified by project in Appendix C. Table 1 (below) summarizes project locations and stream reaches.

Impact Analysis and Documentation

For the purposes of this 2022 Notification, impacts are approximate and estimated based on preliminary site evaluations and pre-construction assessments. These estimates are subject to change based on changing site conditions from fluvial geomorphological changes between the time of authoring this report and project implementation. Other factors can also contribute to changes in impacts, including newly identified biological and cultural constraints, de-watering implications, and site access issues. Therefore, mitigation requirements for impacts to waters, riparian, and focal species will be finalized in the "Annual Post-Construction Report and Summary of 2022 Stream Maintenance Projects". All impact calculations will be based on as-built, post construction measurements.

Proposed Project Types and Project Need

The projects identified in this annual notification have been evaluated by City staff with support from the ACRCD and Swaim Biological, Inc. The projects represent the most urgent maintenance needs within the City's SMP Area. The urgency is based on the threat of flood or fire, risks to infrastructure, or public safety hazards. Projects are also prioritized for their potential to incrementally enhance habitat value for fish and wildlife. These projects were identified as maintenance priorities in the City's annual channel assessment and were chosen from a larger group of maintenance needs in accordance with the maintenance prioritization procedures laid out in the SMP Manual (Chapter 9). The maintenance principles, triggers, and "no unnecessary intervention framework" from Section 4 of the SMP Manual have been used as the defining baseline for determining project need.

Sediment, Vegetation, and Debris Management (Sites 46, 47, 48, 56, 57a, 57b, 57c, 58, 60, 64, 66)

Eleven sites will involve a combination of sediment, and vegetation, and debris management activities; primarily from or adjacent to engineered stream and stormwater conveyance structures. Eight of these projects involve outfall and outfall toe-drainage maintenance, involving sediment and vegetation maintenance operations. Three projects include maintenance under and around culverts or bridges. All maintenance sites will be graded in a manner that ensures the transition between the maintained and unmaintained areas is smooth and does not result in increased erosion or impacts to water quality.

These sites require maintenance to alleviate flooding risks while incorporating focus on enhancing natural resources. These sites have problematic vegetation growth along with sediment and debris accumulation that have impacted storm drain and stream conveyance structures to function as designed.

One or more of the following sediment management triggers from "Chapter 4, *Pre-Maintenance Planning Approach and Impact Avoidance"*, of the SMP have been met at each site.

- In-stream structures designed to direct flows for flood management are causing excessive sediment deposition.

- Sediment is accumulating in a way that supports excessive vegetation growth, threatening creek or channel capacity.
- In-stream hardscape requires sediment removal to maintain as-built functions.
- Sediment and vegetation management offers good opportunities to improve habitat value for fish and wildlife.

Sediment and Vegetation Management (Sites 61, 62,and 68)

Three (3) sites will involve a combination of sediment and vegetation management activities; removing sediment and vegetation from the channel. Vegetation removal at this site will typically be limited to removal of emergent vegetation, invasive plants, and small ornamental trees in the area where sediment will be excavated. Following removal of vegetation and sediment, the excavated areas will be graded in a manner that ensures the transition between the maintained and unmaintained areas is smooth and does not result in increased erosion and impacts to water quality.

Vegetation (Native and Invasive) and Debris Management (Sites 59, 63, 65, 67a, 67b)

Vegetation and debris management activities will occur at 5 sites and focus on the removal of herbaceous vegetation and/or pruning and limbing of non-native and native trees and shrubs. Vegetation is both reducing flood conveyance capacity and increasing erosion along the streambank by altering the course of water flowing through the channel, increasing the likelihood of damage to pedestrian trails. The overgrowth of invasive vegetation results in aggradation of vegetative debris further downstream. Vegetation management activities are intended to reduce fire hazards and prevent damage to infrastructure wherever possible, while enhancing creek and channel habitat to the maximum extent feasible. Two projects will focus on the limbing and/or removal of Arroyo willow where increased flooding risk is determined. Two projects will focus on the pruning of Himalayan blackberry that is reducing flow at storm drain outfalls. Trash will also be removed at sites where necessary.

These sites require some form of vegetation management and/or debris removal in order to maintain channel capacity, minimize damage to infrastructure, reduce fire fuels, and improve water quality/habitat. One or more of the following triggers have been identified at these sites.

- Vegetation growth and annual die-off is significantly increasing fire risk adjacent properties are at risk.
- Invasive nonnative plants are reducing the success of native vegetation
- Vegetation management offers good opportunities to improve habitat value for fish and wildlife.
- Trash and debris accumulation are impacting flood conveyance capacity of hardscape stream structures.
- Trash removal offers good opportunities to improve habitat value for fish and wildlife.
- Trash and decaying debris present a threat to fish, wildlife, and public health.

Yearly Maintenance Project Sites

The 2022 SMP Work Cycle will include 5 yearly maintenance projects at 5 sites. These sites have been determined to require regular maintenance and will therefore be included in the notification on an annual basis. These sites occur on pre-disturbed upland areas, sites where state waters mitigation has been previously fulfilled, and/or where minimal disturbance is anticipated.

These Yearly Maintenance Sites require some form of sediment, vegetation, debris, and/or trash management to maintain channel capacity, minimize damage to infrastructure, reduce fire fuels, enhance ecological function, and improve water quality. At least one or all of the triggers mentioned above can be applied to these Yearly Maintenance Sites.

Specific Projects and Locations

The following specific projects are proposed for the 2022 maintenance season (Table 1 provides details regarding the location and stream reach ID of each project). Appendix A contains figures which depict the regional context and local project site locations.

- **Sediment, Vegetation, and Debris Management (11 Projects)**
    - Bear Creek Basins – Outfall maintenance (SMP #46,47,48, 56)
    - Saddleback Basin – Grassed swale and Outfall maintenance (SMP #57a, 57b, 57c)
    - Arroyo Las Positas –Heather Lane and Bluebell Drive Culvert maintenance (SMP #58, 60)
    - Arroyo Mocho –Stanley Bridge maintenance (SMP #64)
    - Arroyo Mocho – Rockrose Street Culvert maintenance (SMP #66)
- **Sediment and Vegetation Management (3 Projects)**
    - Arroyo Las Positas – Springtown Open Space Outfall maintenance (SMP #61)
    - Arroyo Mocho – Robertson Park Dog Park Outfall maintenance (SMP #62)
    - Altamont Creek – Laughlin Road Culvert maintenance (SMP #68)
- **Vegetation (Native and Invasive) and Debris Management (5 Projects)**
    - Arroyo Las Positas – Hercules Court and Quince Court Vegetation management (SMP #59)
    - Arroyo Mocho – Robertson Park Invasive Vegetation management (SMP #63)
    - Arroyo Mocho Low Flow Channel – Vegetation and Debris management (SMP #65)
    - Collier Canyon Creek – Mitigation Area Vegetation Management (SMP #67a, 67b)
- **Yearly Maintenance Projects (5 Annual Projects)**
    - Arroyo Mocho – Holmes Street Bridge Sediment Removal (YM-1)
    - Arroyo Mocho (upland) – Medeiros Parkway fire breaks (YM-2)
    - Granada Channel – tree limbing and debris removal (YM-3)
    - Collier Canyon Creek - Debris rack cleaning Collier Canyon Road (YM-4)
    - Arroyo Las Positas – Trash/debris removal at Airway Blvd (YM-5)

Table 1. 2022 SMP Project Locations, Stream Reaches, and Land Uses

SMP Site	Location	Latitude	Longitude	Stream Reach ID[1]	Waterbody	Tributary to	Adjacent Land Use	Ownership
46	Sediment and Vegetation Outfall Management at Laughlin Road	37.727581	-121.711243	BS-1	Altamont Creek Tributary	Altamont Creek	Residential Development	Bluffs Homeowners Assn. / City maintenance
47	Sediment and Vegetation Outfall Management at Lake Drive	37.728881	-121.712807	BS-1	(Unnamed) Basin	Altamont Creek	Residential Development	Bluffs Homeowners Assn. / City maintenance
48	Sediment and Vegetation Outfall Management at Meadow Glen Drive	37.727247	-121.713784	BS-2	(Unnamed) Basin	Altamont Creek	Residential Development	Bluffs Homeowners Assn. / City maintenance
56	Sediment and Vegetation Outfall Management at Hillstone Court	37.727581	-121.711243	ACT-3b-2	Altamont Creek Tributary	Altamont Creek	Residential Development, Preserve, Open Space	City
57a	Saddleback Sediment and Vegetation Outfall Management and Debris from Raymond Road to Martingale Lane	37.728881	-121.712807	SDB	Saddleback Basin	Altamont Creek	Residential Development, Preserve	City
57b	Saddleback Sediment and Vegetation Outfall Management - Martingale Lane to Saddleback Basin	37.727247	-121.713784	SDB	Saddleback Basin	Altamont Creek	Residential Development, Preserve	City
57c	Saddleback Sediment, Vegetation and Debris Removal - Dalton Avenue and Ames Street	37.695043	-121.848615	SDB	Roadside ditch	Altamont Creek	Residential Development, Preserve	City

SMP Site	Location	Latitude	Longitude	Stream Reach ID[1]	Waterbody	Tributary to	Adjacent Land Use	Ownership
58	Heather Lane Culvert Sediment, Debris and Vegetation Management along Arroyo Las Positas	37.716259	-121.734066	ALP-12c, ALP-13ab	Arroyo Las Positas	Arroyo Mocho	Residential Development, Golf Course	City
59	Hercules Court and Quince Court Vegetation and Debris Management along Arroyo Las Positas	37.67139	-121.76494	ALP-12b	Arroyo Las Positas	Arroyo Mocho	Residential, Golf Course	City
60	Bluebell Drive Culvert Sediment, Vegetation and Debris Management along Arroyo Las Positas	37.67139	-121.76494	ALP-12ab	Arroyo Las Positas	Arroyo Mocho	Residential, Golf Course	City
61	Springtown Open Space Sediment and Vegetation Outfall Management along Unnamed Tributary to Arroyo Las Positas	37.715642	-121.745342	ALP-10a	Arroyo Las Positas Unnamed Tributary	Arroyo Las Positas	Residential Development	City
62	Robertson Park Sediment and Vegetation Outfall Management at Arroyo Mocho Floodplain	37.669659	-121.756746	AM-8b	Arroyo Mocho	Arroyo de la Laguna	Residential Development, Park	LARPD
63	West of Robertson Park Vegetation and Debris Management at Outfall and Arroyo Road Bridge along Arroyo Mocho	37.67151	-121.763047	AM-7a	Arroyo Mocho	Arroyo de la Laguna	Residential Development, Park	LARPD
64	Stanley Blvd Bridge and the Old Railroad Bridge Sediment, Vegetation, and Debris Management along Arroyo Mocho	37.678124	-121.789208	AM-4a	Arroyo Mocho	Arroyo de la Laguna	Residential, Commercial Development	City , Railroad

SMP Site	Location	Latitude	Longitude	Stream Reach ID[1]	Waterbody	Tributary to	Adjacent Land Use	Ownership
65	Arroyo Mocho Low Flow Channel Vegetation and Debris Management	37.6786661	-121.803337	AM-1a, AM-2-3, AM-4df	Arroyo Mocho	Arroyo de la Laguna	Residential	City
66	Rockrose Street Culvert and Outfall Debris and Sediment Management in Arroyo Mocho Low Flow Channel	37.6782784	-121.804302	AM-1bc	Arroyo Mocho	Arroyo de la Laguna	Residential	City
67a	Collier Canyon Mitigation Site A Vegetation Management along Collier Canyon Creek	37.7104491	-121.805535	CCC-7d	Collier Canyon Creek	Arroyo Las Positas	Residential, Agriculture	City
67b	Collier Canyon Mitigation Site B Vegetation Management along Collier Canyon Creek	37.71033	-121.805311	CCC-5a	Collier Canyon Creek	Arroyo Las Positas	Residential	City
68	Laughlin Bridge Culvert Sediment and Vegetation Management along Altamont Creek	37.7218367	-121.710514	AC-6ab, 7d	Altamont Creek	Arroyo las Positas	Residential	City, Zone 7
YM-1[2]	Holmes Street Bridge Annual Sediment Management	37.693969	-121.847168	AM-5a, AM-6c	Arroyo Mocho	Arroyo de la Laguna	Residential Development, Park	City
YM-2[2]	Medeiros Parkway Fire Break Vegetation Management	37.674051	-121.777169	AM-6	Arroyo Mocho Floodplain	Arroyo de la Laguna	Residential Development	Zone 7 (City Maintained))
YM-3[2]	Granada Channel Vegetation Management	37.675293	-121.795844	GC-1 to GC-2	Granada Channel	Arroyo Mocho	Residential Development	City
YM-4[2]	Debris Removal at Collier Canyon	37.711069	-121.805568	CCC-7bc	Collier Canyon Creek	Arroyo las Positas	Residential Development, Rangelands	City
YM-5[2]	Trash and Debris Removal at Airway Boulevard along Arroyo Las Positas	37.698611	-121.818161	ALP-3c	Arroyo Las Positas	Arroyo Mocho	Commercial Development	City
Mitigation Site	Robertson Park- Planting Extension, Arroyo Mocho	37.670833	-121.7606	AM 8	Arroyo Mocho	Arroyo de la Laguna	Residential Development and Park	LARPD

SMP Site	Location	Latitude	Longitude	Stream Reach ID[1]	Waterbody	Tributary to	Adjacent Land Use	Ownership
Mitigation Site	Golf Drive- along unnamed tributary	37.715642	-121.745342	ALP-10a	Arroyo Las Positas	Arroyo Mocho	Residential Development, Golf Course	City
Mitigation Site	Robertson Park Invasive Plant Management Plan- Arroyo Mocho	37.667998	-121.751201	AM-8a,9c	Arroyo Mocho	Arroyo de la Laguna	Public Facilities, Vineyards, Park	City/LARPD

Table 2. Impacts to Waters of the United States and the State of California[1]

Site	Maintenance Activity[2]	Estimated Impacts on Waters of the U.S./State[3]				Volume Excavated Sediment	Riparian Vegetation Impacts Summary
		Permanent Impacts[4]		Temporary Impacts[4]			
		(SF)	(LF)	(SF)	(LF)	(CY)[5]	
46	Sediment and Vegetation Outfall Management at Laughlin Road	16	4	400	12	3	One willow tree >4" DBH removed. <4" DBH to be removed ornamental privet trees, willow scrub, and two coast live oaks
47	Sediment and Vegetation Outfall Management at Lake Drive	16	4	500	10	5	One willow tree>4" DBH remove. <4-" DBH willow scrub and ornamental trees to be pruned
48	Sediment and Vegetation Outfall Management at Meadow Glen Drive	25	5	350	63	3	One coyote brush
56	Sediment and Vegetation Outfall Management at Hillstone Court	--	--	144	13	5	Cottonwood <4" DBH
57a	Saddleback Sediment and Vegetation Outfall Management and Debris from Raymond Road to Martingale Lane	--	--	1,820	390	39	Remove 6 willow and 1 mulefat, willow limbing to restore channel capacity
57b	Saddleback Sediment and Vegetation Outfall Management - Martingale Lane to Saddleback Basin	--	--	1,520	380	28	Remove 1 coyote brush, willow limbing to restore channel capacity
57c	Saddleback Sediment, Vegetation and Debris Removal - Dalton Avenue and Ames Street	--	--	450	150	17	None
58	Heather Lane Culvert Sediment, Debris and Vegetation Management along Arroyo Las Positas	--	--	9000	450	668	Cattail and tule
59	Hercules Court and Quince Court Vegetation and Debris Management along Arroyo Las Positas	--	--	--	--	--	Vegetation limbing and debris removal by hand, no tree removal over 4" DBH, no impacts to waters

Site	Maintenance Activity[2]	Estimated Impacts on Waters of the U.S./State[3]				Volume Excavated Sediment	Riparian Vegetation Impacts Summary
		Permanent Impacts[4]		Temporary Impacts[4]			
		(SF)	(LF)	(SF)	(LF)	(CY)[5]	
60	Bluebell Drive Culvert Sediment, Vegetation and Debris Management along Arroyo Las Positas	--	--	3,400	130	250	Cattail, tule, watercress
61	Springtown Open Space Sediment and Vegetation Outfall Management along Unnamed Tributary to Arroyo Las Positas	--	--	880	70	64	Cattail and tule
62	Robertson Park Sediment and Vegetation Outfall Management at Arroyo Mocho Floodplain	--	--	24	5	1.5	In channel native and non-native herbaceous, weedy vegetation
63	West of Robertson Park Vegetation and Debris Management at Outfall and Arroyo Road Bridge along Arroyo Mocho	--	--	3700	5	1.5	Himalayan blackberry removal with equipment on Arroyo Mocho floodplain, removal of 6 dead/dying Cottonwoods downstream of Arroyo Road Bridge
64	Stanley Blvd Bridge and the Old Railroad Bridge Sediment, Vegetation, and Debris Management along Arroyo Mocho	--	--	9000	100	50	Removal of vegetation and debris on concrete apron (3rd time)
65	Arroyo Mocho Low Flow Channel Vegetation and Debris Management	--	--	--	--	--	Vegetation limbing and debris removal by hand, no tree removal over 4" DBH, no impacts to waters
66	Rockrose Street Culvert and Outfall Debris and Sediment Management in Arroyo Mocho Low Flow Channel	--	--	270	100	20	None
67a	Collier Canyon Mitigation Site A Vegetation Management along Collier Canyon Creek	--	--	--	--	--	Vegetation limbing and debris removal by hand, no tree removal over 4" DBH, no impacts to waters

Site	Maintenance Activity[2]	Estimated Impacts on Waters of the U.S./State[3]				Volume Excavated Sediment	Riparian Vegetation Impacts Summary
		Permanent Impacts[4]		Temporary Impacts[4]			
		(SF)	(LF)	(SF)	(LF)	(CY)[5]	
67b	Collier Canyon Mitigation Site B Vegetation Management along Collier Canyon Creek	--	--	--	--	--	Vegetation limbing and debris removal by hand, no tree removal over 4" DBH, no impacts to waters
68	Laughlin Bridge Culvert Sediment and Vegetation Management along Altamont Creek	--	--	2400	100	178	Removal of one willow on upstream concrete apron
YM-1[2]	Holmes Street Bridge Annual Sediment Management	--	--	23748	350	700	In channel native and non-native herbaceous, weedy vegetation
YM-2[2]	Medeiros Parkway Fire Break Vegetation Management	--	--	--	--	--	Annual grasses and weeds. Regularly disturbed fire break footprint.
YM-3[2]	Granada Channel Vegetation Management	--	--	--	--	--	Pruning of native and nonnative trees, no removal
YM-4[2]	Debris Removal at Collier Canyon	--	--	--	--	--	None
YM-5[2]	Trash and Debris Removal at Airway Boulevard along Arroyo Las Positas	--	--	--	--	--	None
TOTALS		57 SF	13 LF	33, 858 SF	1,978 LF	1,333 CY	
[1] Table 2 summarizes total estimated waters impacts regardless of whether mitigation has already been fulfilled. Table 5 summarizes the true mitigation requirements for this ANP cycle							
[2] RWQCB Order No. R2-2016-0036 Table 1; No impacts to waters are assumed for upland staging areas (outside OHWM and top of bank)							
[3] These SMP projects impacts occur where in-stream, wetland, and riparian features can be considered both waters of the US and State							
[4] Impact areas are estimated, as built impacts will be finalized in the annual report and final mitigation will be completed based on those calculations.							
[5] Excavation quantity determinations are the estimated maximums based on excavation dimensions, not considering local topography. Actual as built excavation quantities will be documented in the SMP Annual Report.							
SF = square feet; LF = linear feet; CY = cubic yards; DBH = diameter at breast height (in inches); YM = Yearly Maintenance;							

Project Descriptions

A total of 19 project activities are proposed at 10 site locations. An additional 5 yearly maintenance projects are proposed at 5 additional locations. The extent of each project location is included in Appendix A. Representative photos of each of the project sites are provided in Appendix B.

Site 46 – Sediment and Vegetation Outfall Management at Laughlin Road

Proposed work at Site 46 was proposed in 2021 but not implemented. The work will consist of sediment removal and vegetation management from a storm drain outfall that is a component of The Bluffs neighborhood stormwater basin system which is identified in the SMP manual as part of the Bear Creek Basins system. The outfall is located at the northwest corner of Laughlin Road and Bluffs Drive in northeast Livermore. Riprap was installed at this site in 2017 to keep vegetation growth from obstructing the pipe, however, vegetation has grown in the riprap, capturing sediment and blocking flow. The work will occur at the outfall discharge area that accepts stormwater from Laughlin Road and surrounding drainage areas. The outfall discharge area is obstructed with sediment and vegetation, triggering flooding hazards to surrounding streets and homes.

The proposed work will encompass one day of work and requires excavating 3 CY of sediment and removing the previously installed riprap (installed under the SMP in 2017) from a permanently impacted (and previously permanently mitigated) 4-foot by 4-foot area (16 SF) at the storm drain outfall to a depth of approximately 24-inches. A 4-foot by 4-foot (16 SF, 5CY) concrete outfall will be installed in place of the riprap that was previously installed in 2017 because the riprap did not adequately minimize vegetation and sediment from filling in and obstructing the pipe. The concrete outfall will be fabricated off site and installed after the rip rap has been removed. The concrete outfall will allow for regular maintenance of the outfall area limiting the need to repeatedly impact aquatic resources and disturbance to surrounding habitat. This work will require minor localized grading around the storm drain outfall to reestablish the as-built grades and contours around the concrete outfall Approximately 3 CY of sediment and riprap will be excavated at the outfall and grading the surrounding area to original as-built design (temporary impact 400 SF).

Vegetation management will also need to occur along with sediment removal, as several trees are clustered around the outfall opening and are causing sediment accumulation issues. One willow tree with a trunk diameter greater than 4-inches DBH will be removed. Trees less than 4-inches DBH to be removed include ornamental privet trees, willow scrub, and two coast live oaks. Upon removal of sediment and vegetation, the outfall pipe will be hydro-cleaned using a vacuum truck to ensure the storm drainpipe is clear and functions correctly.

The work will be conducted with an excavator from south side of the basin slope (for access and staging see Figures in Appendix A). The site will be accessed from a ruderal access road that runs parallel with the sidewalk and fence line along Bluffs Drive. Staging will occur within the access limits and on Bluffs Drive.

Activities at Site 46 includes removal of a single pampas grass approximately 375 LF to the northwest of the Laughlin culvert at the Dry Creek Court cul-de-sac. Work will be performed by hand with assistance from an excavator to remove the root mass (temporary impact of 16 SF). Equipment will stage on the ruderal disturbed area between the end of the cul-de-sac and top of basin. No other work is proposed at the Dry Creek Court outfall. Dewatering is not anticipated to be necessary for the activities occurring at Site 46 as work is being conducted within the ephemeral stormwater basin that typically only receives flows on a seasonal basis.

Site 47 – Sediment and Vegetation Outfall Management at Lake Drive

Proposed work at Site 47 was proposed in 2021 but not implemented. The work will consist of sediment removal and vegetation management from a storm drain culvert inlet area that is a component of The Bluffs neighborhood stormwater basin system which is identified in the SMP manual as part of the Bear Creek Basins system. Riprap was installed at this site in 2017 to keep vegetation growth from obstructing the pipe, however, vegetation has grown in the riprap, capturing sediment and blocking flow. The work will occur at the upstream side of a 100-foot-long portion of a 12-inch basin culvert pipe that conveys flows under Lake Drive. The inlet is burdened with sediment and vegetation that is obstructing stormwater flows and is causing localized flooding to surrounding streets and homes.

The proposed work will encompass one day of work and requires excavating 5 CY of sediment and removing the previously installed riprap from a permanently impacted (and previously permanently mitigated) 4-foot by 4-foot area (16 SF) at the culvert inlet area to a depth of approximately 24-inches. A 4-foot by 4-foot (16 SF, 5 CY) concrete outfall will be installed as the riprap that was previously installed in 2017 has been filled in by sediment. The concrete outfall will be fabricated off site and installed after the rip rap has been removed. The concrete outfall will allow for regular maintenance of the outfall area limiting the need to repeatedly impact aquatic resources and disturbance to surrounding habitat. This work will require minor localized grading around the storm drain outfall to reestablish the as-built grades and contours around the concrete pad. Once sediment and riprap are excavated the surrounding area will be regraded to original as-built design (temporary impact 500 SF).

Vegetation management will also need to occur with sediment removal, as one arroyo willow tree is blocking the culvert opening and is contributing to sediment accumulation issues. This arroyo willow tree with a trunk diameter greater than 4-inches DBH will be removed. Some willow scrub and nonnative ornamentals less than 4-inches DBH will be pruned for access, but none will be removed completely. Upon removal of sediment and vegetation, the culvert pipe will be hydro-cleaned using a vacuum truck to ensure the storm drainpipe is clear and functions correctly.

The work will be conducted with an excavator from the north of the inlet culvert pipe along the side of the basin slope (for access and staging see Figures in Appendix A). Dewatering is not anticipated to be necessary at Site 47, as work is being conducted at an ephemeral stormwater basin that typically only receives flows on a seasonal basis.

Site 48 – Sediment and Vegetation Outfall Management at Meadow Glen Drive

Proposed work at Site 48 was proposed in 2021 but not implemented. The work will consist of sediment removal and vegetation management from a storm drain outfall that is a component of The Bluffs neighborhood stormwater basin system which is identified in the SMP manual as part of the Bear Creek Basins system. The outfall is located near the dead end of the northern portion of Meadow Glen Drive in northeast Livermore. Sediment buildup and an adjacent coyote brush shrub along with nonnative grass/forb growth have affected the function of the outfall. Included with the outfall work is erosion repair. An erosion rill has formed from the outfall discharges, likely caused from outfall obstruction and improper function.

The proposed work will encompass one day of work and consists of excavating and removing the coyote brush shrub and sediment from a 5-foot by 5-foot area (25 SF) at the storm drain outfall to a depth of 18-inches and grading the surrounding area to original as-built design (temporary impact of 75 SF). Once excavated, a silt barrier fabric and 6-inch layer (1 CY) of ungrouted riprap will be placed in the bottom of the impacted excavated area to minimize erosion and vegetation regrowth (permanent impact of 25 SF). Erosion repair will involve using a backhoe to repair the incised rill and regrade a 3-foot by 60-foot (180 SF) drainage that will result in temporary impacts. Approximately 3 CY of sediment will be excavated at the outfall and grading will involve 1.5 cubic yards of soil movement within the work area. The erosion repair will be regraded and a non-mesh coconut blanket with native seed mix will be installed.

The work will be conducted with an excavator and backhoe, immediately adjacent to the outfall and erosion rill area. The work area will be accessed from a previously disturbed access road at the end of Lake Court (for access and staging see Figures in Appendix A). Impacts to waters are not anticipated for access as the route is at the top of the basin bank and is regularly disturbed. Dewatering is not anticipated to be necessary at Site 48, as work is being conducted at an ephemeral stormwater basin that typically only receives flows on a seasonal basis.

Site 56 –Sediment and Vegetation Outfall Management at Hillstone Court

Proposed work at Site 56 will consist of sediment removal and vegetation management from a storm drain culvert outlet area that is a component of The Bluffs neighborhood stormwater basin system which is identified in the SMP manual as part of the Bear Creek Basins system. Vegetation has grown in the riprap apron which is capturing sediment and blocking flow. The work will occur at the outlet of the 12-inch concrete pipe that conveys storm flows from Hillstone Court.

The proposed work will encompass one day of work and will include temporary impacts to excavate a 12-foot by 12-foot area (144 SF / 5 CY) around the pipe outfall, removing the previously installed riprap, removing vegetation (including 4 cottonwoods, less than 4" DBH) and excavating to a depth of approximately 12-inches to restore the freeboard around the outfall. Removed riprap will be replaced in kind and grades restored to original contours to allow flow to reach the basin without backing up the outfall.

The work will be conducted with an excavator and loader that will access the basin from the north using existing access roads (for access and staging see Figures in Appendix A). Dewatering is not anticipated to be necessary as work is being conducted at an ephemeral stormwater basin that typically only receives flows on a seasonal basis.

Site 57a – Saddleback Sediment and Vegetation Outfall Management and Debris from Raymond Road to Martingale Lane

Proposed work at Site 57a will consist of sediment and vegetation removal from a storm drain outfall and a 390 LF earthen stormwater swale (Swale A) that starts near the corner of Raymond Road and Ames Street. These structures were installed in 1998/1999 and associated with the adjacent Saddleback residential development. Together, the storm outfall and earthen swale collects stormwater from the nearby PG&E facilty, the Dalton Reservoir and access road, and overland surface flow from the hillsides above the Saddleback development. The swale has been filled in with sediment over time and is no longer capturing stormwater but is instead overflowing in the grassy area that ends up flowing onto the adjacent Ames Street. The storm outfall has a rock rip rap apron that is completely filled in with sediment and cattails. The resulting overflow is contributing to surface water accumulation on the roadway causing public safety hazards and concerns.

The proposed work will encompass one day of work and includes temporary impacts to excavate the earthen swale for 390 LF to as built designs (4 feet wide by 0.5 feet deep) including removal of 1560 SF / 30 CY of sediment and removal of five willows (Salix sp.) and one mugwort (Artemisia douglasiana) that are growing within the bottom of the swale. The remaining trees on site will be selectively limbed up and woody debris removed. The storm drain outfall rip rap apron will be cleared and approximately 260 SF / 9 CY of sediment and vegetation (cattails) removed to clear the rip rap outfall to allow for capture of storm flow.

The site will be accessed from Martingale Lane and equipment work access will occur in a 12 foot area parallel to the grassed swale. Equipment will be staged on the street (for access and staging see Figures in Appendix A). Work will be conducted with a mini rubber tracked excavator, a dump truck and a loader. Sediment, vegetation and debris will be hauled to the Vasco dump or the waste water treatment plant for later disposalas there is not an appropriate location to stage materials or leave chipped vegetation on site, dewatering is not anticipated to be necessary.

Site 57b - Saddleback Sediment and Vegetation Outfall Management - Martingale Lane to Saddleback Basin

Proposed work at Site 57b will consist of sediment and vegetation removal from a 380 LF earthen stormwater swale that connects to Swale A which connects to a culvert/storm drain north of Martingale Lane and travels under the street, outfalling into a grassed swale to the south (Swale B). Swale B is obstructed with cattails for approximately 150 LF and filled with sediment, willows and coyote brush for the remaining extent.

The proposed work will encompass one day of work and will include temporary impacts to excavate Swale B for 380 LF to as built conditions (4 feet wide by 0.5 feet deep) including removal of 1520 SF / 28 CY of sediment/vegetation and removal of one coyote brush (Baccharis pilularis) that is growing within the bottom of the swale. The remaining trees on site will be limbed up and downed woody debris that is within the swale will be removed.

The site will be accessed from Martingale Lane and equipment work access will occur in a 12 foot area parallel to the grassed swale. Equipment will be staged on the street (for access and staging see Figures in Appendix A). Work will be conducted with a mini rubber tracked excavator, a dump truck and a loader. Sediment, vegetation and debris will be hauled to the Vasco dump or the waste water treatment plant for later disposal as there is not an appropriate location to stage materials or leave chipped vegetation on site, dewatering is not anticipated to be necessary.

Site 57c – Saddleback Sediment, Vegetation and Debris Removal - Dalton Avenue and Ames Street

Proposed work at Site 57c will consist of sediment removal from an approximately 150 LF roadside v-ditch that collects stormwater flow from Ames Street. The v-ditch connects to a culvert/storm drain on the corner of Dalton Ave. and Ames St. and then outfalls south of the road. The v-ditch is filled in with sediment and grasses affecting capacity and the designed road pattern. The ditch no longer conveys flow from the road to the storm drain, resulting in seepage and standing water on the road. The outfall southwest of the Dalton/Ames corner is also filled with trash, vegetation (tumbleweeds and perennial pepperweed) and debris.

The proposed work will encompass one day of work and will include temporary impacts to excavate the 150 LF v-ditch 3 feet wide and 1 foot deep and will include removal of 450 SF / 17 CY of sediment. There is an approximately 3 foot by 5 foot rip rap apron at the culvert inlet that will be removed and replaced in kind. Vegetation, trash and debris removal from the southern storm drain outfall will be conducted by hand and/or vaccum truck, dewatering is not anticipated to be necessary.

Work to restore the v-ditch will be conducted with a mini rubber tracked excavator, a dump truck and a loader. Equipment will stage on the road/sidewalk with traffic control (for access and staging see Figures in Appendix A). Sediment, vegetation, trash and debris will be hauled off as there is not an appropriate location to stage materials on site.

Site 58 – Heather Lane Culvert Sediment, Debris and Vegetation Management along Arroyo Las Positas

Proposed work at Site 58 consists of managing debris, vegetation, and sediment at the box culvert structure upstream and downstream of the Heather Lane culvert along Arroyo Las Positas. Work was done at this site in 2017, 2019, and 2021 but debris, vegetation, and sediment annually accumulate. Work was completed in 2019 to establish a low flow channel on the south side of the Arroyo Las Positas through this reach and vegetation, trash and debris management has been conducted within the limits of the concrete aprons of the cuvlert. Despite ongoing maintenance efforts immediately surrounding the culvert, localized flooding continues to occur at this location during storm events resulting in damage to adjacent residential properties. Cattail and tule reestablish annually and impact storm flow conveyance at this location due to a combination of factors and the culvert area also catches considerable amounts of debris and trash from upstream non-point sources. The City is actively evaluating a long term solution evaluating the potential to replace the structure at Heather Lane or establishing by-pass flows. In the interim, the City is proposing extending vegetation and sediment management to address the challenges immediately upstream and downstream of the box culvert.

The proposed work is anticipated to take five (5) to seven (7) days and includes temporary impacts associated with sediment, vegetation and debris removal in four locations. The stream is perennial in this stretch and the site will be dewatered to conduct project activities (see dewatering plan below). At the culvert, a concrete apron with wingwalls lines the channel bed and banks for 20-feet upstream and downstream. Inset paver stones line the channel bottom where the concrete aprons end/begin.

(1) Upstream: Clear debris and sediment 100 LF upstream of the culvert to the paver stones in the channel bottom. Temporary impacts will occur in 2,800 SF / 208 CY.
(2) In culverts: Clear sediment within the two box culverts, approximately 60 LF / 800 SF / 60 CY, under the bridge to the concrete bottom. Work will be completed with small hand-push compact track loader to push the sediment into a place that it can be removed with the excavator staged on the top of the bank.
(3) Immediately Downstream: Remove sediment and vegetation approximately 50 by 150 feet (4,000 SF / 296 CY) to the paver stones in the channel bottom.
(4) Downstream Low Flow Channel: Remove sediment and vegetation to the channel bottom to establish a low flow channel on the north side of the stream approximately 10 by 140 feet (1,400 SF / 104 CY) to connect the outfall at Quince Court. The low flow channel will be established to follow the natural contours of the streambank to ensure the ability for the low flow channel to naturally meander within the reach. The outfall at Quince Court was connected across the channel to the southern low flow channel in 2019. This work will ensure the outfall which often backs up is cleared and will create additional connectivity to allow for positive flow to continue downstream during storm events and prevent back up of stormwater into Quince Court and Heather Lane during storm events.

Debris and sediment removal will be performed from the top of bank with an excavator, loader, dump truck and vacuum truck which will be staged outside of the channel. The work area will be accessed from Heather Lane and the adjacent pedestrian trails/access roads. Equipment will be staged outside of the stream with the exception of equipment used to install and maintain a dewatering system and to remove sediment within the culvert (for access and staging see Figures in Appendix A).

Depending on saturation and moisture rates, sediment and vegetation spoils will be staged to dry in the central region of the golf course to the west. This area has been used in previous years as a sediment/vegetation drying site (see figures Appendix A).

A clear water diversion consisting of a gravel bag berm wrapped in visqueen plastic will be installed upstream of Heather Lane bridge prior to work. Flows will be temporarily diverted through a pipe downstream of the project area to maintain flow. The site will be dewatered and surveyed by qualified biologists who will inventory and relocate all aquatic life that is observed during dewatering. Diversion activities will be conducted in accordance with California Stormwater Quality Association (CASQA) NS-5: Clear Water Diversion and SMP BMP BR-4, Impact Avoidance and Minimization During Dewatering.

The details and mapping presented in this Notification are preliminary and a full design set is being generated by the City.

Site 59 – Hercules Court and Quince Court Vegetation and Debris Management along Arroyo Las Positas

Proposed work at Site 59 involves willow limbing within two locations along the southern banks of the Arroyo Las Positas between Hercules Court and Quince Court. This work is focused on removal of dead willow branches and downed woody debris that is impacting flow and contributing to fire fuel concerns.

The total invasive vegetation management area encompasses approximately 280 LF / 7,000 SF with no ground disturbance proposed. This work will focus on limbing willows under the direction of a certified arborist and biologist. No arroyo willows greater than 4-inches DBH are proposed to be removed. Small (<4-inches DBH) nonnative and native trees and plants will be removed if they are causing a potential flood hazard. Approximately 5-10% of the total canopy will be removed. Work will be conducted with chainsaws and hand labor operating from the former golf course and pedestrian trail to ensure low-impact removal operations.

This work entails limbing native arroyo willows for tree health and habitat improvements therefore no impacts to waters is assumed. The work will likely enhance the local ecological function while reducing fire fuels. The work area will be accessed from the adjacent pedestrian trails and decommissioned golf course. Willow cuttings will be chipped and repurposed as mulch for onsite landscaping and restoration. Work at site 59 is anticipated to take three (3) to (5) days and will occur in September and October, after the conclusion of nesting bird season.

Site 60 – Bluebell Drive Culvert Sediment, Vegetation and Debris Management along Arroyo Las Positas

Proposed work at Site 60 consists of managing debris, vegetation, and sediment at the box culvert structure of the Bluebell Drive culvert along Arroyo Las Positas. Work was done at this site in 2017, 2019, and 2021 however the entirety of the culvert has never been succesfully cleared. Work in 2019 and 2021 cleared sediment from two of the five box culverts and the southern concrete apron. Sediment remains in three of the five boxes and on portions of the upstream concrete aprons. This work is focused on removing sediment and vegetation to maintain the connectivity of the low-flow channel and keep the stream functioning and to reduce flooding. Cattail, tule, and Nasturtium species reestablish annually in the channel and impact storm flow conveyance at this location. The culvert area also catches debris and trash from upstream non-point sources.

The proposed work will encompass one day of work and includes temporary impacts associated with sediment, vegetation and debris removal. The stream is perennial in this stretch and the site will be dewatered to conduct project activities (see dewatering plan below). At the culvert, a concrete apron with wingwalls lines the channel bed and banks 20-feet on both sides of the bridge where the channel is 75-feet wide (top-of-bank to top-of-bank).

Debris, sediment and vegetation removal will be conducted in-stream for 130 LF with an excavator, small hand-push compact track loader (under culvert), dump truck and vacuum truck within 3,400 SF / 250 CY. The work area will be accessed from Bluebell Drive and the adjacent pedestrian trails (for access and staging see Figures in Appendix A).

Depending on saturation and moisture rates, sediment and vegetation spoils will be staged to dry in the central region of the golf course to the west. This area has been used in previous years as a sediment/vegetation drying site (see figures Appendix A). A clear-water diversion consisting of a gravel bag berm wrapped in visqueen plastic will be installed prior to work. Flows will be temporarily diverted to the southern side of the stream to maintain flow. The site will be dewatered and surveyed by qualified biologists who will inventory and relocate all aquatic life that is observed during dewatering. Diversion activities will be conducted in accordance with California Stormwater Quality Association (CASQA) NS-5: Clear Water Diversion and SMP BMP BR-4, Impact Avoidance and Minimization During Dewatering.

Site 61 – Springtown Open Space Sediment and Vegetation Outfall Management along Unnamed Tributary to Arroyo Las Positas

Proposed work at Site 61 will occur along a small drainage ditch near Golf Drive in the Springtown Open Space(former Springtown Golf Course). The drainage ditch connects to an unnamed tributary that discharges into the old Springtown golf course diversion pond and eventually connects to the Arroyo Las Positas. This ditch captures stormwater from the open space areas and neighborhood. Work was completed at this location as well as the downstream portions of Golf Creek Drive in 2020.

The proposed work will encompass one day of work and will include the removal of dense sections of cattail and sediment at the outfall as well as removal of cattails downstream for 70 LF totalling 880 SF to a depth of 24" (64 CY).

Work will be performed with an excavator and dump truck. Equipment and material staging will occur along the adjacent graveled access road/trail. Depending on saturation and moisture rates, sediment and vegetation spoils will be staged to dry in the central region of the golf course to the north. This area has been used in previous years as a sediment/vegetation drying site (for access and staging see figures in Appendix A).

This drainage ditch is intermittent from occassional urban runoff. Flows are nonexistent or much lower in the summer. However, if flowing water is present a clearwater diversion technique will be utilized, options include a filter fabric isolation barrier, or an impervious gravel bag berm will be installed along with downstream sediment control BMPs. Diversion activities will be conducted in accordance with California Stormwater Quality Association (CASQA) NS-5: Clear Water Diversion and SMP BMP BR-4, Impact Avoidance and Minimization During Dewatering.

Site 62 – Robertson Park Sediment and Vegetation Outfall Management at Arroyo Mocho Floodplain

Proposed work at Site 62 will consist of sediment and vegetation removal in the vicinity of an 18-inch storm drain outfall in the Arroyo Mocho floodplain. The outfall conveys storm drain flows into a drainage ditch that connects to the Arroyo Mocho. Work was conducted in 2017 to clear the outfall and v-ditch that connects to the Arroyo Mocho. Since then, sediment and vegetation (cattails) have accumluated around the outfall and restricted the flow from the outfall into the v-ditch.

The proposed work will be completed in one day and involve excavating sediment and removing vegetation from an approximately 5-foot by 5-foot area (24 SF, 1.5 CY) at the storm drain outfall to a depth of approximately 24 inches to restore flows from the outfall to the v-ditch.

The site will be accessed from the adjacent gravelled and disturbed parking lot and equipiment where equipment will be staged (for access and staging see Figures in Appendix A). Work will be conducted with an excavator from the disturbed habitat to the east of the outfall.

Site 63 – West of Robertson Park Vegetation and Debris Management at Outfall and Arroyo Road Bridge along Arroyo Mocho

This work at Site 63 was proposed in 2021 but was not implemented. The work consists of vegetation and debris management at a storm drain outfall that connects to the Arroyo Mocho downstream of Robertson Park. The outfall is positioned along the south mid-bank and is being affected by overgrowth of invasive Himalayan blackberry and associated downed woody debris. Work will occur in an approximately 3700 SF area where equipment will be operated to remove Himalayan blackberry and other downed woody debris to access and clean the outfall.

The proposed work will encompass one day of work and consists of removal of Himalayan blackberry thickets in order to remove the blockage of the outfall and will involve excavating sediment from an approximately 5-foot by 5-foot area (24 SF, 1.5 CY) at the storm drain outfall to a depth of approximately 24 inches. To reduce blackberry regrowth, herbicide will be applied directly to cut stumps per the SMP BMPs outlined in Chapter 7 of the SMP manual. Blackberry will be offhauled and properly disposed of, removed downed woody debris will be chipped on site and used for mulch along the trails. Downstream of the Arroyo Road bridge there are 6 dead and/or dying cottonwood trees that will be removed. They are on the banks of the stream, below the top of bank but outside of the active flow channel. The trees need to be removed to address public safety hazards as the trees have the potential to fall on the bridges and trails and could provide flood hazards if they fall within the active flow channel.

This work entails only invasive plant management and will enhance riparian habitat and local ecological function; therefore, the work is considered self-mitigating. Himalyan blackberry work will be conducted with mini excavator, loader, dump truck chainsaws, and hand tools. Tree removal will be conducted with hand tools and chainsaws to remove the trees. Trees will be chipped on site and placed in upland landscape areas adjacent to the trail. The work area will be accessed from the adjacent pedestrian trails (for access and staging see Figures in Appendix A).

Site 64 – Stanley Blvd Bridge and Old Railroad Bridge Sediment, Vegetation, and Debris Management along Arroyo Mocho

Proposed work at Site 64 will consist of sediment, vegetation, and debris removal from a concrete bridge apron between the Stanley Blvd. Bridge and the decommissioned railroad bridge. Work was completed at this site in 2017, 2019 and 2021; however, sediment, vegetation and debris accumulate annually at the site. The site needs to be routinely maintained due to complications with public safety around use of the site by homeless individuals when significant vegetation and debris are present. Scour pools are present on the downstream concrete apron where the apron connects to the natural channel bed. In 2021, quarter ton rip rap was installed in the western most scour pool and backfilled with gravel. This repair was successful in reducing additional scour and therefore additional rip rap is proposed to be installed to extend the scour pool repairs.

The proposed work will encompass one day of work and consists of removing sediment, debris and vegetation less than 4” DBH that establishes on the concrete apron. Approximately 50 CY of vegetation and debris will be removed. In addition to the concrete apron maintenance, 25 CY of native course gravel fill from upstream projects or staged material from previous projects and additional 25 CY of quarter ton rip rap will be placed within the remaining scour pools that have formed at the toe of the concrete apron from the Old Railroad

Bridge. In total the work along the apron and within the channel bed is estimated to account for 9,000 SF/ 100 LF (maximum) of temporary impacts and as-built conditions will be documented in the annual report.

Work will be conducted with a backhoe from the channel bed. The work area will be accessed from the eastern pedestrian trail (for access and staging see Figures in Appendix A). Vegetation will be chipped onsite and spread for upper terrace erosion control along the trail boundary, trash and debris will be off hauled and properly disposed. Dewatering is not expected to be necessary for work at this site. The Arroyo Mocho is naturally ephemeral and as of this report, Zone 7 does not plan to release aqueduct flows for groundwater recharge.

Site 65 – Arroyo Mocho Low Flow Channel Vegetation and Debris Management

Proposed work at Site 65 involves removal of downed woody vegetation and debris that has accumulated within the low flow channel. This work is focused on removal of dead and downed woody debris that is impacting flow, has the potential to clog road culverts at Summertree Drive, and is contributing to fire fuel concerns. This low flow channel occurs within a residential area along the Arroyo Mocho bike trail.

Vegetation management will occur for approximately 4,000 linear feet starting at the gate valve where the low flow channel starts adjacent to the Stanley Reach. This work will only remove downed woody debris within the channel and smaller trees and shrubs less than 4" DBH. Multiple storm outfalls connect to this low flow channel and those outfalls will be cleared by hand and weed whacked to ensure flow is maintained. This will not contribute to removal of any large trees and will not result in canopy cover. Work will be conducted with chainsaws and hand labor operating from the adjacent pedestrian trail to ensure low-impact removal operations (for access and staging see Figures in Appendix A). Removed debris will be chipped and repurposed as mulch for onsite landscaping and restoration.

Site 66 –Rockrose Street Culvert and Outfall Debris and Sediment Management in Arroyo Mocho Low Flow Channel

Proposed work at Site 66 will consist of one day of work clearing downed woody debris, trash and sediment from the Arroyo Mocho low flow channel west of Rockrose Street in a residential neighborhood. Within this reach, a 42-inch concrete culvert travels under Rockrose Street. Two 12-inch concrete storm drains outfalls also connect at this location. These three structures convey flows into an approximately 80-foot by 20-foot settling area, which connects to another 42-inch concrete culvert approximately 50 feet downstream. This culvert connects the low flow channel to the Arroyo Mocho Zone 7 flood control channel (also known as the Stanley Reach) where it outfalls under a maintenance road/trail approximately 50 feet to the west.

The channel between the two 42-inch culverts is obstructed by downed woody debris, trash, leaf litter and sediment buildup within the channel that have the potential to obstruct flow as the debris and sediment mobilize during storm events. To prevent clogging of the western most culvert, sediment and debris removal will be conducted.

The work encompasses one day of work and extends approximately 100 feet downstream (west) from Rockrose Street. The proposed work consists of excavating an approximately 10-foot by 20-foot area (200 SF) at the outlet of the eastern 42-inch culvert to a depth of approximately 24 inches (15 CY); the two 12-inch storm outfalls will also be cleared. Further downstream at the western 42-inch culvert, an approximately 10-foot by 7-foot area (70 SF) at the inlet will also be excavated to a depth of 24 inches (5 CY). These two areas are assumed to be temporarily impacted. Instream impacts will occur associated with equipment movement between the two excavation locations. All excavation work will be conducted with an excavator and/or loader that will access the stream from the adjacent pedestrian trail. Equipment will stage outside of the creek on the trail and Rockrose Street (for access and staging see Figures in Appendix A). The adjacent riparian restoration area will be flagged and avoided. While water is not expected to be present at the time of work, the Zone 7 Water Agency has the ability to control flows through Site 8 and the timing of flows may be coordinated in advance of work, if necessary.

Site 67a – Collier Canyon Mitigation Site A Vegetation Management along Collier Canyon Creek

Proposed work at Site 67a involves removal of downed woody vegetation and debris that has accumulated within the Upper Collier Creek Habitat Mitigation Site A located within Collier Canyon Creek at the northern edge of the City limits. This mitigation area is associated with the Ryland Homes Townhouse Project that occurred in 2001; the mitigation areas were installed in the winter of 2005/2006. This work is focused on removal of dead and downed woody debris that is a fire and fuels hazard and has the potential to clog road culverts downstream.

Vegetation management will occur for approximately 300 linear feet within the Mitigation Site A. This work will only remove downed woody debris within the channel and smaller trees and shrubs less than 4” DBH. This will not contribute to removal of any large trees and will not result in changes to canopy cover. Work will be conducted with chainsaws and hand labor operating from the adjacent access road to ensure low-impact removal operations (for access and staging see Figures in Appendix A). Removed vegetation and debris will be chipped and repurposed as mulch for onsite landscaping in appropriate upland areas as approved by a qualified biologist or off-hauled.

Site 67b – Collier Canyon Mitigation Site B Vegetation Management along Collier Canyon Creek

Proposed work at Site 67b involves removal of downed woody vegetation and debris that has accumulated within the Upper Collier Creek Habitat Mitigation Site B located within Collier Canyon Creek, located parallel to Collier Canyon Road between Campus Loop Road and Heligan Lane. This mitigation area is associated with the Ryland Homes Townhouse Project that occurred in 2001; the mitigation areas were installed in the winter of 2005/2006. This work is focused on removal of woody debris and invasive vegetation (Himalayan blackberry) that is a fire hazard and is rerouting stream flow and contributing to reduced flow at the two 42-inch concrete culverts that convey flows under Heligan Lane and Collier Canyon Road.

Vegetation management will occur for approximately 200 LF within the Mitigation Site B. This work will only remove downed woody debris within the channel and smaller trees and shrubs less than 4” DBH. This will not contribute to removal of any large trees and will not result in canopy cover. Additionally, a dense thicket of Himalayan blackberry (approximately 200 SF) that is completely blocking flow into one of the concrete culverts will be removed. Work will be conducted in three (3) to five (5) days with chainsaws and hand labor operating from the adjacent public roads to ensure low-impact removal operations (for access and staging see Figures in Appendix A). Removed vegetation and debris will be chipped and repurposed as mulch for onsite landscaping in appropriate upland areas as approved by a qualified biologist or off-hauled.

Site 68 – Laughlin Bridge Culvert Sediment and Vegetation Management along Altamont Creek

Proposed work at Site 68 consists of managing sediment at the box culvert structure of the Laughlin Drive Bridge along Altamont Creek. At the culvert, a concrete apron with wingwalls lines the channel bed and banks 20-feet upstream and 25-feet downstream of the bridge where the channel is 40-50-feet wide (top-of-bank to top-of-bank). Sediment build up has occurred within the box culvert with enough sediment present that a willow tree has established on the upstream concrete apron. This work is focused on removing the willow and sediment to keep the stream functioning and reduce flooding. Sediment has established however emergent vegetation is not present.

The proposed work will be completed in one day and includes temporary impacts associated with sediment and willow removal. The stream is seasonal in this stretch and it is assumed work can be conducted in the fall during dry conditions without the need to dewater. Sediment removal will be conducted with an excavator, small hand-push compact track loader (under culvert), dump truck and vacuum truck. Approximately 2,400 SF / 178 CY of sediment will be removed along 100 LF of the stream (maximum estimated temporary disturbance). The work area will be accessed from the adjacent pedestrian trail on the downstream portion and from adjacent private land on the upstream portions (for access and staging see Figures in Appendix A).

Excavated or vacuumed materials will be off-hauled and disposed of properly. The willow tree will be chipped on site with mulch being placed in appropriate upland areas along the pedestrian trail.

SMP Yearly Maintenance Site 1 (YM-1) – Holmes Street Bridge Annual Sediment Management along Arroyo Mocho

Proposed work at Site YM-1 will consist of sediment removal from the channel of the Arroyo Mocho, in an area extending 150 feet upstream and 170 feet downstream of the Holmes Street bridge, as well as the area of the channel beneath the bridge. Work within the proposed 2022 project site footprint has already occurred three times during the 2017, 2018, and 2020 SMP work cycles (see Table # 3). Annual sedimentation issues require sediment removal at this site to be performed on an annual basis which is why it is now included as a Yearly Maintenance Project.

This bridge is a concrete structure supported by piers. Continued sediment buildup around this bridge has restricted the storm flow conveyance in the channel and flood capacity of the stream. The design and location of the bridge structure has created conditions that causes excessive and chronic sediment deposition issues. The City recognizes the need for a long-term solution to sedimentation issues in this area and has commissioned a geomorphic study of possible comprehensive solutions. In the meantime, routine work is needed to maintain this site. The proposed work consists of excavating and grading gravel and debris from a 355 linear foot area under and surrounding the bridge (23,748 SF total) to a depth of 1 to 4-feet. Grading and channel restoration will be performed in an area extending approximately 150 feet upstream and 170 feet downstream and beneath the bridge (totaling 355 LF), to tie-in to the existing unmaintained stream section grades.

The 2022 work will occur within the same boundaries of the 2020 footprint, which accounted for the third temporary impact requiring state waters/riparian mitigation (SMP 8.2.1 Footnote 1). Final impacts will be calculated based on post-construction as-built disturbance dimensions.

Work will be conducted with a bulldozer and a compact track loader (under bridge) to push substrate to an area of the streambed that is accessible to an excavator operating from the top-of-bank. Equipment will not be operated or tracked across any surface water. The upland gravel areas adjacent to the access roads will be utilized for equipment and material staging. Sediment will be eventually transported to off-site staging locations or immediately repurposed at other sites, including SMP Sites 50 and 51A, via dump trucks operating from the eastern or western paved trails. Any woody debris in the channel that is removed will be relocated in beneficial upland locations for habitat, or, if necessary, disposed as green waste at a landfill. Depending on saturation levels, the sediment removed from the channel will be temporarily stockpiled to dry in an upland area that is greater than 100-feet away from the streambank with sediment control BMPs. In total, approximately 700 CY of sediment will be excavated, this estimate is based on quantities removed in 2020.

Upstream and downstream areas of the reach are characterized predominantly by barren gravel and cobble with mixed annual grasses and wetland herbaceous species with no vegetation growth beneath the bridge. Once the work is complete, the channel will be graded so that the transition between excavated area and existing channel is smooth and continuous. Final impacts will be documented in the SMP Annual Report.

Water is not expected to be present at the time of work as the Zone 7 Water Agency controls flows along Arroyo Mocho and at this point they have no plans to release aqueduct flows in the summer. If dewatering is necessary, a cofferdam, pump, and re-routing pipeline will be used together to dewater the section of creek. Cofferdams will be constructed of gravel bags and plastic sheeting or, if necessary, an inflatable rubber cofferdam will be used. Pumping rates will be set to match inflows to the cofferdam with the downstream release of the diverted flows. The diverted flows will be released back into the creek as close as possible to the downstream end of the project area. Silt bags will be used at the end of the diversion pipe to reduce any sediment discharge downstream and to dissipate flow velocity and prevent scour at the discharge site. Dewatering activities will be conducted in accordance with BMP BR-4, Impact Avoidance and Minimization During Dewatering, to ensure impacts on water quality and special-status species are avoided or minimized to the maximum extent practicable.

SMP Yearly Maintenance Site 2 (YM-2) – Medeiros Parkway Fire Break Vegetation Management

Proposed annual maintenance at Medeiros Parkway will consist of vegetation management along existing fire roads on the north and south side of the Arroyo Mocho, within the floodplain of the stream but outside the waters of the US. This work is carried out every year in the late spring; vegetative regrowth requires annual maintenance. This area is a linear polygon along existing access roads and accounts for approximately 143,000 SF. This work will be conducted by a bulldozer to remove overgrown vegetation along fire roads to reduce fuel loads and ensure floodplain capacity. Heavy equipment and vehicles will remain on existing fire breaks. This area is characterized by nonnative annual grasses mixed with scattered almond trees and native trees and woody shrubs. Wildfires pose a significant threat to homes near this site and fires have historically occurred within this reach. As such, the proposed vegetation management work at this site is intended to reduce fuel loads and the threat of fire as described in the Order R2-2016-0036. No impacts are assumed because of the regular maintenance occurring along the fire break corridors. SMP BMPs and biological conservation measures will occur to protect listed species, nesting birds, and water quality.

SMP Yearly Maintenance Site 3 (YM-3) – Granada Channel Vegetation Management

Proposed annual maintenance along Granada Channel consists of pruning and occasional removal of landscape trees and shrubs (native and ornamental species) planted along the eastern top of bank above the concrete channel. While the channel offers little habitat value to amphibians or focal species, the trees provide a riparian canopy over the engineered stormwater drainage feature. Pruning and removal activities will be documented and reported to regulatory agencies. No other impacts are assumed due to the urban context of Granada Channel. Impacts to trees will occur outside of nesting bird season (September-October).

SMP Yearly Maintenance Site 4 (YM-4) – Debris Removal at Collier Canyon Creek Debris Rack

Annual maintenance of the Collier Canyon Creek debris rack and baffles is necessary to prevent impediment to flow and reduce flood risk. The work is conducted by hand during dry stream conditions. A backhoe will be utilized, working from the top of bank with maintenance staff hand removing and placing debris by hand into the backhoe bucket. Due to the debris rack's proximity to suitable listed species' habitat the work will be monitored by a program-approved biologist.

SMP Yearly Maintenance Site 5 (YM-5) – Trash and Debris Removal at Airway Boulevard along Arroyo Las Positas

Proposed work at Site YM-5 will consist of trash and debris removal. Trash and debris have accumulated inside the culverts during storm events (the culvert consists of three oblong corrugated metal culverts that convey flows beneath Airway Blvd). Delayed removal of this trash and debris is compromising the culvert's as-built capacity design and poses threats to downstream habitat, water quality and public health. The trash and debris removal is not considered an impact; work will be conducted by hand. The work will likely only require one day; no equipment or material staging area will be necessary or will be staged offsite at the end of the workday.

Access to the culverts will not require crossing flowing or standing water as the site will be accessed from the north and the perennial low-flow channel is positioned along the south bank. Dewatering is not anticipated to be necessary.

Sediment Management

Based on the volume of material removed and the sampling thresholds outlined in the SMP manual, and as specified by the Regional Water Quality Control Board (RWQCB) and CDFW, sediment sampling, analysis, and reporting is required for any sediment removal project in excess of 50 cubic yards that has not previously been sampled and tested. As per this specification, sediment sampling is required at Sites 61 and 68 (Table 3 below). The other projects exceeding 50 CY of sediment have been sampled in the past 5 years. Previous SMP Sediment Sampling reports are available upon request.

Table 3. Sediment Sampling Needs

SMP No.	Project Location	Waterway	Cubic Yards Sediment Estimated	Previous Sampling Notes	Sediment sampling needed?
58	Heather Lane Culvert Sediment, Debris and Vegetation Management along Arroyo Las Positas	Arroyo Las Positas	668	Previously sampled in 2017 and 2018 as Site 35a; Sampled in 2019 as 35b	No

60	Bluebell Drive Culvert Sediment, Vegetation and Debris Management along Arroyo Las Positas	Arroyo Las Positas	250	Previously sampled in 2019 as 35b	No
61	**Springtown Open Space Sediment and Vegetation Outfall Management along Unnamed Tributary to Arroyo Las Positas**	**Arroyo Las Positas**	**64**	**Not previously sampled**	**Yes**
68	**Laughlin Bridge Culvert Sediment and Vegetation Management along Altamont Creek**	**Altamont Creek**	**178**	**Not previously sampled**	**Yes**
YM1	Holmes Street Bridge Annual Sediment Management	Arroyo Mocho	700	Previously sampled in 2017 as site 15a	No

Material Disposal

Excavated sediment will be placed at specified locations or will be properly disposed as identified in the site descriptions.

Specifically, clean gravel and cobble removed from Arroyo Mocho at Holmes Street (Site YM-1) will be repurposed to backfill the scour depressions along Arroyo Mocho at Site 64 (Stanley Bridge). Sediment reuse activities will incorporate BMPs such as burrow avoidance, compaction, and hydro-seed application (upper bank). If excavated sediment, gravel, or substrate cannot feasibly be repurposed it will be taken via dump truck to either an upland area of the old Springtown golf course for Sites 58, 60 and 61, the interior upland area of Medeiros Parkway for Site YM-1, the upland gravel roadway at Stanley Blvd near Site 64 at the Robertson Park Rodeo Grounds parking area, Zone 7 staging areas, or the City of Livermore's Water Resources Department yard (101 Jack London Blvd) for staging and later alternative repurposing. Trash and non-beneficial debris will be taken to Altamont or Vasco Landfill. Debris generated as part of vegetation management projects may be relocated in upland areas for habitat enhancement or chipped and/or lopped and used as erosion control on upland sites or taken to landfills for green-waste composting.

Post Project Monitoring

Geomorphic Shaping Activities

The City will monitor all maintenance projects that require "geomorphic shaping activities" to determine the sustainability of the grading. For the first year following completion of the 2022 in-channel ground disturbance (SMP Sites 46, 47, 48, 56, 57A/B/C, 58, 60, 61, 62, 63, 64, 66, and 68) the City shall inspect the sites following larger storm events to determine structural integrity and if the project BMPs are adequately functioning to stabilize soil and prevent excessive erosion. After the first year, the sites will be inspected annually in the spring for structural stability and functionality. Photos will be taken, and results will be reported in the Annual Post-Construction Report.

Existing Conditions and Project Impacts

Project Impacts on Jurisdictional Areas

The 2022 stream maintenance projects will result in impacts to waters of the US and State as summarized in Table 2. These include permanent impacts to 13 LF / 57 SF (0.001 acres) and temporary impacts to approximately 1978 LF (0.37 miles) and 33,858 SF (0.78 acres) to aquatic resources within the SMP area.

Several of the 2022 stream maintenance projects will result in impacts on waters of the U.S. and State. The SMP project sites generally fall into one of three categories: other waters at the unnamed basins in The Bluffs neighborhood stormwater basin system which is identified in the SMP manual as part of the Bear Creek Basins system, other waters and in-channel wetlands within Arroyo Las Positas, and other waters and mixed riparian woodland resources within the Arroyo Mocho. These features are described in further detail in the "Aquatic Resources Delineation Report for the Livermore 2022 SMP", prepared by Swaim Biological, Inc., located in Appendix E. Representative photographs are provided in Appendix B.

Upland Impacts

2022 SMP work activities include upland access over mixed land cover types including ruderal, annual grassland and previously disturbed and developed areas. Staging and access areas are identified in the individual project descriptions and in the figures provided in Appendix A.

Project Impacts on Focal Species

This section evaluates the effects of the 2022 Stream Maintenance Project on focal species identified in the SMP. The focal species list in the SMP was developed to identify listed and sensitive species occurring in the SMP Area that could be affected by project activities. The focal species list in the SMP is based, in large part, on the East Alameda County Conservation Strategy (EACCS) and includes the following species.

California red-legged frog (*Rana draytonii*) – FT, SSC

California tiger salamander (*Ambystoma californiense*) – FT, ST

Alameda whipsnake (Masticophis lateralis euryxanthus) – FT, ST

Longhorn fairy shrimp (*Branchinecta longiantenna*) – FE

Vernal pool fairy shrimp (*Branchinecta lynchi*) – FT

Tricolored blackbird (*Agelaius tricolor*) – ST

American badger (*Taxidea taxus*) – SSC

Golden eagle (*Aquila chrysaetos*) – FP

Burrowing owl (*Athene cunicularia*) – SSC

Callippe silverspot butterfly (*Speyeria callippe callippe*) – FE

San Joaquin kit fox (*Vulpes macrotis mutica*) – FE, ST

San Joaquin spearscale (*Atriplex joaquiniana*) – 1B.2

Congdon's tarplant (*Centromadia parryi* ssp. *congdonii*) – 1B.2

Palmate-bracted bird's-beak (*Cordylanthus palmatus*) – FE, SE, 1B.1

Livermore tarplant (*Deinandra bacigalupii*) – SE, 1B.1

State Status			Federal Status		
FP	=	Fully protected	FE	=	Federally endangered
SE	=	State endangered	FT	=	Federally threatened
ST	=	State threatened			
SSC	=	Species of special concern			

California Native Plant Society Ranking

1B	=	Rare or endangered in California and elsewhere.

Rare plant threat rank

.1	=	Seriously threatened in California (high degree/immediacy of threat).
.2	=	Fairly threatened in California (moderate degree/immediacy of threat).

Table 4 quantifies direct permanent and temporary impacts on focal species by site. The details of those impacts are described for each species in the sections below. Indirect impacts from project activities could include invasive, nonnative species introduction; eroded, destabilized slopes; release of hazardous materials, such as oil or other chemicals; fire danger; and effects on air quality. Additionally, disturbed areas of previously stabilized soil could erode into focal species habitat later in time, and could affect the hydroperiod, flow dynamics, aquatic habitat diversity, thermal conditions, and amount of escape refugia associated with focal species habitat. Indirect impacts will be minimized and avoided through implementation of BMPs identified in Table 7-1 of the SMP.

A Biological Assessment will be completed for the 2022 Stream Maintenance Projects with the intent to append to the US Fish and Wildlife Services Programmatic Biological Opinion for the East Alameda County Conservation Strategy.

Table 4. Impacts on Focal Species

Site ID	Focal Fauna													Focal Flora			
	California red-legged frog		California tiger salamander		Longhorn / Vernal Pool Fairy Shrimp		Tri-colored blackbird	Burrowing owl	San Joaquin kit fox	American Badger	Callippe silverspot butterfly	Golden Eagle	Alameda whipsnake	Livermore Tarplant	Congdon's Tarplant	Palmate Bracted Birds Beak	San Joaquin Spearscale
	Perm	Temp	Perm	Temp	Perm	Temp											
	SF	SF	SF	SF	SF	SF											
46	16	400	16	400	--	--	--	--	--	--	--	--	--	A	A	A	A
47	16	500	16	500	--	--	--	--	--	--	--	--	--	A	A	A	A
48	25	350	25	350	25	350	--	A	--	--	--	A	--	A	A	A	A
56	--	144	--	144	--	--	--	A	--	--	--	A	--	A	A	A	A
57A	--	1,820	--	1,820	--	--	--	A	--	--	--	A	--	A	A	A	A
57B	--	1,520	--	1,520	--	--	--	A	--	--	--	A	--	A	A	A	A
57C	--	450	--	450	--	--	--	A	--	--	--	A	--	A	A	A	A
58	--	9000	--	--	--	--	A	--	--	--	--	--	--	--	A	A	A
59	--		--		--	--	A	--	--	--	--	--	--	--	A	A	A
60	--	5000	--		--	--	A	A	--	--	--	--	--	--	A	A	A
61	--	880	--		--	--	A	A	--	--	--	--	--	--	A	A	A
62	A		--		--	--	--	--	--	--	--	--	--	--	A	--	--
63	A		--		--	--	--	--	--	--	--	--	--	--	A	--	--
64	A		--		--	--	--	--	--	--	--	--	--	--	A	--	--
65	A		--		--	--	--	--	--	--	--	--	--	--	A	--	--
66	A		--		--	--	A	--	--	--	--	--	--	--	A	--	--
67A/B	A		--		--	--	--	--	--	--	--	--	--	--	A	--	--
68	--	2400	--	2400	--	--	A	A	--	--	--	--	--	A	A	A	A
YM-1	A		--		--	--	--	--	--	--	--	--	--	--	A	--	--
YM-2	--		--		--	--	--	--	--	--	--	--	--	--	A	--	--
YM-3	--		--		--	--	--	--	--	--	--	--	--	--	A	--	--
YM-4	A		A		--	--	--	A	A	A	--	--	--	--	A	--	--
YM-5	A		--		--	--	A	--	--	--	--	--	--	--	A	--	--
Total Impacts	57	22464	57	7584	25	350	--	--	--	--	--	--	--	--	--	--	

A = Suitable habitat is present, but impacts will be avoided via implementation of best management practices described in Table 7-1 of the SMP.

California Red-legged Frog and California Tiger Salamander

Direct Effects:

Potential direct effects on both California Tiger Salamander (CTS) and California red-legged frog (CRLF) exist at SMP Sites 46, 47, 48, 56, 57A, 57B, 57C, and 68. Potential direct effects to CRLF exist at SMP Sites 58, 60, 61, 62, 63, 64, 66, 67A, 67B, YM-1, YM-2, YM-4 and YM-5.

Habitat-related effects on CRLF and CTS include permanent effects to aquatic habitat where maintenance actions require placement of riprap or other hardscape and temporary effects to both aquatic and upland habitat. Temporary effects to CRLF and/or CTS habitat would occur where sediment removal and/or vegetation management activities disturb wetland and/or adjacent upland habitat that will be left to revegetate naturally (e.g., excavations not filled with riprap or a concrete slab) or replanted with native vegetation (e.g., riparian trees and shrubs, native grass seed mix). Habitat that might provide forage, shelter, or protection from predators would not be available to frogs during this time period and could increase the chance for predation or desiccation. Small mammal burrows providing upland refugia for frogs may also be affected during these activities and would have a similar effect on frogs looking for shelter, but new burrows would likely be created by onsite burrowing mammals within a year of activity completion. Implementation of SMP conservation measures 14 (Removal of Existing Vegetation), 15 (Invasive Plant Species Control Measures), and 17 (Planting and Revegetation after Soil Disturbance) would reduce the potential for such effects.

Indirect Effects:

Potential indirect effects on CRLF and/or CTS include degradation of nearby habitat due to increased nonnative plant cover and temporary siltation of downstream reaches (from excess sediment generated during excavation activities and vegetation management). Implementation of SMP conservation measures 14 (Removal of Existing Vegetation), 15 (Invasive Plant Species Control Measures), and 18 (Planting and Revegetation after Soil Disturbance) would minimize such effects.

The increase in water amounts and channel flow rates from sediment, debris and vegetation removal will not result in adverse permanent effects to frog and/or or salamander habitat. In the channels, stormflows will be slightly increased as stormwater will more readily enter the channels from outfall and underpass features, but these areas will continue to be accessible for dispersal movement. At Sites 53-55, removal of existing stands of dense cattails and excess sediment may benefit CRLF during wet periods by creating more open water than currently exists. Dispersal and aquatic non-breeding habitat for CRLF is present at all sites and would continue to be present after the completion of maintenance activities.

Restoration along the Arroyo Mocho and Arroyo Las Positas near the project sites will avoid placing trees that keep water temperature too cool for breeding too close to potential breeding pools. The EACCS identifies the Arroyo Mocho as a priority area for restoration activities for the California red-legged frog. The proposed vegetation management projects will improve open water conditions creating new potential breeding pools by allowing sunlight to warm the pools in areas currently too shaded to provide warm enough water for tadpole growth. Native plantings at all sites would provide more dispersal cover and foraging habitat for frogs during upland dispersal.

Vernal Pool Branchiopods

Habitat-related effects on vernal pool fairy shrimp and longhorn fairy shrimp (collectively termed “vernal pool branchiopods”) include permanent impacts in seasonal wetlands and freshwater marsh where cysts may be present. Site 48 is adjacent to Bear Creek Basin 1 which provides suitable habitat for vernal pool branchiopods although protocol level surveys conducted in 2017 never detected listed branchiopods in this basin or any of the

59 suitable habitat pools sampled within SMP reaches and basins 2017. Given the project work is outside of the basin itself and impacts will not occur within the sediment basin floor; it is therefore not anticipated for the projects to have any impacts to these species or their habitat.

Alameda Whipsnake

Alameda whipsnake require scrub habitat as their core habitat, however, they use grassland, oak woodland and riparian areas for dispersal. There is no scrub habitat within the project sites, the nearest core scrub habitats are over 3-miles to the northeast of Springtown Arroyo Las Positas Sites and over 1.75-miles to the southwest from Arroyo Mocho Sites. There are agricultural and suburban land uses between the SMP sites and the core habitat. BMPs will be implemented, and it is not anticipated to have any impacts on Alameda whipsnakes or their habitat for the 2022 SMP projects.

Tricolored Blackbird

Tricolored blackbird breeding colony sites require open accessible water; a protected nesting substrate, including either flooded or thorny or spiny vegetation; and a suitable foraging space providing adequate insect prey within a few miles of the nesting colony (Hamilton et al. 1995, Beedy and Hamilton 1997, 1999). There is potential habitat within flooded wetland emergent vegetation along Arroyo Las Positas at Sites 58, 60 and dense cattails in the Saddleback wetland adjacent to Site 57B and 57C. There is limited habitat present along Arroyo Mocho (blackberry thickets) near Site 63. The remaining sites do not contain suitable vegetation necessary to support a breeding colony. If tricolored blackbirds were breeding in the suitable vegetation adjacent to Sites 57A, 57B, 58, 60, or 63 sediment and vegetation removal could impact or destroy the breeding habitat and cause the potential loss of tricolored blackbird adults, young, or eggs. Additionally, indirect impacts from noise and an increase in human activity near nesting habitat could cause nest abandonment. Impacts on tricolored blackbirds would be fully avoided with implementation of SMP BMP BR-18, which prohibits construction during the nesting season (February 1–September 1) at active nest colonies. Preconstruction nesting bird surveys would identify nesting birds prior to any work that did occur during the nesting season.

American Badger

American badgers occur in a wide variety of open, arid habitats but are most commonly associated with grasslands, savannas, mountain meadows, and open areas of desert scrub. The principal habitat requirements for this species appear to be sufficient food (burrowing rodents), friable soils, and relatively open, uncultivated ground. None of the proposed project sites in 2022 provide the open, arid habitat necessary to support American badger.

Golden Eagle

Golden eagles occupy open and semi-open habitats, avoiding developed areas and uninterrupted stretches of forest. They primarily nest on cliffs, as well as trees, on the ground, or in human-made structures such as windmills, electrical transmission towers, and nesting platforms. Sites 46-48 within the sediment basins and Sites 53-55 in Springtown do not provide suitable structures for nesting (no large trees anticipated to support a nest). However, Sites 63, 64, 65 and 66 along the Arroyo Mocho contain trees such as large eucalyptus and large cottonwoods upstream and downstream that could support nests, however, the surrounding urban development at these sites makes it extremely unlikely golden eagles would nest at these locations. Impacts on golden eagles could involve removal of nest trees or shrubs as well as indirect impacts from noise and an increase in human activity near nesting habitat. An increase in noise and human activity could reduce the quality of that habitat and ultimately change the behavior of nesting birds, resulting in nest abandonment. Proposed maintenance activities have the potential to produce higher noise levels than those that currently exist at these locations. Impacts on golden eagle would be avoided with implementation of SMP BMP BR-17, which prohibits construction near active nests from February 1 to September 1 or establishing a no-activity buffer during that time. Preconstruction nesting bird surveys would identify nesting birds prior to any work that did occur during the nesting season.

Burrowing Owl

Burrowing owls require habitat with three basic attributes: open, well-drained terrain; short, sparse vegetation; and underground burrows or burrow facsimiles. Burrowing owls occupy grasslands, deserts, sagebrush scrub, agricultural areas (including pastures and untilled margins of cropland), earthen levees and berms, coastal uplands, and urban vacant lots, as well as the margins of airports, golf courses, and roads (Haug et al. 1993). Suitable conditions for burrowing owl are present adjacent to the Sites 46, 47, 48, 56, 57A, 57B, 57C, and Springtown Open Space areas (near Sites 59, 60, and 61). However, there are no proposed ground disturbing activities at these sites where suitable nesting or wintering burrows are known within the work area. Therefore, disruption to burrowing owls foraging or nesting activities would only be caused by disruption from the nearby construction activities. If burrows are present adjacent to the work area and occupied by burrowing owls (either wintering or nesting), movement of heavy equipment within the work area could disturb nesting burrowing owls which could result in the removal of an occupied breeding or unoccupied wintering burrow site and loss of burrowing owl adults, young, or eggs. Staging and sediment/debris drying areas will be inspected for burrows prior to off-loading and burrows will be avoided. Impacts on western burrowing owl would be fully avoided with implementation of SMP BMP BR-19, which prohibits construction near active nests from February 1 to September 1, establishing a no-activity buffer during that time, or development of a site-specific nesting season avoidance plan. Preconstruction nesting bird surveys would identify nesting birds prior to any work that did occur during the nesting season.

Callippe Silverspot Butterfly

Callippe silverspot is highly unlikely to occur in annual grassland within the action area due to the sites' location on an urban valley floor that lacks hilly terrain and ridgetop habitat that characterizes known population sites in the Bay Area.

San Joaquin Kit Fox

San Joaquin kit fox occurs in numerous habitat types, but dens are typically constructed in relatively open, flat areas with short vegetation. None of the 2022 sites provide large flat areas with short vegetation and there is a lack of habitat connectivity to areas supporting this habitat.

Focal Plant Species

Plants with potential to occur in the SMP Area, specifically near proposed work in northeast Livermore (Sites 46-48) include palmate-bracted bird's beak (*Cordylanthus palmatus*), Livermore tarplant (*Deinandra bacigalupii*), Congdon's tarplant (*Centromadia parryi* ssp. *congdonii*), and San Joaquin spearscale (*Atriplex joaquiniana*). Livermore tarplant occurs in seeps and meadows, often associated with alkali meadows. Congdon's tarplant occurs in annual grassland on lower slopes, flats, and swales. San Joaquin spearscale typically occurs in alkali grassland and alkali meadow, or on the margins of alkali scrub. Palmate-bracted bird's beak occurs in areas that are seasonally flooded, with saline-alkali soils, in lowland plains and basins, which include the edges of channels and drainages, alkali scalds, and grassy areas (U.S. Fish and Wildlife Service 2009). The alkali species have the highest potential to occur along Site 46, 47, 48, 56, 57A, 57B, 57C, 58, 60, 61 in the Springtown area. Congdon's tarplant has the potential to occur at all project sites although is not as likely due to the urbanization of the areas and the high level of historic disturbance.

In the event these species were present, impacts could occur from ground-disturbing activities—including vehicle and equipment access—removing, crushing or burying individual plants. However, impacts on focal plants species will be fully avoided with implementation of SMP BMP BR-7, which requires a preconstruction survey be conducted by a qualified botanist during the appropriate blooming period for each species and avoidance of any identified populations.

Cultural Resources

A cultural resources analysis has been conducted for five of the 10 locations where proposed 2022 Stream Maintenance Projects will occur. The remaining five sites had cultural analyses completed in the last five years. The findings of the analysis are presented in the report titled "Cultural Resources Technical Report", prepared by ICF, under the guidelines of Section 106 of the National Historic Preservation Act and CEQA. The report is provided in Appendix F and documents and presents a brief environmental setting, prehistory, ethnography, and history of the project area; the results of the background research of cultural resources within 0.25-mile of the project area; the results of the correspondence with interested parties; and the methods and results of the archaeological field survey conducted for the proposed 2022 stream maintenance projects. The background research includes a records search for previously recorded cultural resources at the Northwest Information Center, correspondence with local Native American representatives and historical societies, and archaeological and architectural field surveys of all the project sites.

Avoidance and Minimization Measures

Chapter 7, *Impact Reduction and Minimization*, of the SMP presents a comprehensive approach to avoiding and minimizing impacts and lists minimization measures and BMPs. The avoidance and minimization approach rely heavily on Tables 7-1 and 7-2 in the SMP. Table 7-1 presents program-wide BMPs according to the following topics.

- General impact avoidance and minimization
- Air quality
- Biological resources (including species-specific measures)
- Cultural resources
- Construction and seismicity
- Hazardous materials safety
- Vegetation management
- Water quality and creek/channel protection

Good neighbor policies

A table of required BMPs by project site is provided in Appendix C. The City will rely on Appendix C, in conjunction with Table 7-1, to implement the appropriate BMPs and ensure impacts to natural resources are minimized and/or avoided to the maximum extent practicable.

Planting and Revegetation After Soil Disturbance

2022 SMP Sites where maintenance activities result in exposed soil will be stabilized to prevent erosion and revegetated with native vegetation as soon as feasible after maintenance activities are complete. This management practice applies to revegetation activities not associated with mitigation actions. Mitigation actions will have project-specific requirements and success criteria.

Revegetation will occur at a ratio of at least 1.5 to 1 to account for initial mortality of plantings. If soil moisture is deficient, new vegetation will be supplied with supplemental water until vegetation is firmly established. To the extent possible, native grass seed will be used when seeding a project site. Erosion control fabric, hydro-mulch, or other mechanism will be applied as appropriate to provide protection to seeds, hold them in place, and help retain moisture.

Where soil disturbance occurred, revegetation will be regularly monitored for survival for five years or until 80% minimum relative survival/cover is reached (80% native cover relative to pre-construction native cover condition) is achieved. If invasive species colonize the area, action shall be taken to control their spread; options include hand and mechanical removal and replanting or seeding with native species.

Annual Mitigation Plan

The 2022 Stream Maintenance Program Project impacts occur on three sensitive resource types: wetlands/waters, riparian habitat, and focal species. In general, mitigation will seek to maintain functional agreement (in-kind mitigation) between impacts and mitigation as well as locate the mitigation site as close to the impacts as possible. The proposed approach to mitigate for impacts on these sensitive resources is described below. Mitigation ratios were established in Chapter 8, *Program Mitigation*, of the SMP. Table 5 details the vegetation impacts and mitigation requirements. Species mitigation for state and federally listed species will be based on the final mitigation requirements from the USFWS Programmatic Biological Opinion Appendage and the CDFW Incidental Take Permit. Summary of Proposed Mitigation Concepts and Approach

For project impacts on focal species and associated suitable habitat, the City is proposing to purchase mitigation credits from an agency-approved conservation bank or protect City-owned suitable habitat in perpetuity.

For impacts on wetlands/waters and riparian resources, the mitigation approach follows a three-tiered system where mitigation opportunities are sought first onsite at the project location (Tier 1), and second in other SMP Area reaches (Tier 2). Mitigation actions implemented within the SMP Area on City-owned lands will be protected in perpetuity through placement of a deed restriction or equivalent mechanism. Tier 3 mitigation will occur regardless of the location of Tier 1 and 2 mitigation and is intended to address temporal loss. The three-tier mitigation approach ensures that mitigation is first and foremost directed to compensate for the impacts occurring at the specific project reach, then expanded if necessary, to consider reaches within the SMP Area and the watershed as a whole, should opportunities within the project reach be insufficient to compensate for impacts.

Mitigation for wetlands/waters and riparian will continue to occur along Arroyo Mocho at Robertson Park and along Golf Drive Creek and Arroyo Las Positas in Springtown. These mitigation projects are already in the implementation and advanced planning stages. The sites were designed with sufficient extra area to mitigate for anticipated 2022 SMP impacts.

Table 5. 2022 SMP Site Impacts and Associated Mitigation Ratios

Maintenance Activity		Impacts Summary				Mitigation Summary				Mitigation Location
Tier 1 Mitigation		Permanent		Temporary		Permanent Ratio		Temporary Ratio		
		SF	LF	SF	LF	SF (2:1)	LF (2:1)	SF (1.1:1)	LF (1.1:1)	
58	Heather Lane Culvert Sediment, Debris and Vegetation Management along Arroyo Las Positas	--	--	9000	450	0	0	9900	495	Golf Drive
61	Springtown Open Space Sediment and Vegetation Outfall Management along Unnamed Tributary to Arroyo Las Positas	--	--	880	70	0	0	968	77	Robertson Park Expansion
62	Robertson Park Sediment and Vegetation Outfall Management at Arroyo Mocho Floodplain	--	--	24	5	0	0	26	6	Robertson Park Expansion
63	West of Robertson Park Vegetation and Debris Management at Outfall and Arroyo Road Bridge along Arroyo Mocho	--	--	3700	5	0	0	4070	6	Robertson Park Expansion
Total Tier 1 Mitigation		**0**	**0**	**13604**	**530**	**0**	**0**	**14964**	**583**	

Maintenance Activity		Impacts Summary				Mitigation Summary				Mitigation Location
Tier 2 Mitigation		Permanent		Temporary		Permanent Ratio		Temporary Ratio		
		SF	LF	SF	LF	SF (2:1)	LF (2:1)	SF (1.5:1)	LF (1.5:1)	
46	Sediment and Vegetation Outfall Management at Laughlin Road	*16*	*4*	400	12	--	--	600	18	Temporary impacts at Golf Drive, permanent

Maintenance Activity		Impacts Summary				Mitigation Summary				Mitigation Location
Tier 2 Mitigation		Permanent		Temporary		Permanent Ratio		Temporary Ratio		
		SF	LF	SF	LF	SF (2:1)	LF (2:1)	SF (1.5:1)	LF (1.5:1)	
										impacts already fully mitigated in 2017
47	Sediment and Vegetation Outfall Management at Lake Drive	*16*	*4*	500	10	--	--	750	15	Temporary impacts at Golf Drive, permanent impacts already fully mitigated in 2017
48	Sediment and Vegetation Outfall Management at Meadow Glen Drive	25	5	350	63	50	10	525	95	Temporary and permanent impacts at Golf Drive
56	Sediment and Vegetation Outfall Management at Hillstone Court	--	--	144	13	--	--	216	20	Golf Drive
57a	Saddleback Sediment and Vegetation Outfall Management and Debris from Raymond Road to Martingale Court	--	--	1,820	390	--	--	2730	585	Golf Drive
57b	Saddleback Sediment and Vegetation Outfall Management - Martingale Court to Saddleback Wetland	--	--	1,520	380	--	--	2280	570	Golf Drive
57c	Saddleback Sediment, Vegetation and Debris Removal - Dalton Avenue and Ames Street	--	--	450	150	--	--	675	225	Golf Drive
66	Rockrose Street Culvert and Outfall Debris and Sediment	--	--	270	100	--	--	405	150	Robertson Park Expansion

Maintenance Activity		Impacts Summary				Mitigation Summary				Mitigation Location
Tier 2 Mitigation		Permanent		Temporary		Permanent Ratio		Temporary Ratio		
		SF	LF	SF	LF	SF (2:1)	LF (2:1)	SF (1.5:1)	LF (1.5:1)	
	Management in Arroyo Mocho Low Flow Channel									
68	Laughlin Bridge Culvert Sediment and Vegetation Management along Altamont Creek	--	--	2400	100	--	--	3600	150	Golf Drive
	Total Tier 2 Mitigation	**57**	**13**	**7854**	**1218**	**50**	**10**	**11781**	**1827**	
	TOTALS SF/LF	57	13	21458	1748	50	10	26745	2410	Total Mitigation Required 2022 (SF/LF)
		SF	LF	SF	LF	SF	LF	SF	LF	26795 SF (0.64 acres) / 2420 LF

Maintenance Activity		Impacts Summary				Mitigation Summary				Mitigation Location
No Mitigation Needed (No instream impacts, tree removal over 4" DBH, permanently mitigated or already touched 3x)										
59	Hercules Court and Quince Court Vegetation and Debris Management along Arroyo Las Positas	--	--	--	--	--	--	--	--	Vegetation and debris management, no removal of trees <4" DBH
60	Bluebell Drive Culvert Sediment, Vegetation and Debris Management along Arroyo Las Positas	--	--	3400	130	--	--	--	--	Work on aprons (30LF up and downstream) and under culvert have been permanently mitigated in 2017. Mitigation not required.

Maintenance Activity		Impacts Summary				Mitigation Summary				Mitigation Location
No Mitigation Needed (No instream impacts, tree removal over 4" DBH, permanently mitigated or already touched 3x)										
64	Stanley Blvd Bridge and the Old Railroad Bridge Sediment, Vegetation, and Debris Management along Arroyo Mocho	--	--	9000	100	--	--	--	--	Sediment and vegetation removal between Stanley Bridge and Old Railroad Bridge permanently mitigated in 2017. Mitigation not required.
65	Arroyo Mocho Low Flow Channel Vegetation and Debris Management	--	--	--	--	--	--	--	--	Vegetation and debris management, no removal of trees <4" DBH
67a	Collier Canyon Mitigation Site A Vegetation Management along Collier Canyon Creek	--	--	--	--	--	--	--	--	Vegetation and debris management, no removal of trees <4" DBH
67b	Collier Canyon Mitigation Site B Vegetation Management along Collier Canyon Creek	--	--	--	--	--	--	--	--	Vegetation and debris management, no removal of trees <4" DBH
YM-1	Holmes Street Bridge Annual Sediment Management	--	--	23748	350	--	--	--	--	3rd final temporary impact 2020, 169 LF downstream and 120 LF upstream have been temporarily mitigated 3 times. Mitigation not required.
YM-2	Medeiros Parkway Fire Break Vegetation Management	--	--	--	--	--	--	--	--	Non-native annual grasses and weeds. No impacts assumed regularly disturbed fire break footprint.
YM-3	Granada Channel Vegetation Management	--	--	--	--	--	--	--	--	Vegetation and debris management, no removal of trees <4" DBH

Maintenance Activity		Impacts Summary				Mitigation Summary				Mitigation Location
No Mitigation Needed (No instream impacts, tree removal over 4" DBH, permanently mitigated or already touched 3x)										
YM-4	Debris Removal at Collier Canyon	--	--	--	--	--	--	--	--	No impacts, hand removing debris from rack
YM-5	Trash and Debris Removal at Airway Boulevard along Arroyo Las Positas	--	--	--	--	--	--	--	--	No impacts, hand removing debris and trash

Tier 1 and 2 Restoration

Table 6. 2022 Mitigation Sites

2022 Mitigation Sites	SMP Project	Tier	Temporary SF	Permanent SF	Total SF	Total Acreage
Golf Drive/ Springtown Open Space	46	2	600	0	600	0.014
	47	2	750	0	750	0.017
	48	2	525	50	575	0.013
	56	2	216	0	216	0.005
	57a	2	2730	0	2730	0.063
	57b	2	2280	0	2280	0.052
	57c	2	675	0	675	0.015
	58	1	9900	0	9900	0.227
	68	2	3600	0	3600	0.083
	Total		21276	50	21326	0.490
Robertson Park Expansion	61	1	968	0	968	0.022
	62	1	26	0	26	0.001
	63	1	4070	0	4070	0.093
	66	2	405	0	405	0.009
	Total		5469	0	5469	0.126
Total Across Sites			26745	50	26795	0.615

Tier 1 and 2: SMP Mitigation Site 9 – Restoration and Enhancement of Stream Resources along Golf Drive Creek and Bluebell Drive in Springtown

Tier 1 and 2 mitigation for impacts to habitat includes restoration and enhancement of riparian habitat between along the creek that runs parallel to Golf Drive and near Bluebell Drive. Parallel to Golf Drive is a spring-fed perennial creek is approximately 1,500 LF long and discharges into the former Springtown Golf Course diversion pond, near the confluence of Arroyo Las Positas and Altamont Creek. Planting at Golf Drive Creek began in 2020 and 2021with additional plantings to be established in 2022/23 to address additional impacts from 2022 work. Based on the temporary maintenance impacts from 2022 for Sites 46, 47, 48, 56, 57A, 57B, 57C, 61 and 68 the mitigation required for restoration and enhancement of stream resources is 21,326 SF (to be fulfilled at Golf Drive). The Golf Drive mitigation site is currently 13,300 SF and includes mitigation for 2020, 2021 and 2022 impacts, the entire size of the site will be expanded to address 2022 impacts. The site incorporates both riparian and wetland mitigation components to compensate for impacts to landcover types found at impact areas.

Riparian and wetland mitigation planting was completed in 2021 and involves revegetation elements to develop a mosaic of riparian canopy over cattails with intermittent wetland plantings in lower floodplain locations. Mitigation at this location includes establishment of native species in available channel zones (i.e., at the toe of slope, on channel banks, and/or along the top of bank) and in the understory for enhancement. Wetland species are identified as those planted within the channel bed, while riparian species consist of those planted from the toe to the top of bank.

To meet the native wetland-species cover criteria, the planting plan also includes facilitation of volunteer native plant populations (e.g., salt grass, creeping wildrye, gumplant, heliotrope, and alkali heath). Invasive weed management to support establishment of volunteer rhizomatous species will be conducted in late winter and early spring, before nonnative weeds drop seed and will involve selective mowing, mulching, and hand weeding. Combining this weed control approach, it is anticipated that the site should continue to recruit native wetland species towards meeting the 5-year wetland cover success criteria. The Golf Drive Creek Mitigation Planting Plan is currently being revised to incorporate the 2022 mitigation areas and will be sent to agencies for approval. The plant palette for this mitigation site was drawn from the SMP Preferred Plant Palette (SMP Manual, Appendix D, Table 8.2). Special attention was given to the alkaline soil types along this corridor and specific plants will be selected to be installed in the following locations along the channel edge (grasses, rushes, and sedges), on the banks (trees) and at the top of bank (trees and shrubs) to support the restoration and enhancement of stream resources and aquatic habitat.

Tier 2 SMP Mitigation Site 2 - Restoration and Enhancement of Stream Resources Mitigation Site Expansion at Robertson Park

The SMP impacts along Arroyo Mocho for 2022 (Site 62, 64, 66) will be incorporated with the planting area expansion at Robertson Park, adding 6669 SF of mitigation needs to the site. The mitigation site includes additional riparian planting immediately upstream of the Robertson Park pedestrian bridge along the south bank of Arroyo Mocho. The expansion site was installed in 2021 and connects to the existing interior Robertson Park planting site. This bank is infested with invasive weeds including poison hemlock, Himalayan blackberry, and perennial pepperweed and weed management activities have been conducted prior to planting. The mitigation plantings not only provide habitat benefits, but also improve stabilization of the incised bank in this area, possibly reducing the need for future maintenance work.

To meet the SMP mitigation performance standards, the planting plan also includes facilitation of volunteer native plant populations. Invasive weed management will be conducted in late winter and early spring before nonnative weeds drop seed and will involve selective mowing and hand weed removal. The report titled "Riparian Enhancement at Robertson Park" is currently being revised to incorporate the expansion area and will be sent to agencies for approval prior to implementation.

The plant palette for this mitigation site will be drawn from the SMP Preferred Plant Palette (SMP Manual, Appendix D, Table 8.2). Special attention will be given to the gravel and clay soil types along with the surrounding vegetation community along this corridor. Specific plants will be selected to be installed in the following locations: along the channel edge (grasses, rushes, sedges, and willows), on the banks (trees) and at the top of bank (trees and shrubs) to support the restoration and enhancement of stream resources and aquatic habitat.

Tier 3

Tier 3 mitigation includes a contribution equaling 10% the total approved SMP 2022 implementation costs to the Living Arroyo's Program. Living Arroyos will use this funding to conduct some or all of the following work:

- Management of Adopt-A-Creek spot program which includes invasive plant management and trash removal along Arroyo Las Positas from Bluebell Avenue to Central Avenue
- Volunteer planting and expansion of existing mitigation sites (not counted towards mitigation requirements)

Focal Species

To compensate for unavoidable impacts on suitable, potentially occupied habitat for focal species where avoidance measures may not ameliorate the risk of take, the City will purchase credits from a USFWS- and CDFW-approved mitigation/conservation bank with a service area covering the impacted sites. Mitigation ratios for focal species are outlined in Table 8-4 in Chapter 8, *Program Mitigation*, of the SMP. Table 4 above summarizes the 2022 stream maintenance projects mitigation targets by species. The City intends to fulfill their focal species mitigation requirements for the 2022 stream maintenance projects through the purchase of credits from the Ohlone West Conservation Bank. The City will purchase credits based on the final cumulative as built impact calculations in 2022.

Planting Plan and Implementation Details

Planting Plan

The majority of the proposed mitigation sites will involve a native species planting/revegetation element. Depending on the site, the planting plan will consist of the installation of native species in suitable locations. The intent of the planting/revegetation is to establish native vegetation on the selected mitigation sites that, at maturity, blends with and approximates natural communities found in the SMP Area under similar environmental conditions.

The SMP planting strategy focuses on introducing native plants and propagules that will be strong competitors for undesirable species such as Himalayan blackberry and cattail species, which can result in unfavorable flood management conditions. Similarly, for sites with an understory enhancement component, shrubs, grasses, and vines have been selected for their particular ability to compete and establish despite the existing vegetation.

Planting layout and densities will be calculated by planting zone and based on area in square feet. In general, the following guidelines will be adhered to for the plant installation/revegetation activities at the mitigation sites:

Trees: Trees will be planted on 30-foot centers relative to each other (1 every 900 square feet). Trees will be distributed regularly on both sides of the channel, as appropriate given future access considerations and existing plant community structure, to encourage canopy closure and increase shading over the water surface.

Shrubs: Shrubs will be planted on 10-foot centers (1 every 100 square feet). Shrubs will be placed strategically in groups to mimic natural distribution patterns over approximately 20% of the area available for planting.

Grasses, Sedges and Ferns: Grasses, sedges and ferns will be planted in clusters at approximately 10-foot intervals along the toe of bank(s) to provide natural cover and improve channel stability. Emergent plantings are generally limited to 20% of the channel/basin bottom area.

A plant palette specific to each of the proposed mitigation sites is provided above.

Implementation

Plant material will be obtained from local sources preferentially as feasible. Trees will be in the treepot-4 size range. Shrubs will be treepot-4 to 1-gallon size, and herbaceous species will be planted from seed or liners. Seed mixes will be obtained from a commercial seed supplier that can authenticate regionally local sources. Plants on the upper bank will be top dressed with a 3-inch thick layer of certified weed-free fir bark mulch to reduce weed growth and retain moisture. Irrigation systems will be installed when feasible to water the plants until they are adequately established. An irrigation basin 2–3 feet in diameter will be formed around each planting hole where feasible. Plants will be installed and mulched so that root crowns are at, or slightly above, the soil/mulch surface.

To further support the restoration and enhancement of mitigation sites, all disturbed soils resulting from mitigation implementation activities will be hydroseeded and stabilized (as specified in project-specific design specifications) with native grasses to discourage erosion and encourage a native herbaceous understory. Landscape fabric will be used for erosion control on slopes and disturbed areas.

In general, planting will be conducted from late fall to early winter in the same year as the maintenance activities occurred. However, toe of slope/bank plantings can be installed any time of the year if the channel remains moist and flow velocities are amenable. During implementation, the project botanist or restoration specialist will coordinate and direct the planting efforts at each mitigation site and will either position the plants themselves or place color-coded pin flags in specific planting locations for each shrub and tree species.

Maintenance of Mitigation Sites

Planted mitigation sites without access to irrigation lines will be irrigated manually during the dry season for 3 years. Irrigation frequency will be determined by the project botanist or restoration specialist based on the site conditions, but will occur approximately weekly the first year, every two weeks the second year, and monthly during the third year.

Success Criteria

The SMP defines a *performance standard* as a measure of a habitat characteristic used to assess the progress of the restored habitat toward meeting a success criterion. A *success criterion* is a measure that indicates whether the mitigation goals have been achieved at the end of the performance monitoring period.

Performance standards for wetland, riparian shrub, and riparian willow plantings are applied during the first 4 years of the monitoring period, and success criteria are applied at the end of the 5-year monitoring period. Performance standards for riparian trees are applied during the first 9 years of the monitoring period, and success criteria are applied at the end of the monitoring period. Performance standards for riparian trees change from individual plant success to vegetative cover trends at Year 5 due to the density of vegetation and the ultimate success criteria. The mitigation plantings will be evaluated annually using the annual performance standards. The performance standards and success criteria for wetland and riparian plantings are summarized in Table 8-3 of the SMP.

Per the SMP Manual Chapter 8.3, channel bed plantings are considered wetland plantings. Channel toe of slope, floodplain bench, lower slope, upper slope, and top of bank plantings are considered riparian plantings.

Performance standards for invasive plant management are applied during the first 4 years of the monitoring period, and success criteria are applied at the end of the 5-year monitoring period. The goal is to achieve a reduction of invasive plant cover, to achieve dominance of native vegetative cover (canopy and/or wetland), and to reduce the ratio of invasive trees to native trees.

In the event of poor plant survival or failure to meet stated performance criteria, corrective measures will be implemented, including replanting or seeding to reach the 75% goal. The number of plant replacements will be above the threshold to meet the target percent survival. The monitoring period for replacement plants will be reset to Year 1, while the original surviving plantings remain on the original monitoring schedule. As a last resort, new mitigation would be provided elsewhere, should a project not be capable of meeting performance criteria.

Monitoring and Reporting

Monitoring will be conducted for up to 10 years following planting of woody riparian species and up to 5 years following planting of non-woody wetland species or invasive plant management. Information collected will include the number and species planted at each site, square footage of channel planted, estimated percent canopy cover, plant vigor, and the number or percent of planted trees and shrubs surviving.

Vegetative cover will be determined using a visual estimate of cover and species composition for both wetland plantings and riparian plantings as outlined in Table 8-3 of the SMP.

Plant vigor will be determined by assigning a vigor rating of good, fair, or poor to each plant. Dead plants will not be assigned a vigor rating. The ratings are defined below.

- Good: a seedling with less than 25% of its aboveground growth exhibiting one or more of the factors listed above.
- Fair: a seedling with 25–75% of its aboveground growth exhibiting one or more of the factors listed above.
- Poor: a seedling with more than 75% of its aboveground growth exhibiting one or more of the factors listed above.
- Dead: a seedling that is no longer visible or that does not appear capable of growth.

Invasive and exotic plant management monitoring will include the number and type of invasive trees removed (as applicable), square feet of removal for shrub or ground-cover species (as applicable), and the percent of managed area re-colonized by invasive weeds. The success criteria will define whether the removal project is intended to eradicate or manage an invasive plant population. In addition, the removal sites will be monitored for at least 5 years to verify that the success criteria are successfully met.

Monitoring of invasive and exotic plant removal will include tracking the overall percentage of invasives and nonnatives, area of removal activities for shrub or ground-cover species and annual surveys to assess the area's plant composition percentages.

Site conditions will be documented annually by taking repeat photographs at set reference locations. The monitoring data will be reviewed annually to evaluate the overall success of the revegetation approach.

Reporting on the performance monitoring conducted for the mitigation activities will be included in the Annual Report prepared at the conclusion of the annual work cycle each maintenance season. The Annual Report will be submitted to the regulatory agencies by December 15 each year.

Literature Cited

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Hamilton, W. J., III, L. Cook, and R. Grey. 1995. *Tricolored Blackbird Project 1994*. Unpublished report. Prepared for U.S. Fish and Wildlife Service, Portland, OR.

Haug, E. A., B. A. Millsap, and M. S. Martell. 1993. The Burrowing Owl (*Speotyto cunicularia*). In *The Birds of North America*, No. 61, edited by A. Poole and F. Gill. Philadelphia, PA: The Academy of Natural Sciences; Washington, D.C.: The American Ornithologists' Union.

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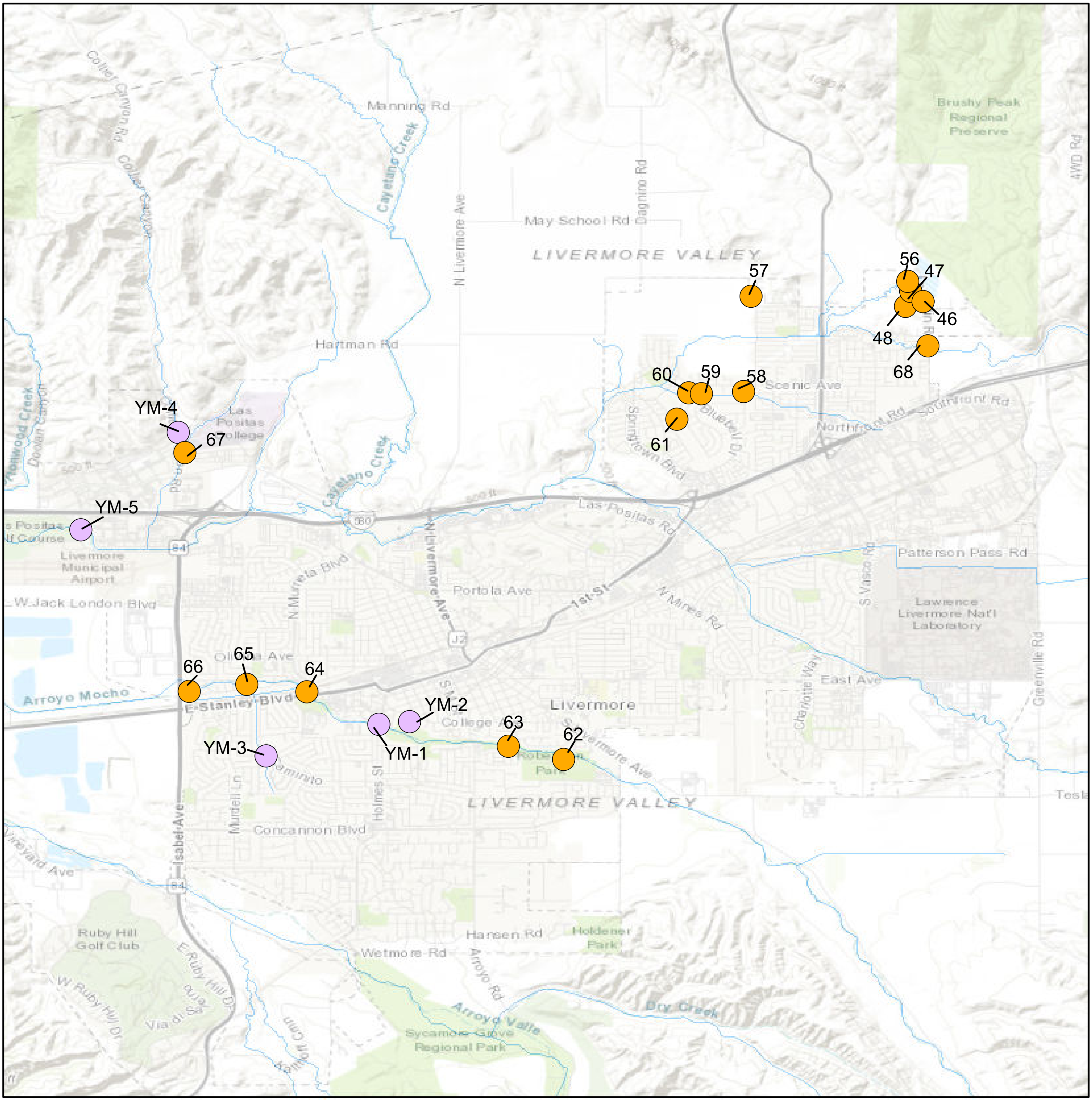
———. 2003. Designation of Critical Habitat for Four Vernal Pool Crustaceans and Eleven Vernal Pool Plants in California and Southern Oregon. Federal Register Final Rule. August 6.

———. 2009. *Palmate-bracted Bird's Beak 5-Year Review* (Cordylanthus palmatus = Chlorophyron palmatum). Sacramento, CA. June.

Appendix A
Figures and Action Impact Area Maps



Legend

Type

- 2022 SMP
- Yearly Maintenance

Figure 1
2022 SMP Locations

City of Livermore
2022 Stream Maintenance Program
March 2022

N

0 0.5 1 2 Miles

SBI

46 - Access
46 - Pampas Grass Removal
46 - Permanent Outfall Maintenance
46 - Temporary Outfall Maintenance
Unnamed Stormwater Basin

Figure A-1
Site 46 - The Bluffs Neighborhood
City of Livermore
2022 Stream Maintenance Program
March 2022

N

0 0.0125 0.025 0.05 Miles

SBI

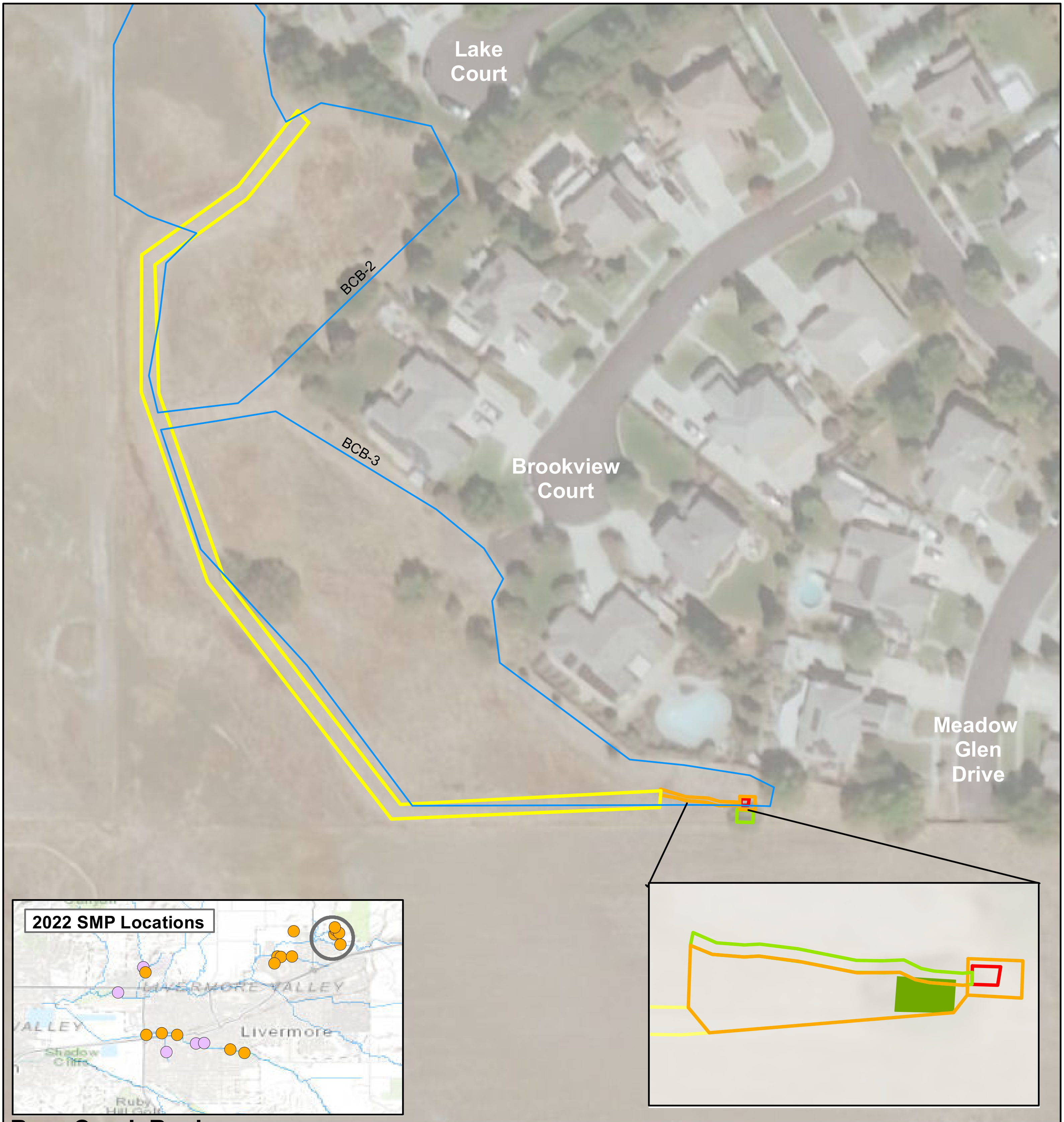
46 - Pampas Grass Removal
47 - Access
47 - Permanent Outfall Maintenance
47 - Temporary Outfall Maintenance
Unnamed Stormwater Basin

Figure A-2
Site 47 - The Bluffs Neighborhood
City of Livermore
2022 Stream Maintenance Program
March 2022

N

0 0.0125 0.025 0.05 Miles

SBI Swaim Biological Inc.



Bear Creek Basins

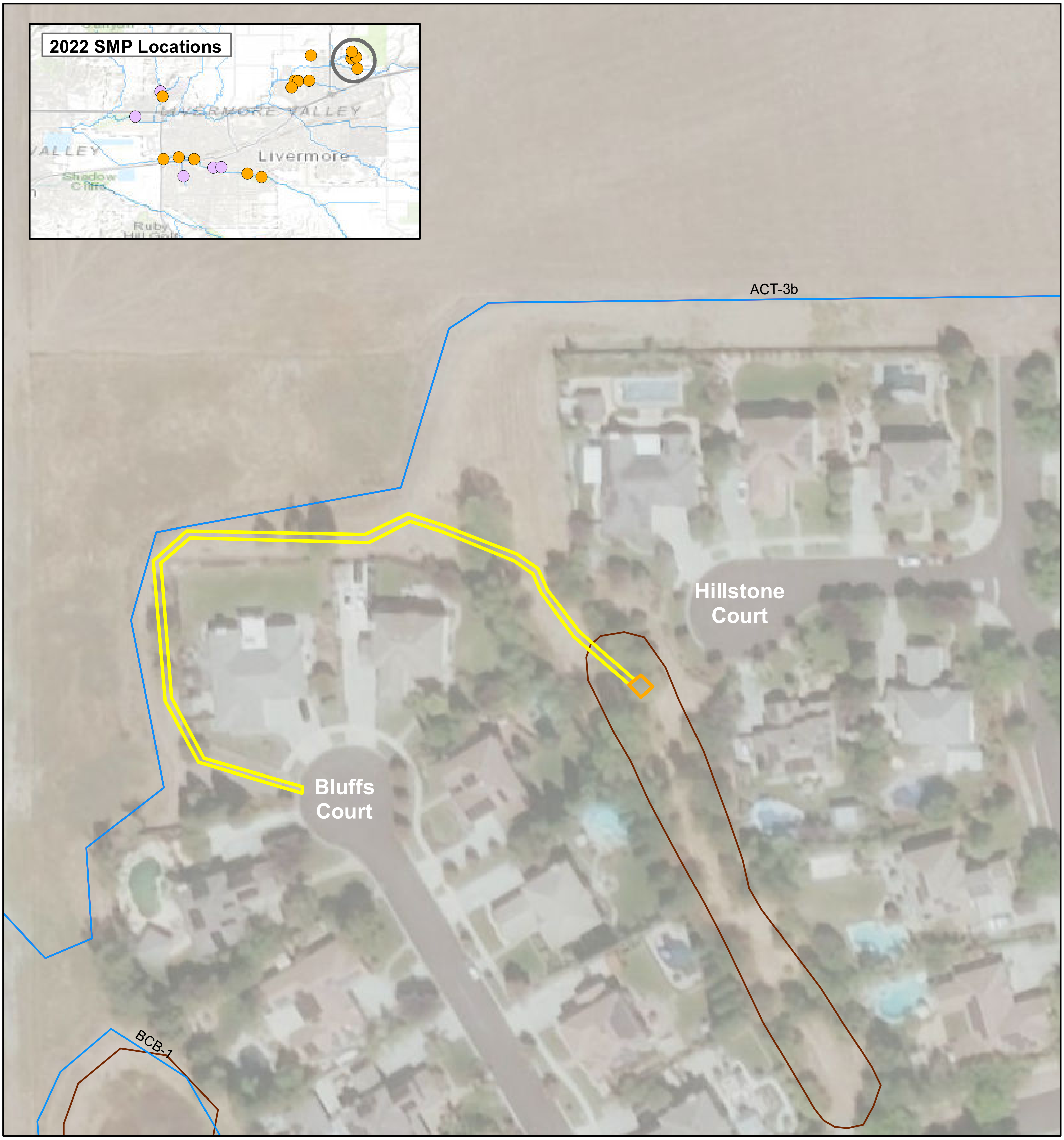
- Bear Creek Basins
- 48 - Access and Staging
- 48 - Coyote Brush Removal
- 48 - Permanent Outfall Maintenance
- 48 - Temporary Erosion Rill Repair
- 48 - Temporary Outfall Maintenance

N

0 0.0125 0.025 0.05 Miles

Figure A-3
Site 48 - The Bluffs Neighborhood
City of Livermore
2022 Stream Maintenance Program
March 2022

SBI
Swaim Biological Inc.



56 - Access

56 - Temporary (Outfall Sediment and Vegetation Revmoval)

Unnamed Stormwater Basin

Figure A-4
Site 56 - The Bluffs Neighborhood
City of Livermore
2022 Stream Maintenance Program
March 2022

N

0 0.0125 0.025 0.05 Miles

SBI Swaim Biological Inc.

57a - Access
57a - Temporary (Outfall Sediment and Vegetation Removal)
57a - Temporary (Sediment and Vegetation Removal)
57b - Access
57b - Temporary (Sediment and Vegetation Removal)

N

0 0.0175 0.035 0.07 Miles

Figure A-5
Site 57a and 57b - Saddleback
City of Livermore
2022 Stream Maintenance Program
March 2022

SBI
Swaim Biological Inc.

57b - Access

57b - Temporary (Sediment and Vegetation Removal)

57c - Access and Staging

57c - Temporary (Sediment)

57c - Temporary (Vegetation and Debris Removal)

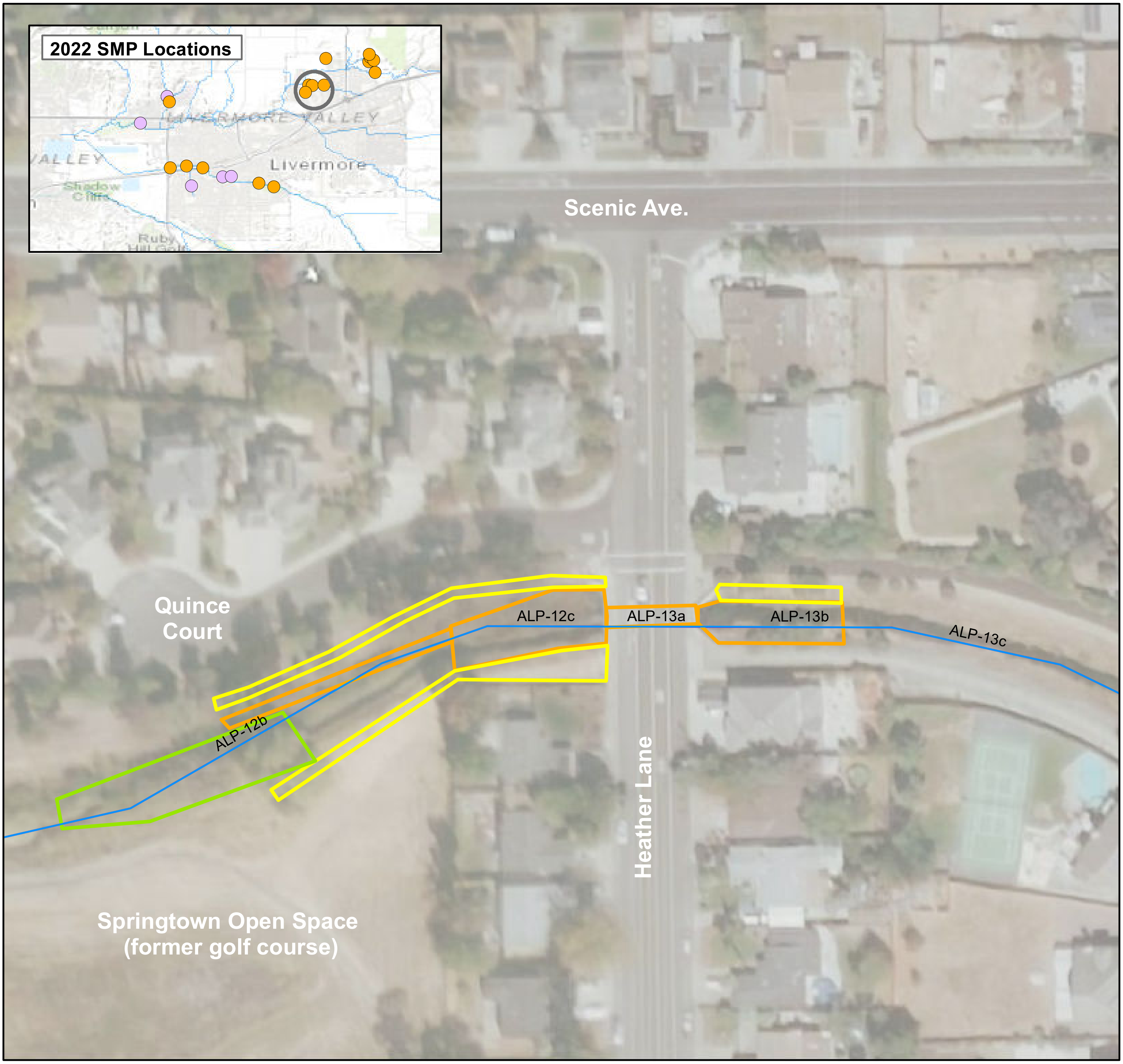
N

0 0.0175 0.035 0.07 Miles

Figure A-6
Site 57b and 57c - Saddleback

City of Livermore
2022 Stream Maintenance Program
March 2022

SBI



58 - Access Northeast
58 - Access Northwest
58 - Access Southwest
58 - Temporary (Downstream Sediment, Vegetation and Debris Removal)
58 - Temporary (North Low Flow Channel)
58 - Temporary (Sediment Removal in culverts)
58 - Temporary (Upstream Sediment, Vegetation and Debris Removal)
59a - Quince Court Willow limbing and debris removal

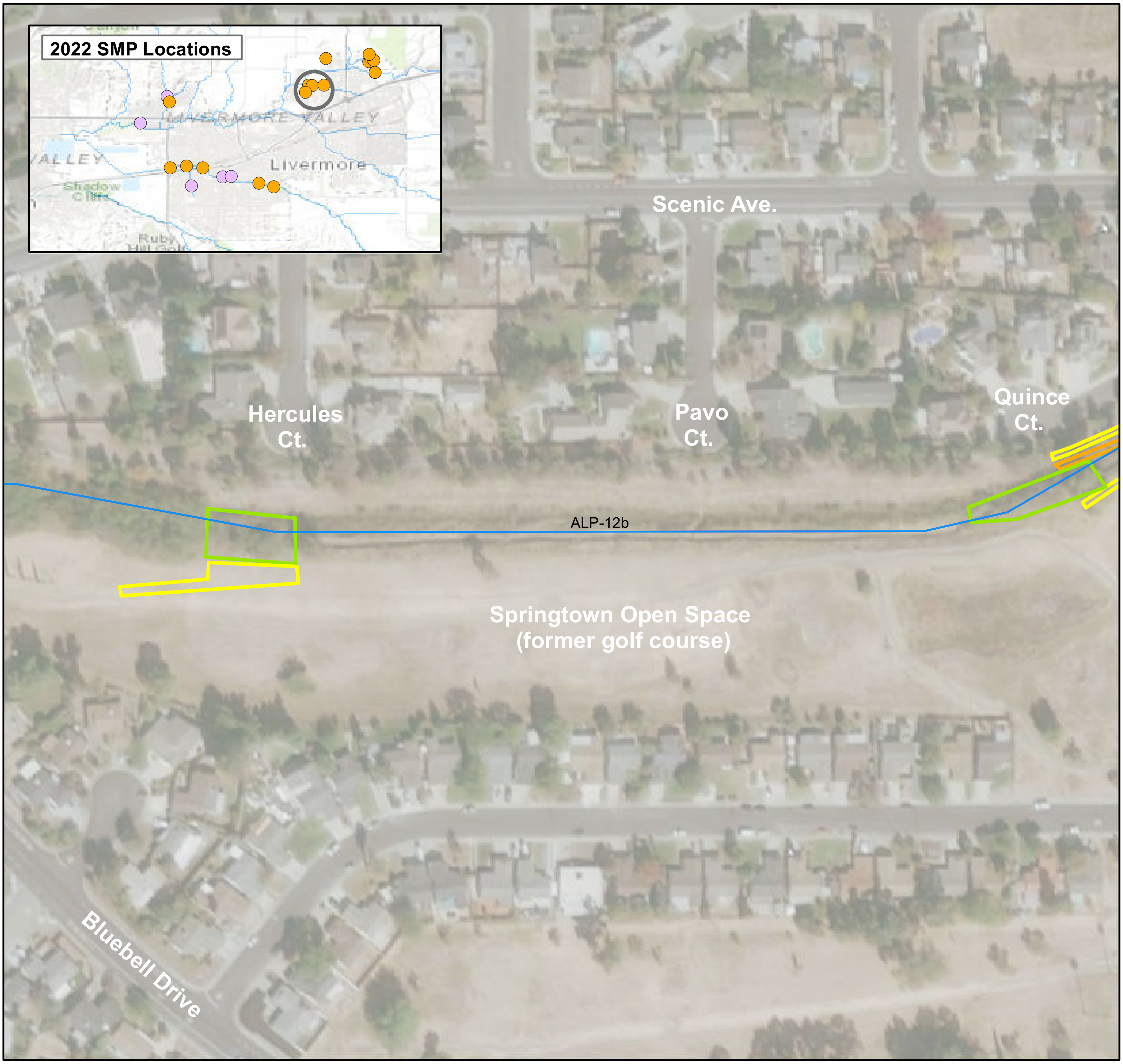
Figure A-7
Site 58 Heather Lane, 59a Quince Court

City of Livermore
2022 Stream Maintenance Program
March 2022

N

0 0.015 0.03 0.06 Miles

SBI Swaim Biological Inc.



58 - Access Northwest
58 - Access Southwest
58 - Temporary (North Low Flow Channel)
59 - Access and Staging
59a - Quince Court Willow limbing and debris removal
59b - Hercules Court Willow limbing and debris removal

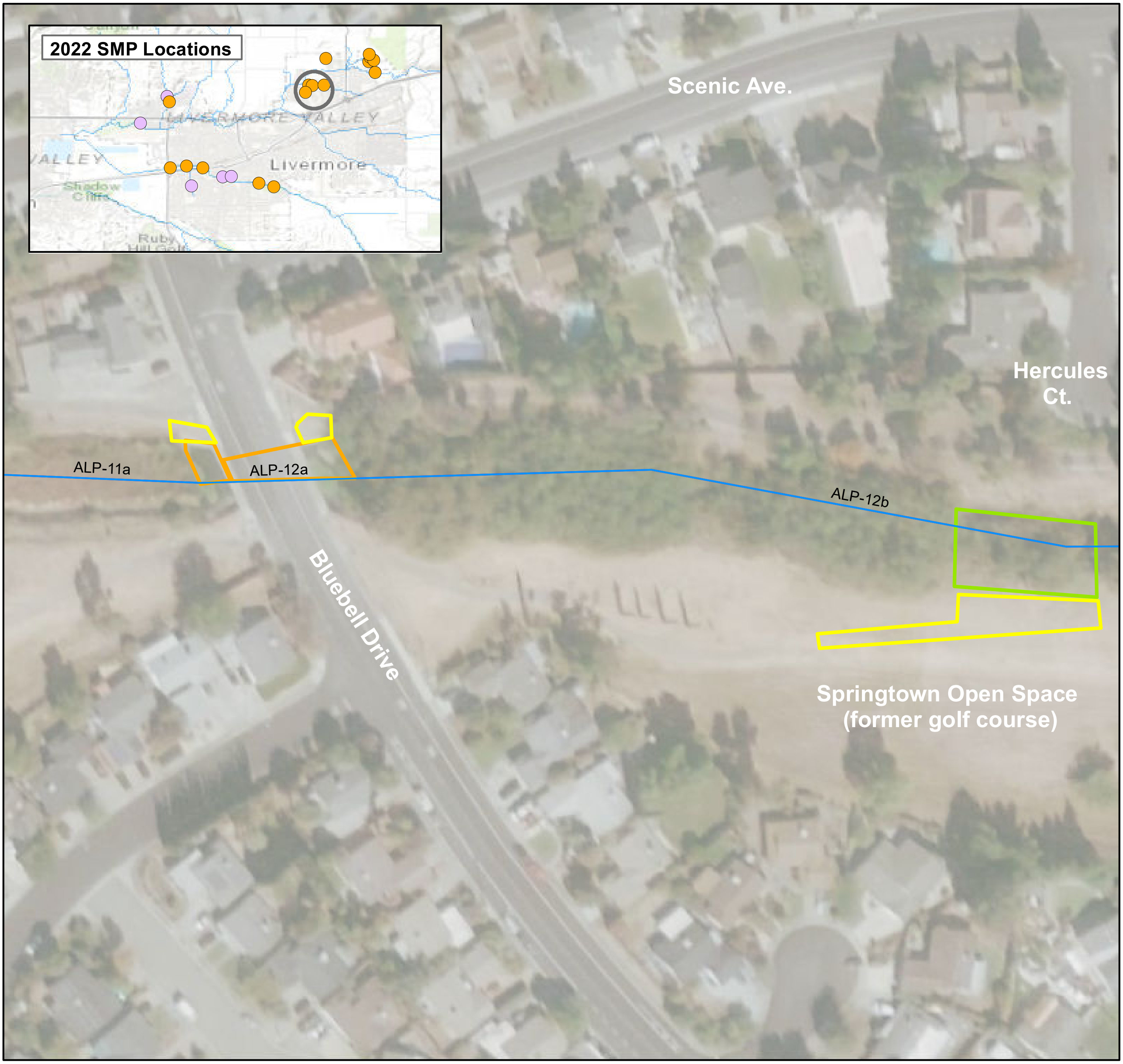
Figure A-8
Site 58 Heather Lane
Site 59a Quince Court, Site 59b Hercules Court

City of Livermore
2022 Stream Maintenance Program
March 2022

N

0 0.0275 0.055 0.11 Miles

SBI Swaim Biological Inc.



59 - Access and Staging
59b - Hercules Court Willow limbing and debris removal
60 - Access Downstream
60 - Access Upstream
60 - Downstream Sediment and Vegetation Removal
60 - Upstream Sediment and Vegetation Removal

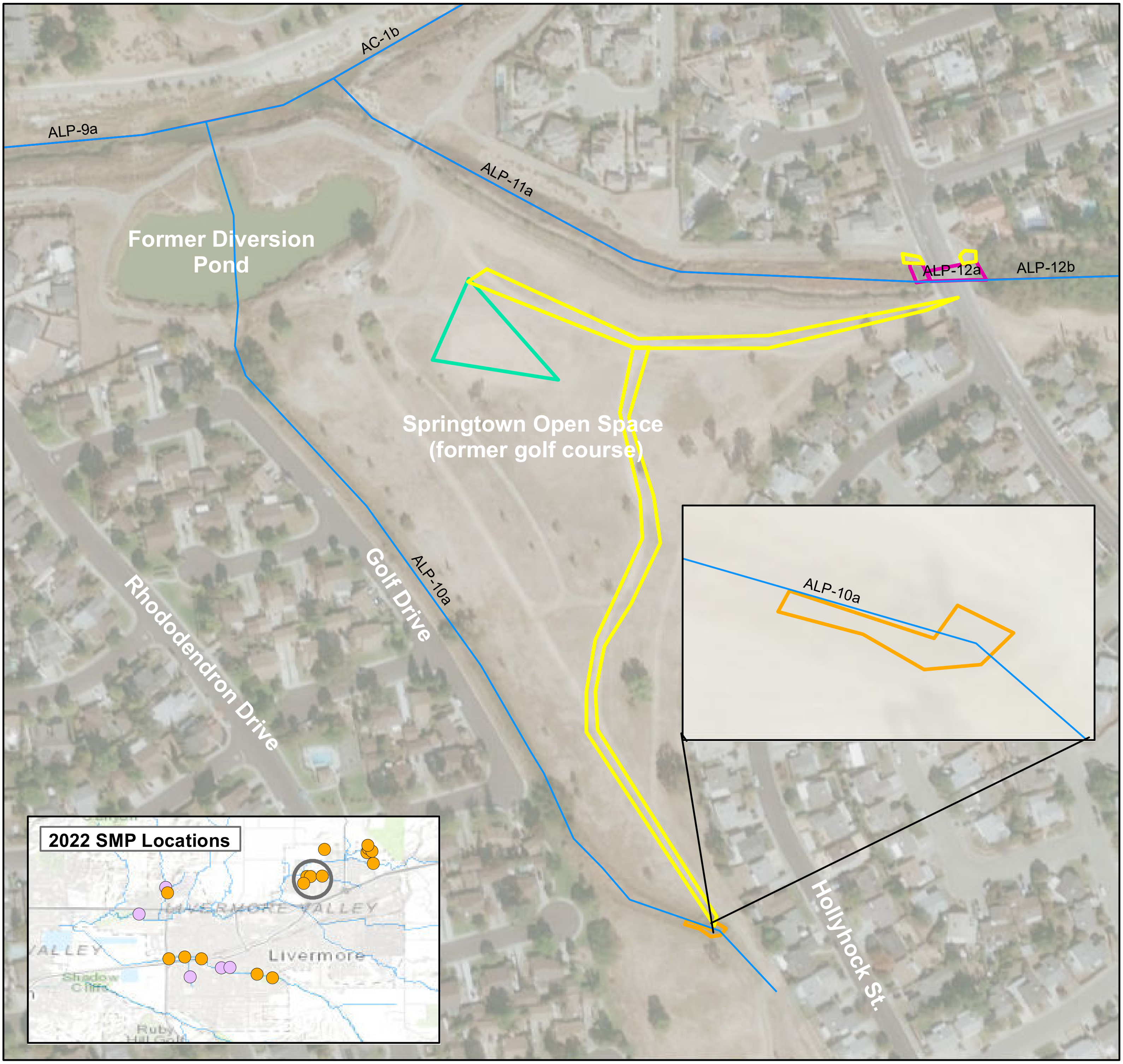
Figure A-9
Site 59b Hercules Court, Site 60 Bluebell Drive

City of Livermore
2022 Stream Maintenance Program
March 2022

N

0 0.0175 0.035 0.07 Miles

SBI



60 - Access Downstream
60 - Access Upstream
60 - Downstream Sediment and Vegetation Removal
60 - Upstream Sediment and Vegetation Removal
61 - Access
61 - Temporary (Sediment and Vegetation Removal)
Access to Drying Location
Drying Location (Sites 58, 60, 61)

Figure A-10
Site 61 Springtown Open Space Outfall

City of Livermore
2022 Stream Maintenance Program
March 2022

0 0.0375 0.075 0.15 Miles

N

SBI

62 - Access
62 - Temporary (Sediment and Vegetation Removal)

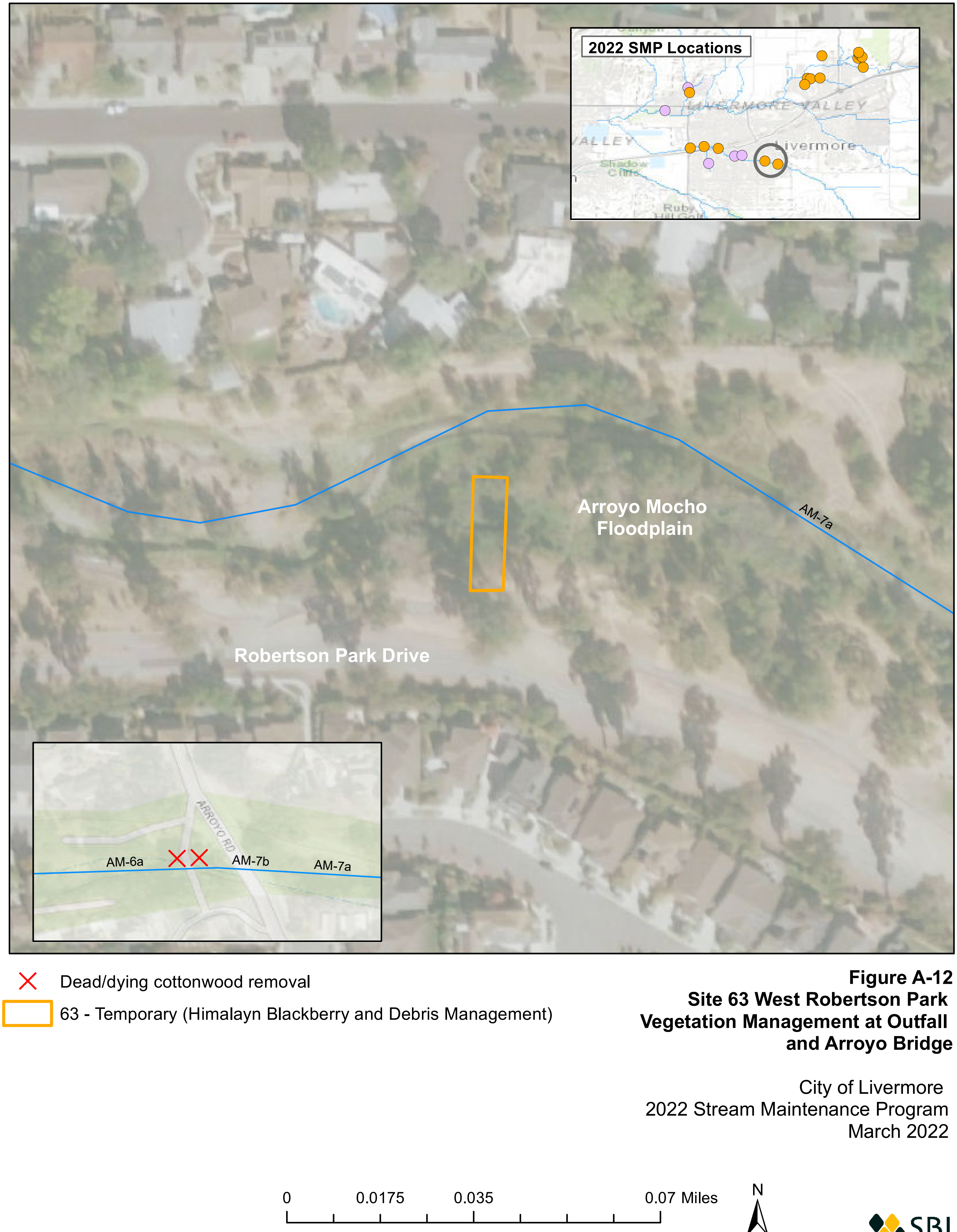
Figure A-11
Site 62 Arroyo Mocho Floodplain Outfall

City of Livermore
2022 Stream Maintenance Program
March 2022

0 0.0175 0.035 0.07 Miles

N

SBI Swaim Biological Inc.



Dead/dying cottonwood removal

63 - Temporary (Himalayn Blackberry and Debris Management)

Figure A-12
Site 63 West Robertson Park
Vegetation Management at Outfall
and Arroyo Bridge

City of Livermore
2022 Stream Maintenance Program
March 2022

64 - Access and Staging
64 - Scour pool
64 - Sediment, Vegetation and Debris Removal
65 - Gate Valve to Trail Bridge 1

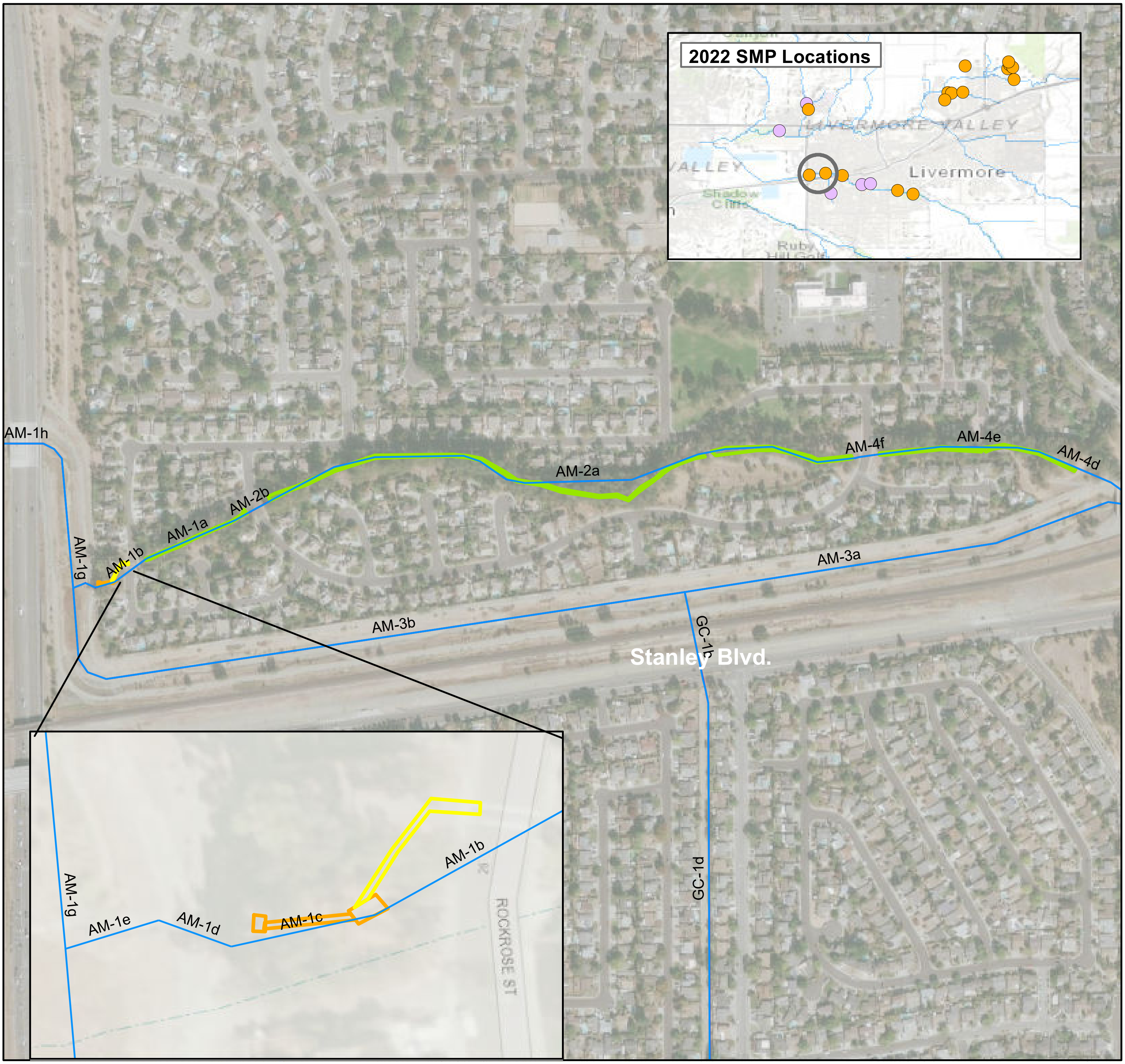
Figure A-14
Site 64 Stanley Bridge

City of Livermore
2022 Stream Maintenance Program
March 2022

0 0.0175 0.035 0.07 Miles

N

SBI
Swaim Biological Inc.



65 - Bridge to Summertree Dr and Cottonwood Ct
65 - Gate Valve to Trail Bridge 1
65 - Summertree Dr. to Rockrose
65 - Summertree Dr. to Trail Bridge 2
65 - Trail Bridge 2 to Summertree Dr at Summertree Ct.
66 - Access and Staging
66 - Temporary (In stream Equipment Access)
66 - Temporary (Sediment and Debris Removal)

0 0.075 0.15 0.3 Miles

N

Figure A-15
Site 65 Arroyo Mocho Low Flow Channel
Site 66 Rockrose Street

City of Livermore
2022 Stream Maintenance Program
March 2022

SBI

67a - Vegetation and Debris Management
67b - Himalyan Blackberry removal
67b - Vegetation and Debris Management

Figure A-16
Site 67 Collier Canyon Mitigation Areas

City of Livermore
2022 Stream Maintenance Program
March 2022

0 0.0225 0.045 0.09 Miles

N

SBI

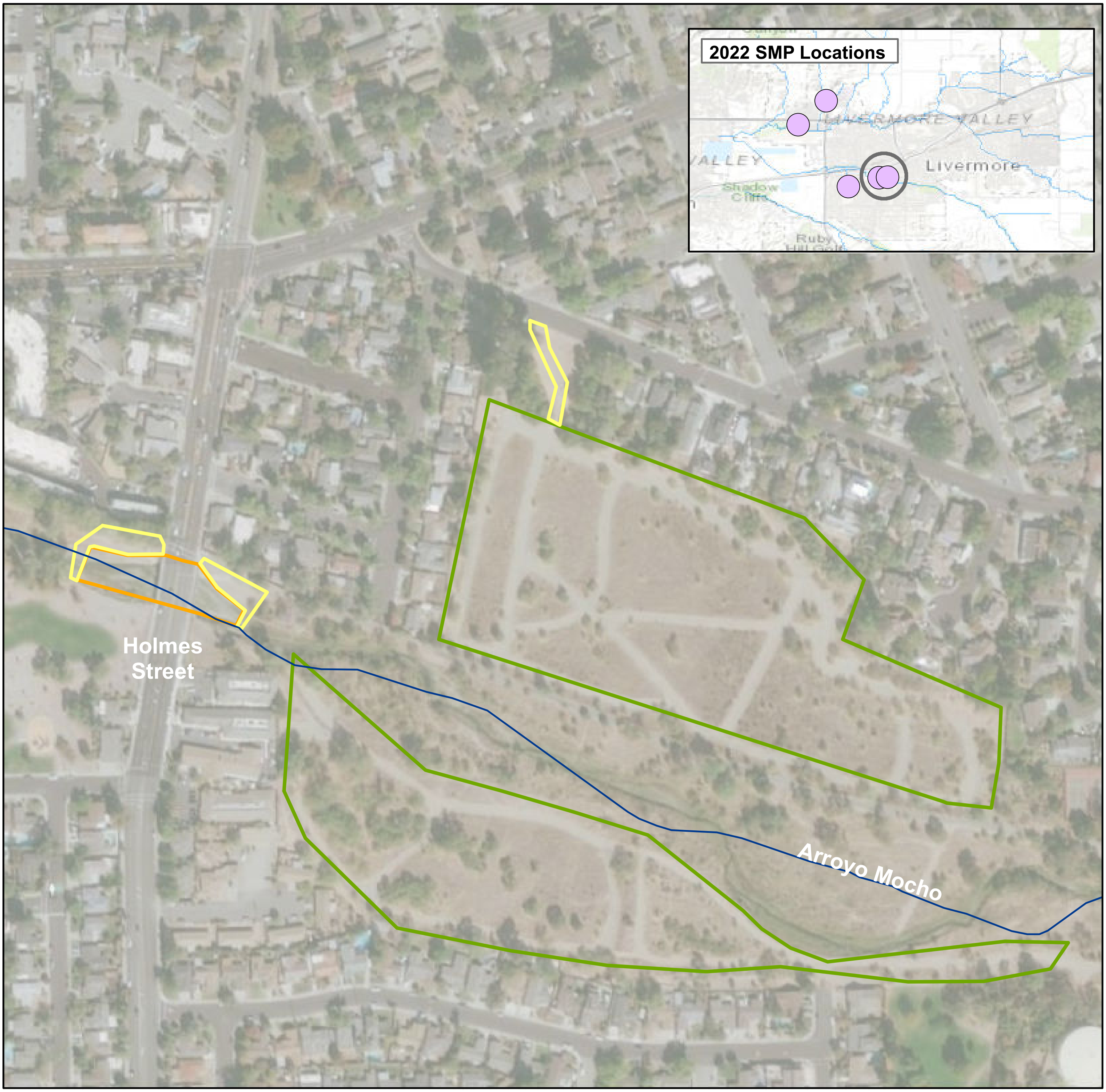
68 - Access Downstream
68 - Access Upstream
68 - Temporary (Sediment and Vegetation Removal)

Figure A-17
Site 68 Laughlin Road Bridge Culvert

City of Livermore
2022 Stream Maintenance Program
March 2022

0 0.01 0.02 0.04 Miles

N



YM-1 Holmes Street Staging and Access East

YM-1 Holmes Street Staging and Access West

YM-1 Holmes Street Bridge Gravel Removal

YM-2 Medeiros Parkway Firebreak Access North

YM-2 Medeiros Parkway Firebreak North

YM-2 Medeiros Parkway Firebreak South

Staging and Access will occur in previously disturbed, paved trails and existing gravel roads.

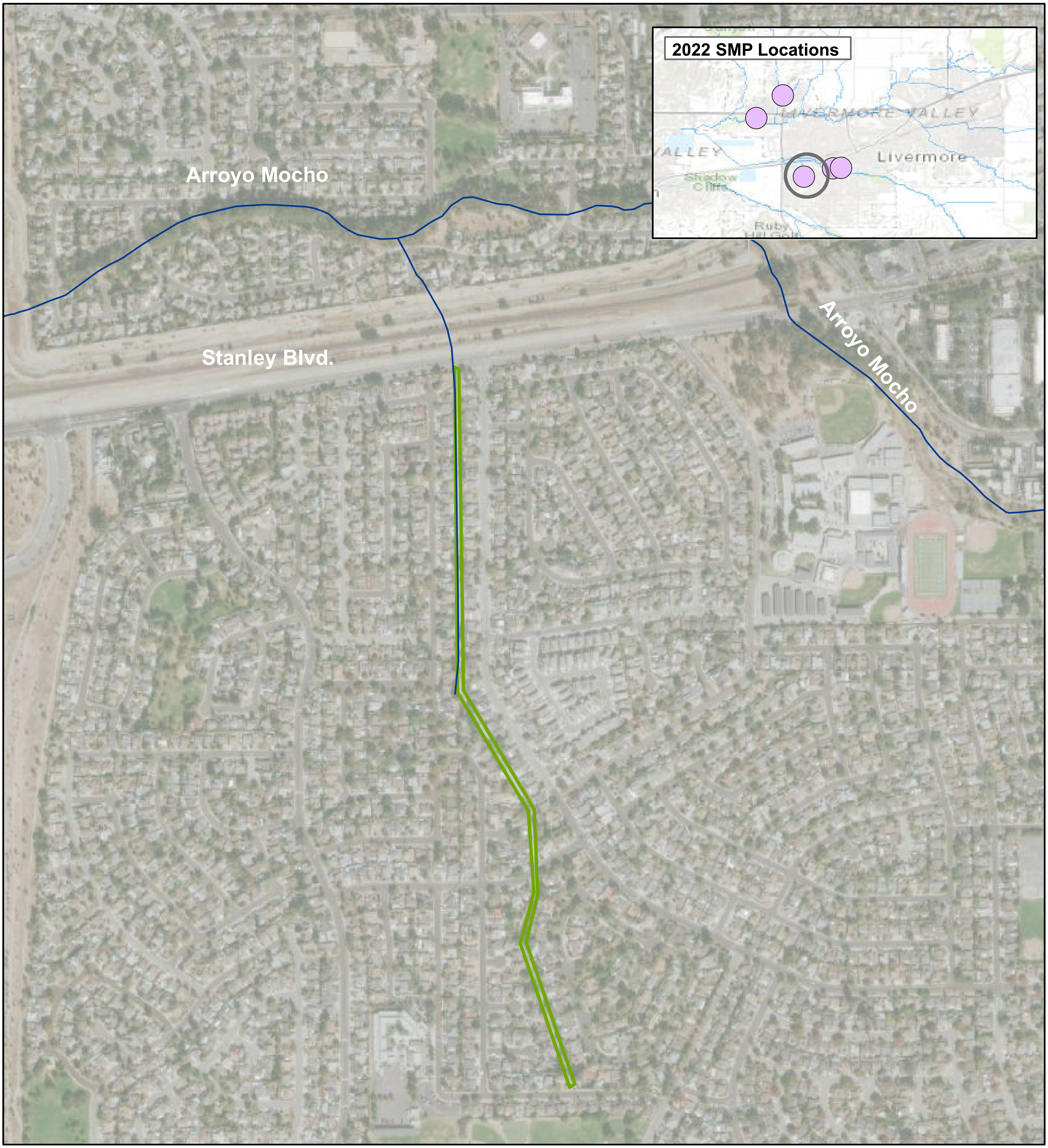
N

0 0.0275 0.055 0.11 Miles

Figure A-18
YM-1 Holmes Street
YM-2 Medeiros Parkway
Arroyo Mocho

City of Livermore
2022 Stream Maintenance Program
March 2022

SBI
Swaim Biological Inc.



YM-3 Granada Channel Vegetation Removal

Staging and Access will occur on paved and existing gravel roads.

N

0 0.05 0.1 0.2 Miles

Figure A-19
YM-3 Granada Channel

City of Livermore
2022 Stream Maintenance Program
March 2022

YM-4 Collier Debris Rack

Figure A-20
YM-4 Collier Canyon Creek

Access will occur from existing paved areas and equipment will not access stream.

City of Livermore
2022 Stream Maintenance Program
March 2022

N

0 0.0125 0.025 0.05 Miles

SBI

YM-5 Airway Blvd Trash and Debris Removal

Access will occur from existing paved areas and equipment will not access stream.

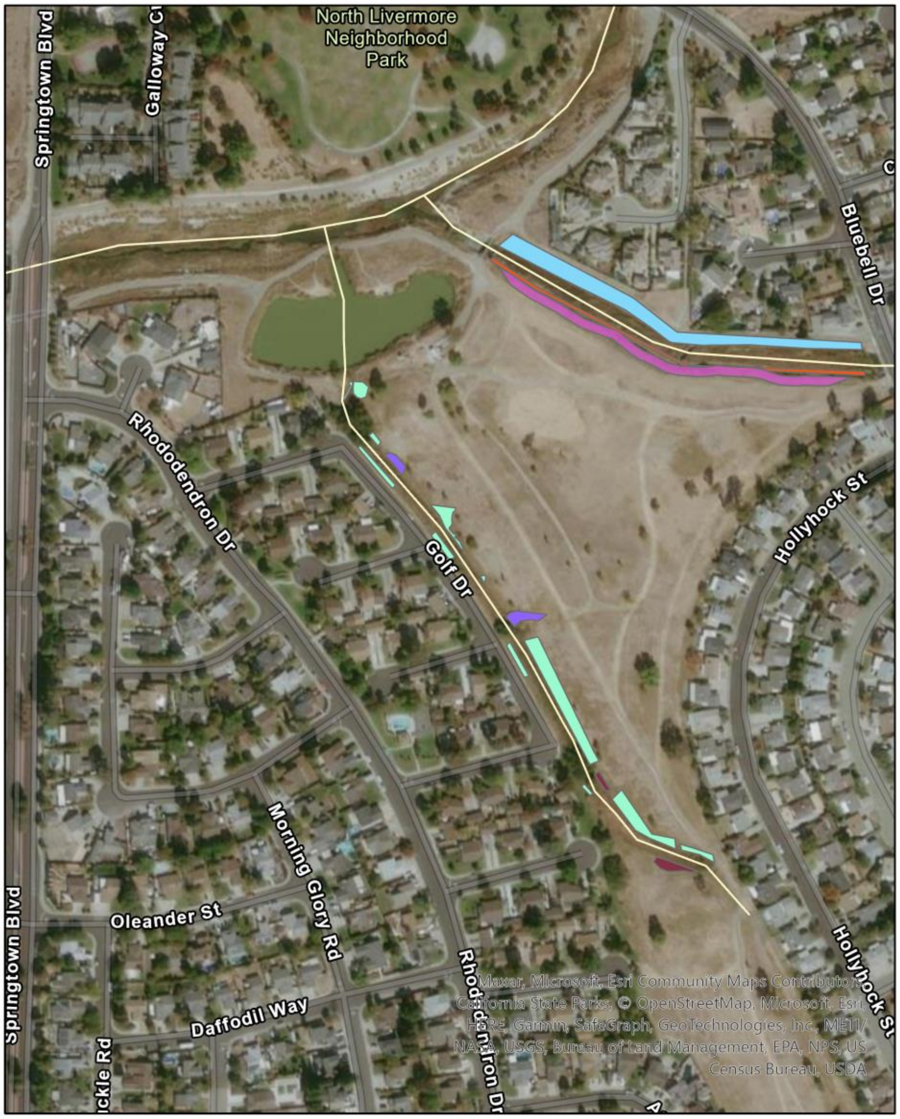
Figure A-21
YM-5 Airway Blvd
Arroyo Las Positas

City of Livermore
2022 Stream Maintenance Program
March 2022

N

0 0.0125 0.025 0.05 Miles

SMP Mitigation at Golf Creek Drive & Springtown Open Space with Potential 2022 Mitigation Areas



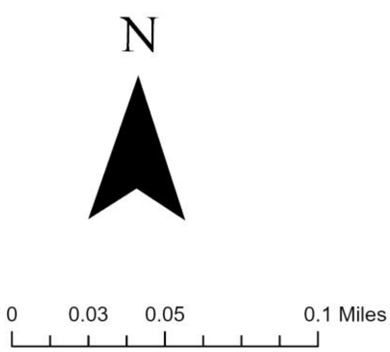
0 0.04 0.07 0.14 Miles

N

SMP Mitigation Sites by Project Year

- 2011
- 2017
- 2019
- 2020
- 2021
- 2022

SMP Mitigation at Robertson Park with Potential 2022 Mitigation Area



SMP Mitigation Sites by Project Year

- 2017
- 2018, 2019
- 2019
- 2020, 2021
- 2022

Appendix B

Representative Photos

Photo Documentation Site 46 – Laughlin Drive and Dry Creek Court

Blocked outfall

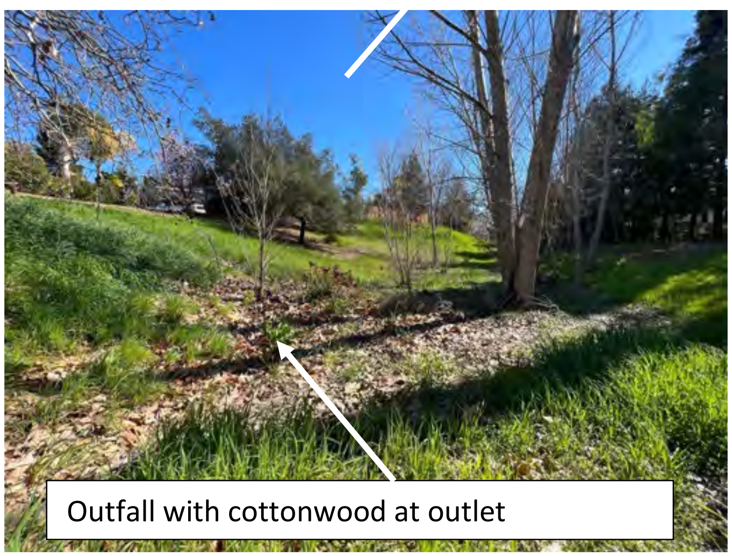
Photo Documentation Site 47 – Lake Drive

Blocked outfall

Looking south standing above outfall

Photo Documentation Site 48 – Meadow Glen

Photodocumentation Site 56- Hillstone Court at Bear Creek Basins



Outfall with cottonwood at outlet

Court and berm separating basin and outfall

Photodocumentation Site 57A/B/C Saddleback Features

57a looking south

57a looking south

57b looking south

57c looking south at culvert inlet

Photo Documentation Site 58 – Heather Lane Bridge Culvert on Arroyo Las Positas


Downstream looking southwest


Downstream looking east


Upstream looking east


Upstream looking southwest

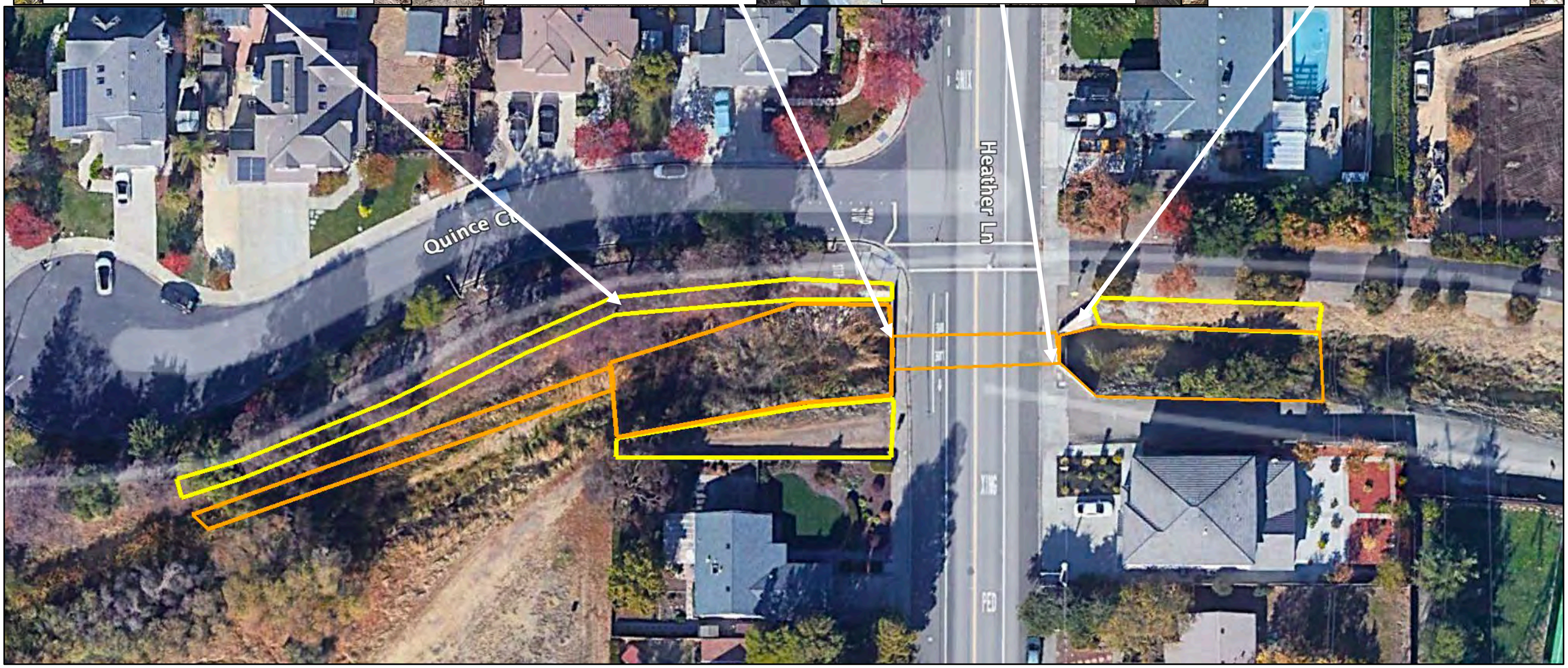
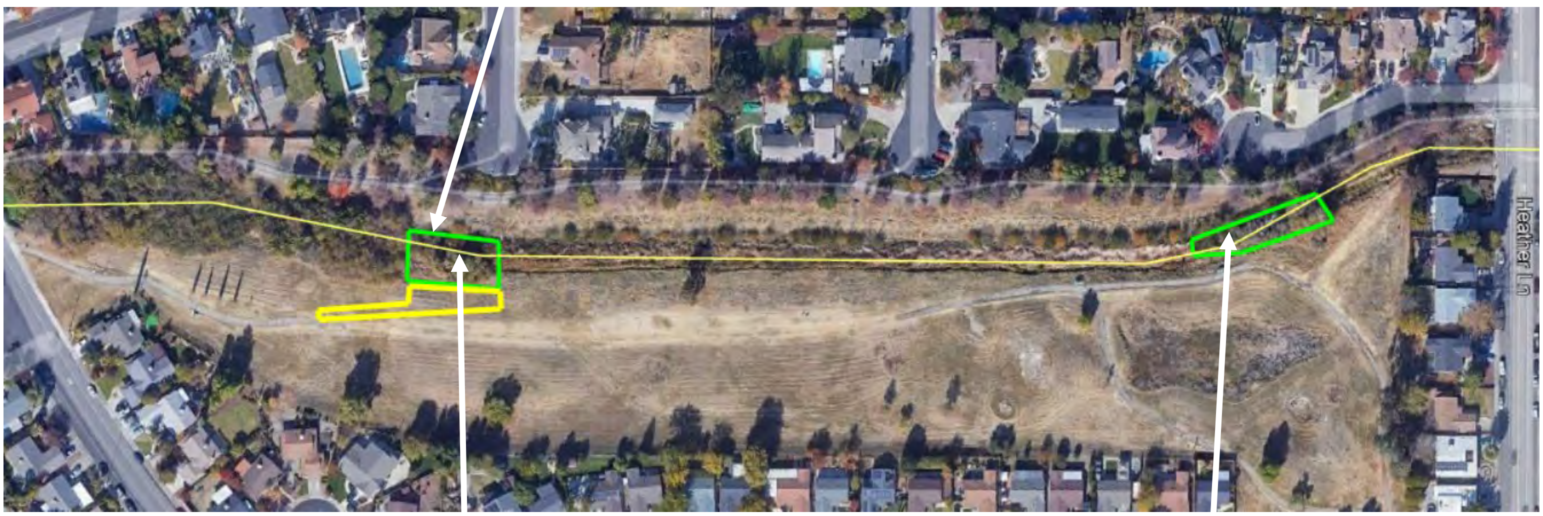


Photo Documentation Site 59 – Vegetation Management on Arroyo Las Positas, Hercules Court and Quince Court

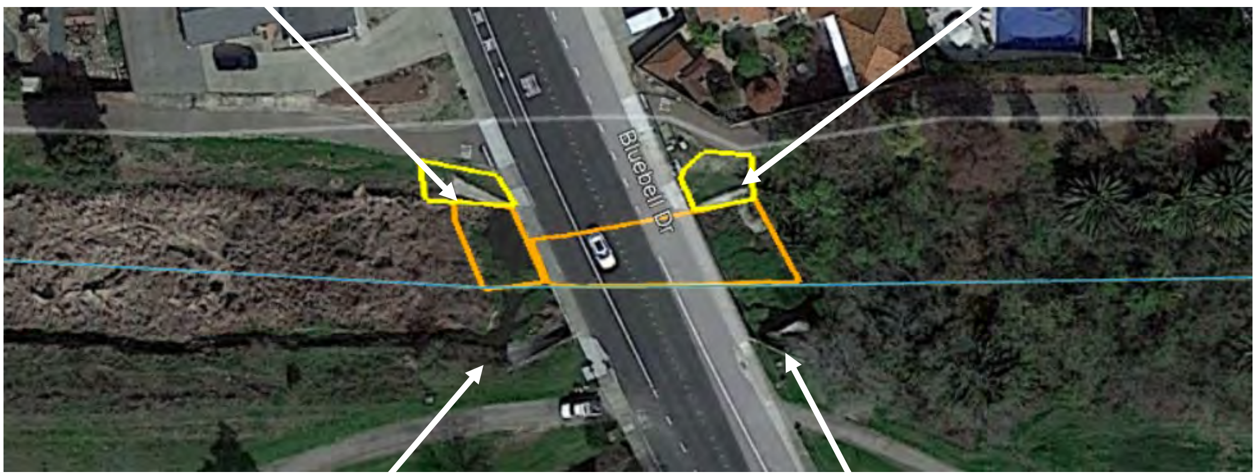


Willow limbing and debris removal

Photo Documentation Site 60 – Sediment and Vegetation Management at Bluebell Bridge Culvert on Arroyo Las Positas

Downstream looking south

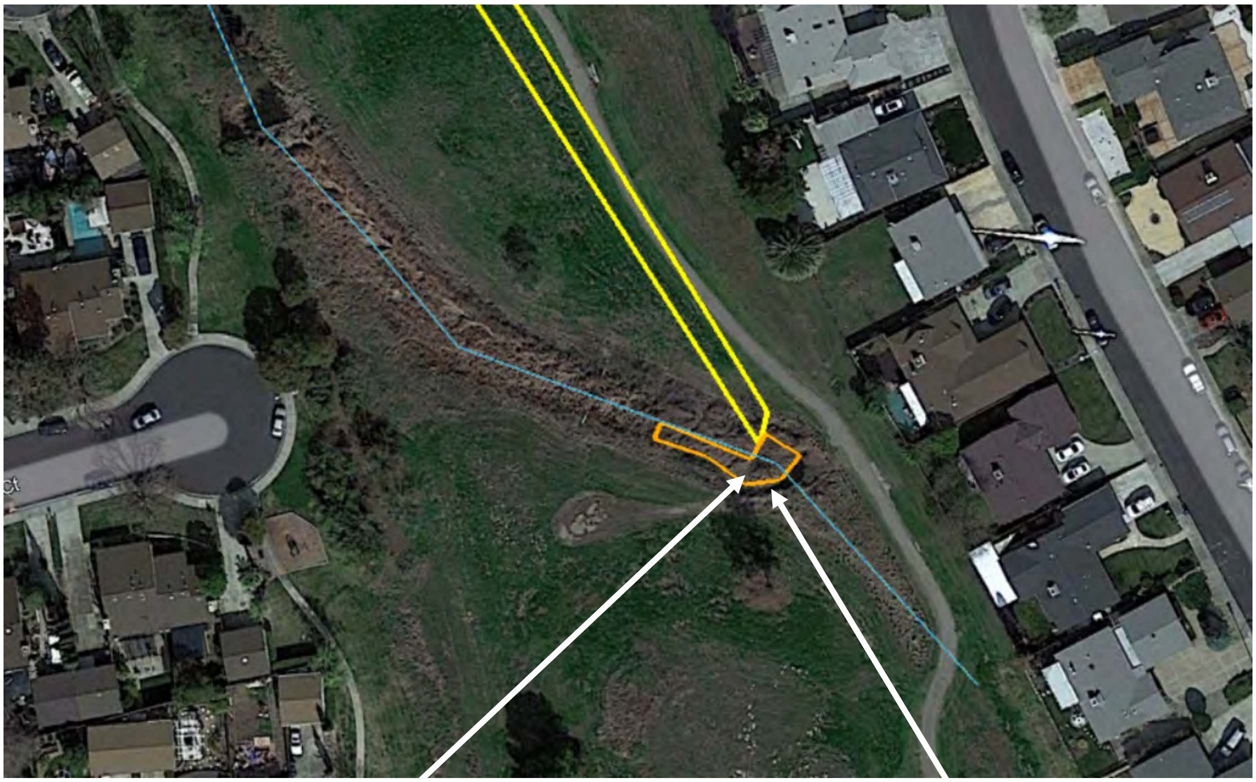
Upstream looking south



Downstream looking north

Upstream looking north

Photo Documentation Site 61 – Sediment and Vegetation Management at Outfall on Springtown Open Space, Tributary to Arroyo Las Positas



Cattails looking east towards homes on Hollyhock St.

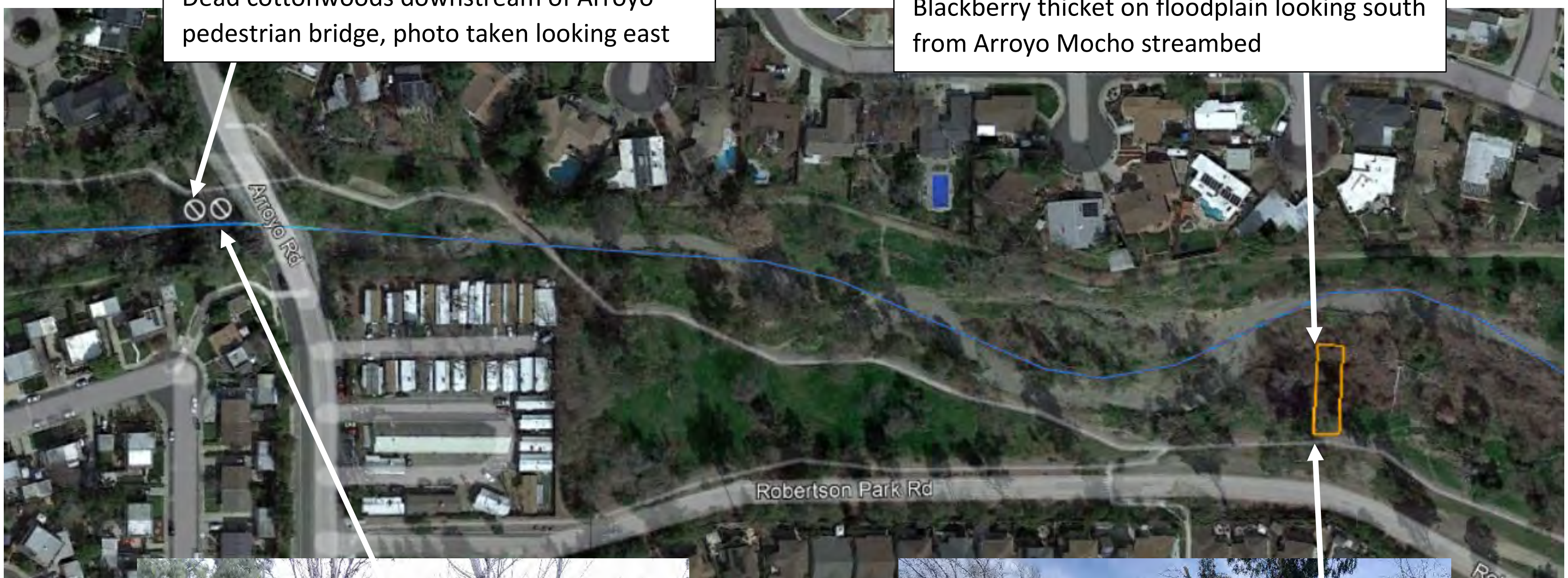
Looking west towards homes on Gladiolus Court.

Photodocumentation Site 62 Outfall at Robertson Dog Park on Arroyo Mocho

Photo Documentation Site 63 –Vegetation Management at Outfall and Arroyo Road Bridge along Arroyo Mocho

Dead cottonwoods downstream of Arroyo pedestrian bridge, photo taken looking east

Blackberry thicket on floodplain looking south from Arroyo Mocho streambed



Dead cottonwoods upstream of Arroyo pedestrian bridge, photo taken looking north

Blackberry thicket on floodplain looking north from Arroyo Mocho bike trail

Photo Documentation Site 64 – Sediment and Vegetation Management between Stanley Road Bridge and Old Railroad Bridge on Arroyo Mocho

Debris caught in old railroad bridge piers, looking south

Scour pool below concrete of old railroad bridge, looking east

Stanley Bridge, pedestrian trail and Arroyo Mocho, looking southwest

Photo Documentation Site 65 –Vegetation and Debris Management along Arroyo Mocho Low Flow Channel

Examples of downed woody debris and debris jams along entire stretch of Arroyo Mocho low flow channel

Photodocumentation Site 66- Rockrose Outfall on Arroyo Mocho Low Flow Channel

Culvert that connects to Stanley Reach

Culvert under Rockrose

Photo Documentation Site 67 – Vegetation and Debris Management at Mitigation Areas A and B on Collier Canyon Creek

Vegetation to be limbed up at Mitigation Area A

Downed tree blocking channel, diverting flow at Mitigation Area B

Blackberry blocking culvert inlet at downstream end of Mitigation Area B

Photodocumentation Site 68 Laughlin Road Bridge Culvert on Altamont Creek

Altamont Creek Downstream

Culvert and apron downstream

Culvert, apron, debris and willow upstream

Appendix C

BMPs by Site

SMP Best Management Practices		2022 Maintenance Sites															
BMP	**Name**	**Site 46**	**Site 47**	**Site 48**	**Site 56**	**Site 57**	**Site 58**	**Site 59**	**Site 60**	**Site 61**	**Site 62**	**Site 63**	**Site 64**	**Site 65**	**Site 66**	**Site 67**	**Site 68**
General																	
GEN-01	Environmental Sensitivity Training	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
GEN-02	Environmental Tailboard Training	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
GEN-03	Contractor Compliance	X	X	X	X	X	X	X									
GEN-04	Prohibited Activities	X	X	X	X	X	X	X									
GEN-05	Staging	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
GEN-06	Off-road Travel	X	X	X	X	X	X	X									
GEN-07	Speed Limits	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
GEN-08	Vehicle Refueling	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
GEN-09	Vehicle Washing	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
GEN-10	Invasive Plants	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
GEN-11	Wildlife Entrapment	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
GEN-12	Erosion Control Measures	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
GEN-13	Material Stockpiling	X	X	X	X	X	X	X									
GEN-14	Minimal Grading	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
GEN-15	Project Construction Boundaries	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
GEN-16	Wet Weather Work-stop	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
GEN-17	Open Trenches	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Species Specific																	
AMPH-1	California Red-Legged Frog	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X
AMPH-2	California Red-Legged Frog	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X

SMP Best Management Practices		2022 Maintenance Sites															
BMP	**Name**	**Site 46**	**Site 47**	**Site 48**	**Site 56**	**Site 57**	**Site 58**	**Site 59**	**Site 60**	**Site 61**	**Site 62**	**Site 63**	**Site 64**	**Site 65**	**Site 66**	**Site 67**	**Site 68**
Bio-2	Special Status Plants	X	X	X	X	X	X		X	X							
Air Quality Protection																	
AQ-1	Basic Construction Air Quality Measures (based on BAAQMD Air Quality Guidelines)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
AQ-2	Additional Construction Air Quality Measures (based on BAAQMD Air Quality Guidelines)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Biological Resources Protection																	
BR-1	Area of Disturbance	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BR-2	Pre-Maintenance Educational Training	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BR-3	Biotechnical Bank Stabilization	X	X	X	X	X	X		X	X	X		X		X		X
BR-4	Impact Avoidance and Minimization During Dewatering	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X
BR-5	Amphibian Species Relocation	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BR-6	On-Call Biologist	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BR-7	Focal Species Plants	X	X	X	X	X	X		X	X							
BR-8	Nesting Migratory Bird and Raptor Pre-maintenance Surveys	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BR-9	California Red-legged Frog Avoidance and Impact Minimization Measures for Ground-Disturbing Activities	X	X	X	X	X	X		X	X	X		X		X		X

SMP Best Management Practices		2022 Maintenance Sites															
BMP	**Name**	**Site 46**	**Site 47**	**Site 48**	**Site 56**	**Site 57**	**Site 58**	**Site 59**	**Site 60**	**Site 61**	**Site 62**	**Site 63**	**Site 64**	**Site 65**	**Site 66**	**Site 67**	**Site 68**
BR-10	California Red-legged Frog Avoidance and Impact Minimization Measures for Vegetation Management	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X
BR-11	California Tiger Salamander Avoidance and Impact Minimization Measures for Sediment and Debris Removal	X	X	X	X	X											X
BR-12	California Tiger Salamander Avoidance and Impact Minimization Measures for Vegetation Management	X	X	X	X	X											X
BR-13	California Tiger Salamander Avoidance and Impact Minimization Measures for Bank Stabilization	X	X	X	X	X											X
BR-14	Western Pond Turtle Pre-maintenance Surveys for Ground-Disturbing Activities							X	X	X							
BR-15	Vernal Pool Fairy Shrimp and Longhorn Fairy Shrimp Avoidance and Impact Minimization Measures	X	X	X													
BR-16	Callippe Silverspot Butterfly Avoidance and Impact Minimization Measures						X	X	X	X	X						
BR-17	Golden Eagle Avoidance and Impact Minimization Measures						X								X	X	X
BR-18	Tricolored Blackbird Avoidance and Impact Minimization Measures					X	X		X			X					

SMP Best Management Practices		2022 Maintenance Sites															
BMP	**Name**	**Site 46**	**Site 47**	**Site 48**	**Site 56**	**Site 57**	**Site 58**	**Site 59**	**Site 60**	**Site 61**	**Site 62**	**Site 63**	**Site 64**	**Site 65**	**Site 66**	**Site 67**	**Site 68**
BR-19	Burrowing Owl Avoidance and Impact Minimization Measures									X							
BR-20	Den Avoidance for American Badger and San Joaquin Kit Fox							X	X	X							
Cultural Resources Protection																	
CR-1	Cultural Resources Investigation	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
CR-2	Previously Undiscovered Cultural Resources	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
CR-3	Previously Undiscovered Paleontological Resources	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Hazardous Materials Safety																	
HAZ-1	Spill Prevention and Response Plan	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
HAZ-2	Equipment and Vehicle Maintenance	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
HAZ-3	Equipment and Vehicle Cleaning	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
HAZ-4	Refueling	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
HAZ-5	On-Site Hazardous Materials Management	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
HAZ-6	Existing Hazardous Sites or Waste	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
HAZ-7	Fire Prevention	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
HAZ-8	Testing and Disposal of Spoils	X		X	X	X	X		X	X	X		X		X		X
Vegetation Management																	
VEG-1	Removal of Existing Vegetation	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
VEG-2	Invasive Plant Species Control Measures	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

SMP Best Management Practices		2022 Maintenance Sites															
BMP	**Name**	**Site 46**	**Site 47**	**Site 48**	**Site 56**	**Site 57**	**Site 58**	**Site 59**	**Site 60**	**Site 61**	**Site 62**	**Site 63**	**Site 64**	**Site 65**	**Site 66**	**Site 67**	**Site 68**
VEG-3	Use of Herbicides and Pesticides											X					
VEG-4	Use of Grazing Animals																
VEG-5	Planting and Revegetation After Soil Disturbance	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X
Water Quality and Creek/Channel Protection																	
WQ-1	Apply Erosion Control Fabric to or Hydroseeding of Exposed Soils		X														
WQ-2	Prevent Scour Downstream of Sediment Removal	X		X	X		X		X	X	X				X		
WQ-3	In-Channel Grading					X	X						X				X
WQ-4	Dechlorination Procedures for Discharges into Creeks and Channels					X											
Good Neighbor Policies																	
GN-1	Work Site Housekeeping	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
GN-2	Public Outreach	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
GN-3	Noise Control	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
GN-4	Traffic Flow, Pedestrians, and Safety Measures	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
GN-5	Odors	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

SMP Best Management Practices		Yearly Maintenance Sites				
BMP	**Name**	**YM-1**	**YM-2**	**YM-3**	**YM-4**	**YM-5**
General						
GEN-01	Environmental Sensitivity Training	X	X	X	X	X
GEN-02	Environmental Tailboard Training	X	X	X	X	X
GEN-03	Contractor Compliance					
GEN-04	Prohibited Activities	X	X	X	X	X
GEN-05	Staging	X	X	X	X	X
GEN-06	Off-road Travel	X	X	X	X	X
GEN-07	Speed Limits	X	X	X	X	X
GEN-08	Vehicle Refueling	X	X	X	X	X
GEN-09	Vehicle Washing	X	X	X	X	X
GEN-10	Invasive Plants	X	X	X	X	X
GEN-11	Wildlife Entrapment	X	X	X	X	X
GEN-12	Erosion Control Measures	X				
GEN-13	Material Stockpiling	X				
GEN-14	Minimal Grading	X				
GEN-15	Project Construction Boundaries	X	X	X	X	X
GEN-16	Wet Weather Work-stop	X	X	X	X	X
GEN-17	Open Trenches	X				
Species Specific						
AMPH-1	California Red-Legged Frog	X	X		X	X
AMPH-2	California Red-Legged Frog	X	X		X	X
Bio-2	Special Status Plants	X	X	X	X	X
Air Quality Protection						
AQ-1	Basic Construction Air Quality Measures (based on BAAQMD Air Quality Guidelines)	X	X	X	X	X
AQ-2	Additional Construction Air Quality Measures (based on BAAQMD Air Quality Guidelines)	X	X	X	X	X

SMP Best Management Practices		Yearly Maintenance Sites				
BMP	**Name**	**YM-1**	**YM-2**	**YM-3**	**YM-4**	**YM-5**
Biological Resources Protection						
BR-1	Area of Disturbance	X	X	X	X	X
BR-2	Pre-Maintenance Educational Training	X	X	X	X	X
BR-3	Biotechnical Bank Stabilization	X				X
BR-4	Impact Avoidance and Minimization During Dewatering	X	X	X	X	X
BR-5	Amphibian Species Relocation	X	X	X	X	X
BR-6	On-Call Biologist	X	X	X	X	X
BR-7	Focal Species Plants					
BR-8	Nesting Migratory Bird and Raptor Pre-maintenance Surveys	X	X	X	X	X
BR-9	California Red-legged Frog Avoidance and Impact Minimization Measures for Ground-Disturbing Activities	X	X		X	X
BR-10	California Red-legged Frog Avoidance and Impact Minimization Measures for Vegetation Management	X	X		X	X
BR-11	California Tiger Salamander Avoidance and Impact Minimization Measures for Sediment and Debris Removal					
BR-12	California Tiger Salamander Avoidance and Impact Minimization Measures for Vegetation Management					
BR-13	California Tiger Salamander Avoidance and Impact Minimization Measures for Bank Stabilization					
BR-14	Western Pond Turtle Pre-maintenance Surveys for Ground- Disturbing Activities					

SMP Best Management Practices		Yearly Maintenance Sites				
BMP	**Name**	**YM-1**	**YM-2**	**YM-3**	**YM-4**	**YM-5**
BR-15	Vernal Pool Fairy Shrimp and Longhorn Fairy Shrimp Avoidance and Impact Minimization Measures					
BR-16	Callippe Silverspot Butterfly Avoidance and Impact Minimization Measures					
BR-17	Golden Eagle Avoidance and Impact Minimization Measures	X	X	X	X	X
BR-18	Tricolored Blackbird Avoidance and Impact Minimization Measures					
BR-19	Burrowing Owl Avoidance and Impact Minimization Measures					
BR-20	Den Avoidance for American Badger and San Joaquin Kit Fox					
Cultural Resources Protection						
CR-1	Cultural Resources Investigation	X	X	X	X	X
CR-2	Previously Undiscovered Cultural Resources	X	X	X	X	X
CR-3	Previously Undiscovered Paleontological Resources	X	X	X	X	X
Hazardous Materials Safety						
HAZ-1	Spill Prevention and Response Plan	X	X	X	X	X
HAZ-2	Equipment and Vehicle Maintenance	X	X	X	X	X
HAZ-3	Equipment and Vehicle Cleaning	X	X	X	X	X
HAZ-4	Refueling	X	X	X	X	X
HAZ-5	On-Site Hazardous Materials Management	X	X	X	X	X
HAZ-6	Existing Hazardous Sites or Waste	X	X	X	X	X
HAZ-7	Fire Prevention	X	X	X	X	X
HAZ-8	Testing and Disposal of Spoils	X				
Vegetation Management						

SMP Best Management Practices		Yearly Maintenance Sites				
BMP	**Name**	**YM-1**	**YM-2**	**YM-3**	**YM-4**	**YM-5**
VEG-1	Removal of Existing Vegetation	X	X	X	X	X
VEG-2	Invasive Plant Species Control Measures	X	X	X	X	X
VEG-3	Use of Herbicides and Pesticides					
VEG-4	Use of Grazing Animals					
VEG-5	Planting and Revegetation After Soil Disturbance	X	X	X	X	X
Water Quality and Creek/Channel Protection						
WQ-1	Apply Erosion Control Fabric to or Hydroseeding of Exposed Soils			X		
WQ-2	Prevent Scour Downstream of Sediment Removal	X				
WQ-3	In-Channel Grading	X				
WQ-4	Dechlorination Procedures for Discharges into Creeks and Channels					
Good Neighbor Policies						
GN-1	Work Site Housekeeping	X	X	X	X	X
GN-2	Public Outreach	X	X	X	X	X
GN-3	Noise Control	X	X	X	X	X
GN-4	Traffic Flow, Pedestrians, and Safety Measures	X	X	X	X	X
GN-5	Odors	X	X	X	X	X

City of Livermore Stream Maintenance Program Manual (available upon request)

Appendix E

2022 Aquatic Resources Delineation

Appendix F

Cultural Resources Assessment

WETS Table

WETS Station: LIVERMORE, CA

Requested years: 1971 - 2022

Month	Avg Max Temp	Avg Min Temp	Avg Mean Temp	Avg Precip	30% chance precip less than	30% chance precip more than	Avg number days precip 0.10 or more	Avg Snowfall
Jan	57.4	38.1	47.8	2.62	1.09	3.14	6	0.0
Feb	62.0	40.5	51.2	2.48	1.14	3.00	6	0.0
Mar	66.1	42.8	54.5	2.24	0.94	2.72	6	0.0
Apr	71.3	44.9	58.1	1.04	0.46	1.27	3	0.0
May	77.5	49.2	63.4	0.40	0.11	0.39	1	0.0
Jun	84.6	53.3	68.9	0.09	0.00	0.08	0	0.0
Jul	89.6	55.9	72.8	0.02	0.00	0.00	0	0.0
Aug	88.9	55.7	72.3	0.06	0.00	0.00	0	0.0
Sep	86.3	54.0	70.1	0.19	0.00	0.15	0	0.0
Oct	77.9	49.0	63.5	0.85	0.24	0.90	2	0.0
Nov	65.3	42.5	53.9	1.65	0.69	2.01	4	0.0
Dec	57.3	38.0	47.6	2.45	1.09	2.98	6	0.0
Annual:					11.40	16.72		
Average	73.7	47.0	60.3	-	-	-	-	-
Total	-	-	-	14.09			34	0.0

GROWING SEASON DATES

Years with missing data:	24 deg = 7	28 deg = 10	32 deg = 9
Years with no occurrence:	24 deg = 41	28 deg = 8	32 deg = 0
Data years used:	24 deg = 45	28 deg = 42	32 deg = 43
Probability	24 F or higher	28 F or higher	32 F or higher
50 percent *	No occurrence	1/15 to 12/22: 341 days	2/20 to 12/3: 286 days
70 percent *	No occurrence	1/1 to 1/5: 369 days	2/10 to 12/13: 306 days

* Percent chance of the growing season occurring between the Beginning and Ending dates.

STATS TABLE - total precipitation (inches)

Yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annl
1903	3.19	0.94	5.65	0.81	0.12	0.00	0.00	0.00	0.00	T	2.16	0.59	13.46
1904	0.89	4.18	3.71	1.56	0.24	T	T	0.32	1.62	1.00	0.70	1.42	15.64
1905	2.43	2.30	4.17	0.93	1.89	0.00	0.00	0.00	T	0.00	1.61	1.18	14.51
1906	5.56	2.67	5.18	0.95	1.61	0.56	T	0.00	0.20	0.03	1.34	6.45	24.55
1907	4.13	1.86	6.85	0.47	0.16	0.56	0.00	0.00		0.81	0.04	3.90	18.78
1908	2.27	1.35	0.73	0.28	0.53	T	T	0.00	0.03	0.27	0.60	1.55	7.61
1909	10.18	3.96	1.94		T	0.05	0.00	0.00	0.62	0.75	1.68	5.77	24.95
1910	2.50	1.14	1.90	0.10	T	0.04	T	0.00	0.10	0.29	0.10	1.32	7.49

1911	12.60	1.42	4.45	0.69	0.24	0.07	T	0.00	T	0.43	0.29	1.71	21.90
1912	2.66	0.20	1.99	0.73	0.94	0.65	T	0.00	0.48	0.71	0.44	0.81	9.61
1913	2.63	0.38	1.65	0.54	0.58	0.01	0.27	0.02	T	0.00	2.17	3.17	11.42
1914	7.10	2.11	0.66	0.76	0.45	0.19		0.00	0.00	0.42	0.33	4.96	16.98
1915	4.16	4.79	1.50	0.66	2.66	0.00	M0.00	0.00	T	0.00	0.76	4.41	18.94
1916	11.35	2.17	1.47	0.21	0.05	T	0.00	T	0.44	0.50	0.68	3.28	20.15
1917	1.06	3.37	1.08	0.15	0.02	0.00	T	0.00	0.04	0.00	0.43	0.66	6.81
1918	0.59	3.08	3.32	0.61	M0.00	T	0.00	T	5.72	0.39	2.38	1.51	17.60
1919	1.03	4.58	2.33	0.05	T	0.00	T	T	0.48	0.15	0.33	2.21	11.16
1920	0.22	0.71	3.52	1.07	0.00	0.13	0.00	0.00	T	2.03	1.43	3.81	12.92
1921	3.38	0.59	0.83	0.16	1.05	0.00	0.00	0.00	0.05	0.15	1.17	3.38	10.76
1922	1.51	5.46	1.83	0.23	0.27	T	T	T	0.00	0.54	2.86	5.43	18.13
1923	1.80	0.65	0.15	2.15	T	0.02	0.00	T	0.82	0.25	0.76	0.87	7.47
1924	1.40	0.93	0.65	0.28	0.07	0.00	0.00	T	T	1.30	1.53	2.63	8.79
1925	1.02	3.74	1.14	1.75	1.41	0.04	0.00	0.00	T	T	0.97	1.14	11.21
1926	2.35	3.58	0.16	3.11	0.11	T	0.00	T	0.00	0.93	2.83	0.78	13.85
1927	1.74	3.49	1.54	1.73	0.10	0.18	0.00	T	0.03	1.71	1.43	2.00	13.95
1928	1.46	0.29	3.42	1.43	0.45	0.00	0.00	0.00	0.00	T	1.50	2.76	11.31
1929	1.26	0.87	1.07	0.59	0.03	0.83	0.00	0.00	0.00	0.01	0.00	1.81	6.47
1930	3.64	1.91	1.88	0.63	0.43	0.00	0.00	T	0.20	0.00	1.14	0.26	10.09
1931	3.45	1.67	0.57	0.36	0.93	0.11	T	0.00	T	0.27	1.89	5.63	14.88
1932	1.29	3.15	0.19	0.41	0.37	T	0.00	0.00	0.00	0.00	0.51	2.03	7.95
1933	4.51	0.44	2.09	0.13	0.70	0.03	0.00	0.00	0.01	0.75	0.00	3.69	12.35
1934	1.29	2.86	0.00	0.13	0.60	0.53	0.00	T	0.27	0.62	2.71	2.32	11.33
1935	3.53	0.52	3.16	3.28	0.00	0.00	T	0.04	0.00	0.79	0.21	1.53	13.06
1936	3.28	6.76	0.71	0.63	0.46	0.10	T	T	0.00	0.40	0.02	3.26	15.62
1937	3.38	4.13	5.07	0.68	0.17	0.20	T	0.00	0.00	0.55	2.46	4.57	21.21
1938	2.40	6.14	4.09	0.90	0.02	0.00	0.00	0.00	T	1.00	1.08	0.52	16.15
1939	2.40	1.57	2.18	0.53	0.18	T	T	0.00	0.16	1.23	0.15	0.78	9.18
1940	8.13	5.14	2.60	0.35	0.14	0.00	0.00	0.00	0.25	0.50	0.43	4.63	22.17
1941	3.24	4.19	2.07	2.76	0.23	0.00	0.00	0.03	0.00	0.72	0.89	5.34	19.47
1942	3.89	1.68	1.42	3.10	1.00	0.00	0.00	0.00	0.09	1.08	3.05	1.73	17.04
1943	4.48	1.68	2.39	1.14	T	0.06	0.00	0.00	0.00	0.30	0.53	1.23	11.81
1944	2.36	4.89	1.01	0.94	0.73	T	0.00	0.00	0.00	0.77	3.41	2.03	16.14

1945	0.87	3.68	3.19	0.20	0.17	T	0.00	0.02	0.00	1.07	2.07	M2.50	13.77
1946	0.76	1.23	1.69	0.02	0.61	0.00	0.24	0.00	0.02	0.02	2.93	2.07	9.59
1947	0.69	1.45	2.34	0.53	0.17	0.36	0.00	0.00	T	1.84	0.85	0.51	8.74
1948	0.20	1.11	2.79	2.50	1.03	M0.16	0.03	0.00	T	0.46	0.34	2.71	11.33
1949	1.39	2.47	3.38	0.02	0.34	0.00	0.03	0.16	0.05	0.08	1.20	M0.90	10.02
1950	4.65	1.54	1.44	M0.85	M0.59	0.01	M0.00	0.00	0.08	M1.84	M5.95	4.95	21.90
1951	2.23	M1.81	M1.82	0.55	M0.35	M0.06	M0.00	M0.00	T	1.04	M3.01	6.07	16.94
1952	7.60	1.40	M2.36	2.20	M0.16	0.04	M0.00	0.00	M0.10	0.01	2.11	6.33	22.31
1953	2.07	0.05	M1.12	M1.42	0.61	0.59	M0.00	M0.15	0.00	M0.21	M1.33	M0.64	8.19
1954	2.19	2.27	M3.00	0.73	0.16	0.30	0.00	0.00	M0.04	MT	1.68	M3.33	13.70
1955	M2.45	1.69	M0.38	M1.28	0.65	0.00	0.00	M0.01	0.01	M0.01	M1.31	10.15	17.94
1956	5.49	M1.15	0.14	1.92	M0.63	0.00	0.00	0.00	M0.63	0.79	0.03	0.48	11.26
1957	2.65	M2.23	1.30	1.14	M2.65	M0.04	0.00	0.00	M0.05	1.06	0.37	M1.62	13.11
1958	3.16	5.37	4.44	3.74	0.66	0.41	T	T	0.02	0.09	0.14	0.86	18.89
1959	2.45	3.59	0.29	0.35	T	0.00	0.00	0.07	1.89	0.00	T	0.75	9.39
1960	2.98	4.12	0.60	0.48	0.42	0.00	0.02	0.00	0.01	0.05	2.92	1.25	12.85
1961	2.08	1.04	1.92	1.03	0.69	0.19	T	0.13	0.16	0.15	2.24	0.82	10.45
1962	0.73	5.61	1.82	0.22	T	0.00	0.00	T	0.00	3.64	0.28	1.55	13.85
1963	1.40	4.50	2.60	3.47	M0.70	T	0.00	T	0.33	0.93	3.18	0.19	17.30
1964	2.37	0.08	1.57	0.21	0.48	0.32	T	0.12	0.04	0.85	2.44	4.91	13.39
1965	2.11	0.59	1.73	1.53	0.00	0.00	T	0.21	T	0.03	4.22	3.23	13.65
1966	1.05	1.17	0.17	0.33	0.10	0.12	0.17	0.00	0.11	0.00	3.43	2.35	9.00
1967	6.14	0.29	4.15	4.65	0.19	0.48	0.00	T	0.02	0.24	0.88	1.62	18.66
1968	3.93	0.90	2.40	0.43	0.15	0.00	0.00	T	T	0.43	2.48	3.04	13.76
1969	6.28	4.76	0.55	1.24	0.08	T	0.00	0.00	0.00	1.10	0.49	2.34	16.84
1970	5.38	1.18	1.42	0.40	0.07	0.32	0.00	0.00	0.00	0.41	5.24	5.27	19.69
1971	1.19	0.33	1.75	1.37	0.54	T	0.00	T	0.13	0.04	0.46	3.27	9.08
1972	0.90	0.79	0.14	0.64	0.00	0.04		0.00	0.58	2.98		2.22	8.29
1973	5.50			0.29	0.03	T	0.00	0.00	0.08	2.08	3.71	3.80	15.49
1974	1.50	0.71	2.69	1.62	0.00	0.00	0.00	0.00	0.00	0.50	0.66		7.68
1975	0.84	3.65	5.24	1.42	T	0.06	0.10	0.35	0.00	1.27	0.08	0.21	13.22
1976	0.30	1.46	0.48	0.39	0.00	0.18	0.00	0.91	0.95	0.50	0.50	0.73	6.40
1977	1.15	0.83	0.82	0.16	1.01	0.00	0.10	0.00	0.22	0.13		3.07	7.49
1978	5.44	2.95		2.49	0.01	T	0.00	0.00	0.04	0.00	2.16	0.58	13.67

1979	4.52	3.19	1.86	0.88	0.34	0.00	0.06	T	0.00	1.51	1.13	2.66	16.15
1980	4.16	4.24	1.36	1.32	0.48	0.00	0.70	0.00	0.00	0.04	0.28	1.18	13.76
1981	3.97	1.11	2.94	0.61	0.11	0.00	0.00	0.00	0.06	2.07	3.44	2.57	16.88
1982	5.29	2.16	5.58	1.50	0.00	0.28	0.00	M0.01	1.48	2.24	3.72	2.80	25.06
1983	6.28	5.56	6.14	3.51	0.21	0.00	0.00	0.50	1.02	0.27	5.44	3.44	32.37
1984	0.33	1.87	1.00	0.53	0.01	0.03	T	0.00	0.04	1.25	4.71	1.51	11.28
1985	0.48	1.25	2.62	0.32	0.07	0.22	T	0.03	0.13	0.89	2.69	1.97	10.67
1986	2.04	7.11	4.09	0.40	0.14	0.00	0.01	0.00	0.45	0.04	0.08	0.92	15.28
1987	2.73	3.47	2.30	0.16	0.09		0.00	0.00	0.00	0.87	1.40	2.30	13.32
1988	1.78	0.38	0.26	1.15	0.45	0.10	0.00	T	0.00	0.11	1.92	2.03	8.18
1989	0.81	0.95	2.94	0.88	0.08	0.10	0.00	T	1.33	1.13	1.02	0.10	9.34
1990	1.54	2.46	0.87	0.37	1.78	T	0.02	T	0.06	0.08	0.39	1.45	9.02
1991	0.31	2.20	5.87	0.34	0.35	0.08	0.00	0.21	0.04	1.65	0.31	1.19	12.55
1992	1.39	4.61	1.97	0.43	0.00	0.09	0.00	0.00	0.00	0.90	0.15	4.79	14.33
1993	6.41	4.53	2.91	0.63	0.51	0.30	0.00	0.00	T	0.57	2.00	1.81	19.67
1994	0.94	3.33	0.15	1.20	1.78	0.04	T	0.00	T	0.58		1.36	9.38
1995	6.64	0.33	6.66	1.02	0.92	0.70	T	0.00	0.00	0.00	0.01	5.37	21.65
1996	5.17	4.10	2.34	1.91	1.05	0.00	0.00	0.00	0.00	1.08	2.55	4.43	22.63
1997	5.81	0.15	0.06	0.15	0.29	0.17	0.00	0.42	0.00	0.28	4.23	1.95	13.51
1998	5.47	7.30	2.37	1.37	2.00	0.13	0.00	0.00	0.18	0.54	2.48	0.73	22.57
1999	3.23	3.33	1.67	0.99	0.08	0.01	0.00	0.03	0.04	0.15	1.26	0.25	11.04
2000	4.61	4.87	1.25	0.59	0.69	0.18	0.00	0.01	0.24		0.49	0.45	13.38
2001	1.92	2.89	1.22	1.80	0.00	0.12	0.00	0.00	0.09	0.37	1.92	5.09	15.42
2002	0.72	0.62	1.65	0.16	0.68	0.00	0.00	0.00	0.00	0.00	2.65	7.01	13.49
2003	0.66	1.31	1.07	3.09	0.95	0.00	T	0.29	T	0.02	2.02	3.57	12.98
2004	2.19	4.01	0.39	0.18	0.11	0.00	0.00	0.00	0.58	2.77	0.89	3.01	14.13
2005	2.81	3.55	3.41	1.53	1.03	0.05	T	0.00	0.25	0.17	0.65	5.40	18.85
2006	2.22	1.32	4.79	2.60	0.34	T	T	0.00	0.00	0.20	1.68	2.25	15.40
2007	0.52	3.92	0.33	0.44	0.11	0.00	T	0.00	0.21	1.12	0.71	2.05	9.41
2008	4.79	1.89	0.10	0.02	T	0.00	0.00	0.00	0.00	0.33	1.40	1.56	10.09
2009	1.34	3.31	2.29	0.23	0.41	0.11	T	0.00	0.31	2.79	0.21	2.02	13.02
2010	3.53	2.36	1.57	2.10	0.24	0.00	0.00	0.00	T	1.00	2.02	3.87	16.69
2011	0.78	2.69	4.10	0.22	0.46	1.07	0.00	0.00	T	1.06	0.93	0.04	11.35
2012	1.52	0.52	2.57	2.01	0.02	0.12	0.00	0.00	0.01	0.27	3.40	4.22	14.66

2013	1.07	0.47	0.33	0.44	0.14	0.04	0.00	0.00	0.33	0.00	1.30	0.38	4.50
2014	0.08	2.58	1.25	0.98	0.00	0.01	0.00	0.00	0.22	0.17	1.19	8.23	14.71
2015	0.00	1.62	0.25	0.78	0.50	0.33	T	0.01	0.05	0.02	2.49	2.55	8.60
2016	3.95	0.69	3.30	2.14	0.21	0.00	0.00	0.00	0.00	3.34	1.37	2.62	17.62
2017	8.10	6.07	2.09	1.93	0.03	0.02	0.00	T	T	0.18	2.20	0.06	20.68
2018	3.30	0.57	4.44	1.68	0.01	0.00	0.00	0.00	0.00	0.18	1.64	1.54	13.36
2019	2.66	6.31	2.58	0.30	1.63	0.00	0.00	0.00	0.22	0.00	0.97	2.91	17.58
2020	1.05	0.00	2.97	1.72	0.75							1.04	7.53
2021	2.37	0.56	0.54	0.09	T	0.00	T	0.00	T	4.01	0.76	3.72	12.05
2022	0.01	M0.10											0.11
Notes: Data missing in any month have an "M" flag. A "T" indicates a trace of precipitation.													
Data missing for all days in a month or year is blank.													
Creation date: 2022-02-28													

AgACIS for Alameda County

AgACIS

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WETS Station: LIVERMORE MUNICIPAL AP, CA

Requested years: 1971 - 2022

Month	Temperature (°F)			Precipitation (inches)				
	Avg daily max	Avg daily min	Avg daily mean	Avg	30% chance will have less than	30% chance will have more than	Avg number of days with 0.10 inch or more	Average total snowfall
Jan	58.2	38.1	48.2	2.25	0.84	2.63	5	-
Feb	61.5	39.6	50.6	2.42	1.03	2.87	6	-
Mar	65.5	42.2	53.8	1.92	0.90	2.34	5	-
Apr	69.6	45.1	57.4	1.07	0.33	1.27	3	-
May	75.7	49.8	62.8	0.47	0.15	0.47	2	-
Jun	83.4	54.3	68.8	0.10	0.00	0.04	0	-
Jul	88.2	57.2	72.7	0.00	0.00	0.00	0	-
Aug	87.9	57.5	72.7	0.01	0.00	0.00	0	-
Sep	85.8	55.5	70.7	0.08	0.00	0.10	0	-
Oct	77.6	49.8	63.7	0.94	0.17	0.83	2	-
Nov	65.8	42.4	54.1	1.42	0.77	1.73	4	-
Dec	58.2	38.0	48.1	2.79	0.89	3.32	6	-
Annual:					11.11	15.57		
Average	73.1	47.4	60.3	-	-	-	-	-
Total	-	-	-	13.47			32	-

GROWING SEASON DATES

Requested years of data:	1971 - 2022		
Years with missing data:	24 deg = 29	28 deg = 29	32 deg = 29
Years with no occurrence:	24 deg = 23	28 deg = 6	32 deg = 0
Data years used:	24 deg = 23	28 deg = 23	32 deg = 23

Probability	Temperature		
	24 F or higher	28 F or higher	32 F or higher
	Beginning and Ending Dates Growing Season Length		
50 percent *	No occurrence	1/17 to 12/21 338 days	2/19 to 12/2 286 days
70 percent *	No occurrence	1/5 to 1/2 362 days	2/11 to 12/11 303 days

** Percent chance of the growing season occurring between the Beginning and Ending dates.*

STATS TABLE

Total precipitation (inches)

Yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annl
1998				M0.75	2.27	MT	0.00	T	0.27	0.52	2.40	0.67	6.88
1999	3.19	3.57	1.79	1.11	0.05	0.01	0.00	0.04	0.08	0.16	M1.21	0.18	11.39
2000	4.84	5.68	1.44	0.58	0.85	0.23	0.00	T	0.13	2.06	0.46	0.41	16.68
2001	1.48	3.18	1.29	1.63	0.00	0.12	T	0.00	0.02	0.42	2.38	5.67	16.19
2002	0.62	0.72	1.73	0.04	0.79	0.00	0.00	0.00	0.00	T	3.03	7.95	14.88
2003	0.65	1.26	1.24	3.66	1.32	0.00	T	0.07	T	0.07	2.19	3.80	14.26
2004	2.31	3.80	0.38	0.02	0.10	0.00	0.00	0.00	T	3.05	0.90	3.59	14.15

CALIFORNIA NEVADA RIVER FORECAST CENTER
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

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Hydrology-meteorology Data Report Part 4

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SRUS56 KRSA 280201
RR4RSA

CLIMATE STATION PRECIPITATION SUMMARY
NATIONAL WEATHER SERVICE / CALIFORNIA NEVADA RFC / SACRAMENTO CA
600 PM PST SUN FEB 27 2022

WARNING!! THIS PRODUCT IS AUTOMATED AND UPDATED ONCE PER DAY
THIS PRODUCT CONTAINS PRELIMINARY CLIMATE DATA SUBJECT TO REVISION
THIS PRODUCT RELIES ON PRECIPITATION DATA ISSUED BY LOCAL NWS OFFICES

DATA REPRESENT PRECIPITATION (INCHES) ENDING AT 400 PM PST ON 02/27/2022

CLIMATE STATION	SINCE MIDNITE TOTAL	OCT 01- FEB 27 2022	PON	OCT 01- FEB 27 2021	PON	OCT 01- FEB 27 NORMAL	OCT 01- SEP 30 NORMAL
...NORTHERN CALIFORNIA...							
MEDFORD OR	T	8.60	72	10.39	87	11.97	18.43
KLAMATH FALLS OR	T	3.99	61	4.09	63	6.51	11.14
CRESCENT CITY	0.11	26.50	68	36.68	94	39.11	57.98
EUREKA	0.02	16.53	60	18.34	67	27.40	40.40
UKIAH	T	15.37	62	10.82	43	24.98	34.84
MONTAGUE / SISKIYOU	T	3.13	43	5.51	76	7.24	11.99
ALTURAS	T	4.21	71	3.73	63	5.92	11.68
MOUNT SHASTA CITY	T	14.40	58	13.58	55	24.70	42.63
REDDING	0.00	14.79	64	10.68	46	23.10	33.52
SACRAMENTO EXEC AIRPORT	0.00	14.42	111	5.48	42	12.97	18.14
SACRAMENTO - CSUS	0.00	14.49	107	6.44	47	13.58	19.20
BLUE CANYON AIRPORT*	0.00	45.89	109	25.91	62	41.94	62.44
SANTA ROSA	0.00	22.06	88	10.12	40	25.11	33.78
SAN FRANCISCO	0.00	16.88	100	7.10	42	16.93	22.89
SFO INT`L AIRPORT	0.00	16.71	114	5.87	40	14.69	19.64
OAKLAND AIRPORT	0.00	15.27	113	5.95	44	13.55	18.68
LIVERMORE	0.00	10.83	100	4.57	42	10.88	15.18
SAN JOSE	0.00	6.65	70	4.12	43	9.54	13.48

United States Department of Agriculture

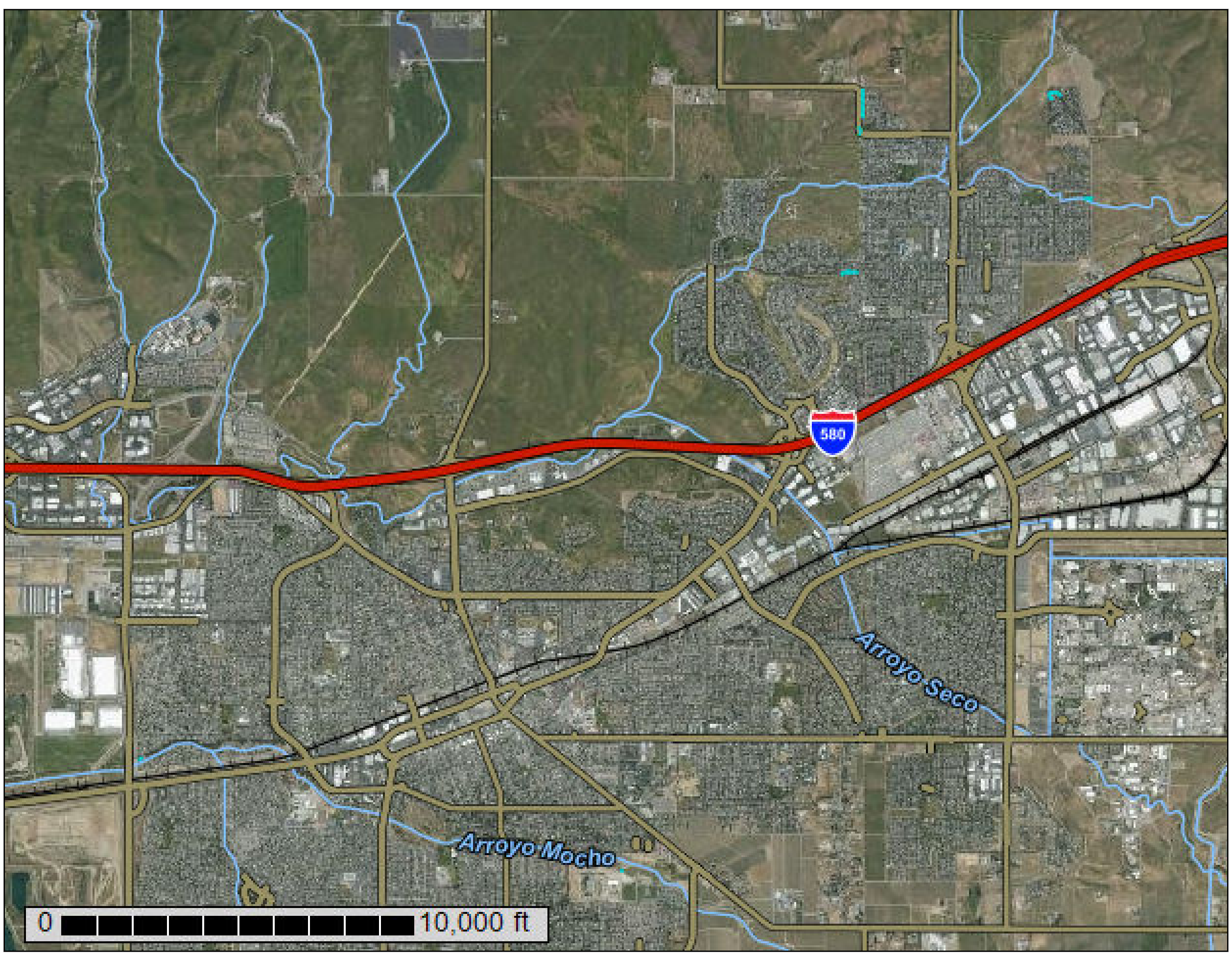
NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for
Alameda Area, California

City of Livermore Stream Maintenance Program 2022



February 22, 2022

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

Map Scale: 1:57,200 if printed on A landscape (11" x 8.5") sheet.

Meters: 0, 500, 1000, 2000, 3000

Feet: 0, 2500, 5000, 10000, 15000

N

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Unit Polygons

Soil Map Unit Lines

Soil Map Unit Points

Special Point Features

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh or swamp

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

Spoil Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Alameda Area, California
Survey Area Data: Version 15, Sep 9, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 29, 2019—May 10, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
GaE2	Gaviota rocky sandy loam, 5 to 40 percent slopes, eroded	0.0	0.2%
LaC	Linne clay loam, 3 to 15 percent slopes	0.0	0.0%
Rh	Riverwash	0.0	2.3%
Sa	San Ysidro loam, 0 to 2 percent slopes, MLRA 14	0.2	25.6%
Sf	Solano fine sandy loam	0.5	68.3%
YmA	Yolo loam, calcareous substratum, 0 to 6 percent slopes, MLRA 14	0.0	3.4%
Totals for Area of Interest		**0.7**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Alameda Area, California

GaE2—Gaviota rocky sandy loam, 5 to 40 percent slopes, eroded

Map Unit Setting

National map unit symbol: hb3g
Elevation: 600 to 2,500 feet
Mean annual precipitation: 15 to 20 inches
Mean annual air temperature: 57 degrees F
Frost-free period: 280 to 360 days
Farmland classification: Not prime farmland

Map Unit Composition

Gaviota and similar soils: 65 percent
Minor components: 35 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Gaviota

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from sandstone

Typical profile

H1 - 0 to 17 inches: sandy loam
H2 - 17 to 21 inches: unweathered bedrock

Properties and qualities

Slope: 5 to 40 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 1.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: R015XD129CA - SHALLOW LOAMY UPLANDS
Hydric soil rating: No

Minor Components

Rock outcrop

Percent of map unit: 20 percent
Hydric soil rating: No

Los osos

Percent of map unit: 10 percent
Hydric soil rating: No

Vallecitos

Percent of map unit: 4 percent
Hydric soil rating: No

Unnamed

Percent of map unit: 1 percent
Landform: Drainageways
Hydric soil rating: Yes

LaC—Linne clay loam, 3 to 15 percent slopes

Map Unit Setting

National map unit symbol: hb3l
Elevation: 700 to 1,700 feet
Mean annual precipitation: 10 to 15 inches
Mean annual air temperature: 57 degrees F
Frost-free period: 240 to 260 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Linne and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Linne

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from sandstone and shale

Typical profile

H1 - 0 to 36 inches: clay loam
H2 - 36 to 40 inches: bedrock

Properties and qualities

Slope: 3 to 15 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 6.4 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: R015XY008CA - Hills <20"ppt
Hydric soil rating: No

Minor Components

Altamont

Percent of map unit: 5 percent
Hydric soil rating: No

Diablo

Percent of map unit: 5 percent
Hydric soil rating: No

Clear lake

Percent of map unit: 3 percent
Landform: Basin floors
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

Pescadero

Percent of map unit: 2 percent
Landform: Basin floors
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

Rh—Riverwash

Map Unit Setting

National map unit symbol: hb4l
Elevation: 10 to 900 feet
Mean annual precipitation: 12 to 16 inches
Mean annual air temperature: 57 degrees F
Frost-free period: 240 to 280 days
Farmland classification: Not prime farmland

Map Unit Composition

Riverwash: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Riverwash

Setting

Landform: Channels
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from sandstone and shale

Typical profile

H1 - 0 to 6 inches: Error
H2 - 6 to 60 inches: Error

Properties and qualities

Slope: 0 to 2 percent
Drainage class: Excessively drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Very high (19.98 to 99.90 in/hr)
Depth to water table: About 0 to 24 inches
Frequency of flooding: FrequentNone

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8w
Hydrologic Soil Group: A
Hydric soil rating: Yes

Sa—San Ysidro loam, 0 to 2 percent slopes, MLRA 14

Map Unit Setting

National map unit symbol: 2tyys
Elevation: 70 to 1,990 feet
Mean annual precipitation: 13 to 22 inches
Mean annual air temperature: 59 to 61 degrees F
Frost-free period: 300 to 360 days
Farmland classification: Not prime farmland

Map Unit Composition

San ysidro and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of San Ysidro

Setting

Landform: Valley floors, alluvial fans, terraces
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear

Parent material: Alluvium derived from sedimentary rock

Typical profile

A - 0 to 23 inches: loam
B1 - 23 to 38 inches: clay loam
Bt2 - 38 to 64 inches: loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 16 to 24 inches to abrupt textural change
Drainage class: Moderately well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.1 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: R014XE029CA - LOAMY CLAYPAN
Hydric soil rating: No

Minor Components

Arbuckle

Percent of map unit: 6 percent
Hydric soil rating: No

Rincon

Percent of map unit: 2 percent
Hydric soil rating: No

Solano

Percent of map unit: 2 percent
Hydric soil rating: No

Pleasanton, loam

Percent of map unit: 2 percent
Hydric soil rating: No

Cropley, clay

Percent of map unit: 1 percent
Hydric soil rating: No

Pescadero

Percent of map unit: 1 percent
Landform: Basin floors
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

Palexeralfs

Percent of map unit: 1 percent
Landform: Depressions
Hydric soil rating: Yes

Sf—Solano fine sandy loam

Map Unit Setting

National map unit symbol: hb4s
Elevation: 10 to 600 feet
Mean annual precipitation: 10 to 16 inches
Mean annual air temperature: 57 degrees F
Frost-free period: 240 to 260 days
Farmland classification: Not prime farmland

Map Unit Composition

Solano and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Solano

Setting

Landform: Fluvial terraces, rims
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread, rise
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from sandstone and shale

Typical profile

H1 - 0 to 6 inches: fine sandy loam
H2 - 6 to 60 inches: clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to moderately saline (0.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum: 50.0
Available water supply, 0 to 60 inches: Moderate (about 7.7 inches)

Interpretive groups

Land capability classification (irrigated): 3w

Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: C
Ecological site: R014XG911CA - Dry Loamy Terrace
Hydric soil rating: No

Minor Components

San ysidro
Percent of map unit: 5 percent
Ecological site: R017XY907CA - Aridic Alkali Desert
Hydric soil rating: No

Rincon
Percent of map unit: 5 percent
Ecological site: R017XY907CA - Aridic Alkali Desert
Hydric soil rating: No

Pescadero
Percent of map unit: 5 percent
Landform: Rims
Landform position (three-dimensional): Rise
Ecological site: R017XY907CA - Aridic Alkali Desert
Hydric soil rating: Yes

YmA—Yolo loam, calcareous substratum, 0 to 6 percent slopes, MLRA 14

Map Unit Setting
National map unit symbol: 2w89t
Elevation: 70 to 480 feet
Mean annual precipitation: 15 to 24 inches
Mean annual air temperature: 59 to 61 degrees F
Frost-free period: 260 to 360 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition
Yolo, calcareous substratum, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Yolo, Calcareous Substratum

Setting
Landform: Alluvial fans
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from sedimentary rock

Typical profile

A - 0 to 8 inches: loam
A - 8 to 16 inches: loam
C1 - 16 to 24 inches: very fine sandy loam
C2 - 24 to 46 inches: fine sandy loam
C3 - 46 to 60 inches: loam

Properties and qualities

Slope: 0 to 6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 2 percent
Maximum salinity: Nonsaline (0.3 to 0.5 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: High (about 10.6 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 4c
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Unnamed

Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

Livermore

Percent of map unit: 5 percent
Hydric soil rating: No

Sycamore

Percent of map unit: 5 percent
Hydric soil rating: No

Supplemental Attachment A-1

2022 SMP Includes the following sites which were previously delineated in 2021.

2021	2022
Site 46	No change
Site 47	No change
Site 48	No change
Site 54 (Bluebell)	Site 60
Site 52 south	Site 63
Site 51A (Stanley)	Site 64
YM-1 (Holmes)	No change

AQUATIC RESOURCE DELINEATION FOR THE

2021 LIVERMORE STREAM MAINTENANCE PROGRAM

SUBMITTED TO:

U.S. Army Corps of Engineers
San Francisco District
1455 Market Street
San Francisco, CA 94103-1398
Contact: Frances P. Malamud-Roam

PREPARED FOR:

City of Livermore
Community Development Dept.
1052 S. Livermore Avenue
Livermore, CA 94550
Contact: Pam Lung, P.E.
925.960.4538

PREPARED BY:

Swaim Biological, Inc.
4435 First Street, PMB 312
Livermore, California 94551
Contact: Leslie Koenig
(916) 849-0513

March 2021

City of Livermore. 2021. *Aquatic Resource Delineation for the 2021 Livermore Stream Maintenance Program*. Alameda County, California. Prepared by Swaim Biological. Inc., Livermore, California. March 2021.

2. Site 46 Sediment and Vegetation Outfall Management at Laughlin Road

2.1 Delineation Map

This section includes a map of delineated aquatic resources ("Aquatic Resources Delineation Map") at the unnamed Bear Creek Basin at Laughlin Road ARDA.

To avoid cluttering the Aquatic Resources Delineation Maps, the requested reference block identifying the individual(s) who conducted the delineation, date(s) of the maps, and date(s) of any revisions is provided here as follows:

Map Reference Block for ARD Site 46 Sediment and Vegetation Outfall Management at Laughlin Road

Delineation date:	March 5, 2021
Delineators:	Natasha Dvorak/ Swaim Biological, Inc. Bridget Sousa/ Swaim Biological, Inc.
GIS & Map Preparers:	Chris Swaim/ Swaim Biological, Inc. Natasha Dvorak/ Swaim Biological, Inc.
Map Imagery Data:	ESRI ArcGIS Basemap World Imagery Local Imagery date: 1993-2020
Date Maps Prepared:	Field delineation results were mapped in GIS in March 2021.
	Reports maps were prepared in March 2021.

Note Mapping on Figure 2-1 to show Sites 46 and 47 in proximity to eachother.

Aquatic Resource Features

- LFC
- OHWM
- TOB
- Active Floodplain
- Low Terrace

N

0 50 100 Feet

Figure 2-1- Site 46 Laughlin Road at Bear Creek Basins

City of Livermore - Stream Maintenance Program

March 2021

SBI Swaim Biological Inc

2.2 Aquatic Resources

Table 2-1. Aquatic Resources Site 46 Sediment and Vegetation Outfall Management at Laughlin Road

Aquatic Resource Name	Aquatic Resources Classification				Aquatic Resource Size* (acre) Required for all resources	Aquatic Resource Size (linear feet) Required for only stream channels
	Cowardin	Location (lat/long) UTM 10S				
Bear Creek Basins Unnamed Basin at Laughlin Road	R6	Upstream	613568	4176374	**0.09**	**47**
		Downstream	613562	4176381		
		Dry Creek Ct Culvert	613493	4176477		

R6: Cowardin wetland classification code meaning Riverine Ephemeral (Cowardin et al., 1979).
* Active Floodplain/area between Ordinary High Waters

Other Waters

The Site 46 ARDA is a 0.1-acre area encompassing two areas within the east Bear Creek Basin: a culvert outfall and 25-ft. reach, plus a separate 70-square-foot culvert outfall.

As described in the Summary, Site 46 was evaluated as an Other Waters and is presumed to have hydrological connectivity to Arroyo Las Positas via unnamed tributary connections to Altamont Creek. Arroyo Las Positas connects to Arroyo Mocho engineered channel near the Chain of Lakes, and then connects into Arroyo de la Laguna thence Alameda Creek thence San Francisco Bay and ultimately the Pacific Ocean. Both Alameda Creek in its lower 5.6-mile reach and San Francisco Bay are Navigable Waterways (Corps 1971).

Delineators completed the Arid West Ephemeral and Intermittent Streams Datasheet for this location. Data were collected for 2 cross-sections, documenting at each location a simple culvert outfall stream with one low-flow channel. The first drainage supports a small grove of trees for approximately 70 feet. Total vegetative cover was 90%, with a tree overstory and minimal herbaceous understory. A break in bank slope, a change in vegetation species, and a change in total vegetation cover identified the Ordinary High Water Mark (OHWM) boundary. There was no flow at the time of the delineation. The second drainage supports a large pampas grass and a small willow. Total vegetative cover was 75%. A break in bank slope, a change in vegetation species, and a change in total vegetation cover identified the Ordinary High Water Mark (OHWM) boundary. There was ponded water in the channel bed at the time of the delineation.

2.3 Soil Survey and Hydric Soil Information

The NRCS Web Soil Survey (USDA, 2021) was consulted to determine the soil types occurring within the ARDA. The soil type *San Ysidro loam, 0 to 2 percent slopes, MRLA 14* occurs at this location. Figure 2- Soils in the Delineation Area provides a map of soil types overlaid on ARDA imagery. The NRCS Web Soil Survey is provided in **Appendix B.**

2.4 Vegetation

Vegetation is previously described in the Summary and includes London planetree, purple locust, willow, privet, coast live oak saplings, wild oat, ripgut brome, crane's bill and mowed annual grasses. The second outfall location of Site 46 supports a single large pampas grass and a small willow, along with flattop sedge, rattail sixweeks grass, meadow barley, Italian rye-grass, and California rose grow within the OHWM. Upland banks support the growth of coyote brush, wild oat, crane's bill, prickly oxtongue, and coast live oak saplings.

2.5 Data Sheets

Arid West Ephemeral and Intermittent Streams OHWM Datasheets for the ARDA at Site 46 consists of data for 2 cross-sections (A-A') and (B-B').

2.6 Representative Photographs

Following the Datasheets is a pictorial map and photo guide for Site 46.

Data Sheets for Site 46 Sediment and Vegetation Outfall Management at Laughlin Road

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: COL SMP 2021
Project Number:
Stream: Laughlin Rd.
Investigator(s): N. Dvora, B. Souza

Date: 3/5/21
Town: Livermore
Photo begin file#:
Time:
State: CA
Photo end file#:

Y ☐ / N ☒ Do normal circumstances exist on the site?

Y ☐ / N ☒ Is the site significantly disturbed?

Location Details: 37.727603, -121.711267

Projection:
Datum:
Coordinates: WGS 84

Potential anthropogenic influences on the channel system:
shallow lake, culverted under Laughlin Rd. into neighborhood drainage system.

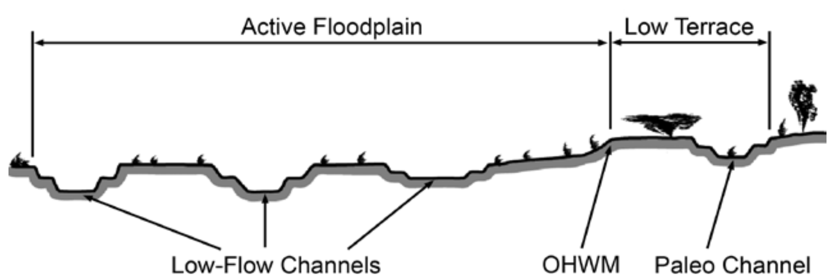
Brief site description:
Culvert outfall into bowl-shaped engineered basin.

Checklist of resources (if available):

- ☒ Aerial photography
  Dates: 1985-2020
- ☐ Topographic maps
- ☐ Geologic maps
- ☐ Vegetation maps
- ☐ Soils maps
- ☐ Rainfall/precipitation maps
- ☐ Existing delineation(s) for site
- ☒ Global positioning system (GPS)
- ☐ Other studies

- ☐ Stream gage data
  Gage number:
  Period of record:
  - ☐ History of recent effective discharges
  - ☐ Results of flood frequency analysis
  - ☐ Most recent shift-adjusted rating
  - ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units

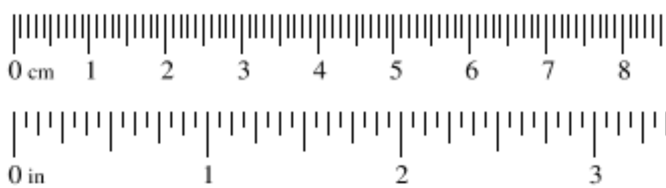


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - ☐ Mapping on aerial photograph
   - ☐ Digitized on computer
   - ☐ GPS
   - ☒ Other: Trimble

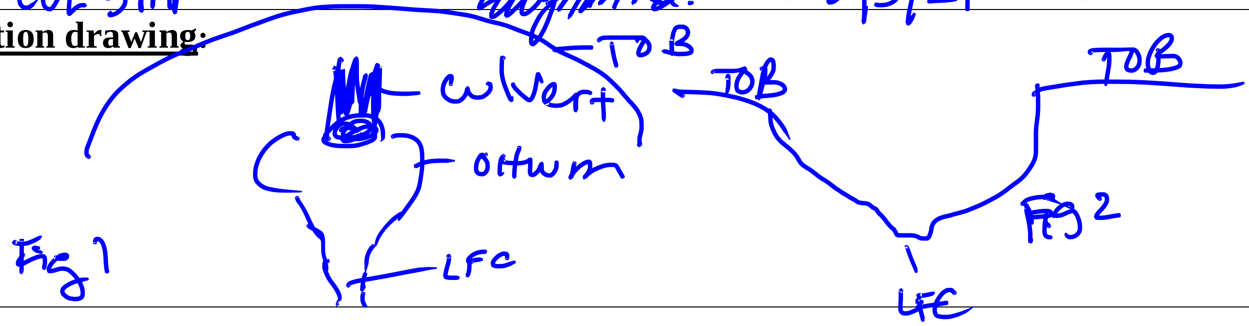
Wentworth Size Classes

Inches (in)		Millimeters (mm)	Wentworth size class	
			Boulder	Gravel
	10.08	256		Gravel
			Cobble	Gravel
	2.56	64		Gravel
			Pebble	Gravel
	0.157	4		Gravel
			Granule	Gravel
	0.079	2.00		
			Very coarse sand	Sand
	0.039	1.00		Sand
			Coarse sand	Sand
	0.020	0.50		Sand
			Medium sand	Sand
1/2	0.0098	0.25		Sand
			Fine sand	Sand
1/4	0.005	0.125		Sand
			Very fine sand	Sand
1/8	0.0025	0.0625		
			Coarse silt	Silt
1/16	0.0012	0.031		Silt
			Medium silt	Silt
1/32	0.00061	0.0156		Silt
			Fine silt	Silt
1/64	0.00031	0.0078		Silt
			Very fine silt	Silt
1/128	0.00015	0.0039		
			Clay	Mud



Project ID: COL 2021 SMP **Cross section ID:** Laughlin Rd. **Date:** 3/5/21 **Time:**

Cross section drawing:



OHWM

GPS point: equiv. to previous

Indicators:

- [ ] Change in average sediment texture
- [x] Change in vegetation species
- [x] Change in vegetation cover
- [ ] Break in bank slope
- [ ] Other: ____________________
- [ ] Other: ____________________

Comments: Engineered outfall creates a small bowl of forceful water expulsion before disseminating into a large drainage area w/narrow channel of trees.

Floodplain unit:

- [x] Low-Flow Channel
- [ ] Active Floodplain
- [ ] Low Terrace

GPS point: equivalent to previous

Characteristics of the floodplain unit:

Average sediment texture: coarse silt

Total veg cover: 25 % Tree: 0 % Shrub: 0 % Herb: 25 %

Community successional stage:

- [ ] NA
- [x] Early (herbaceous & seedlings)
- [ ] Mid (herbaceous, shrubs, saplings)
- [ ] Late (herbaceous, shrubs, mature trees)

Indicators:

- [ ] Mudcracks
- [ ] Ripples
- [ ] Drift and/or debris
- [ ] Presence of bed and bank
- [ ] Benches
- [ ] Soil development
- [x] Surface relief
- [ ] Other: ____________________
- [ ] Other: ____________________
- [ ] Other: ____________________

Comments: essentially the culvert dimensions through a small grove of trees.

Project ID: **Cross section ID:** **Date:** **Time:**

Floodplain unit: ☐ Low-Flow Channel ☒ Active Floodplain ☐ Low Terrace

GPS point: equivalent to previous

Characteristics of the floodplain unit:

Average sediment texture: coarse silt

Total veg cover: 125 % Tree: 100 % Shrub: 25 % Herb: 0 %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☒ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☒ Other: trees
- ☐ Other: ______
- ☐ Other: ______

Comments:

Presumably the outer tree edge. This is an engineered basin.

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☒ Low Terrace

GPS point: equivalent to previous

Characteristics of the floodplain unit:

Average sediment texture: coarse silt

Total veg cover: 80 % Tree: 0 % Shrub: 0 % Herb: 80 %

Community successional stage:

- ☐ NA
- ☒ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

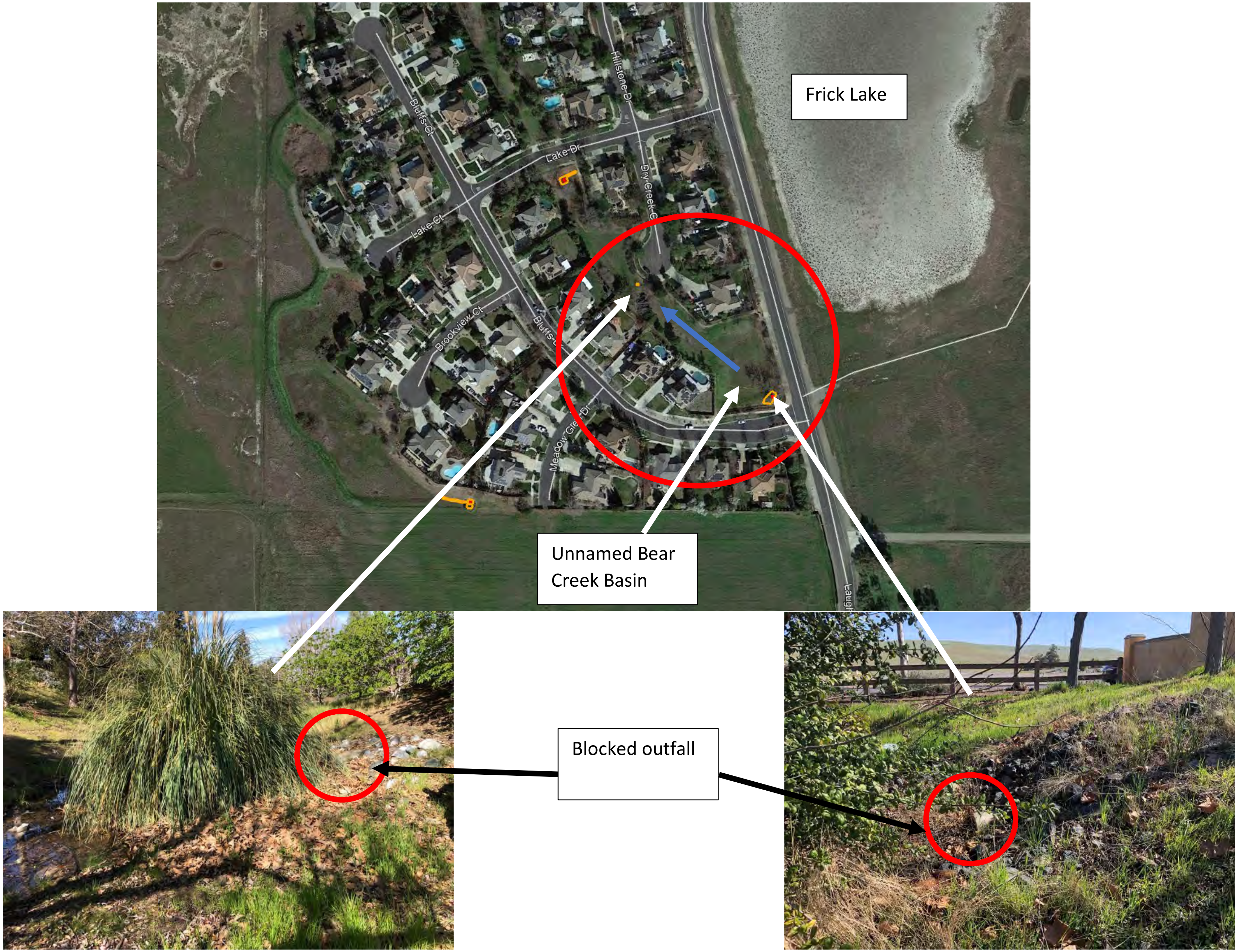
Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☒ Surface relief
- ☐ Other: ______
- ☐ Other: ______
- ☐ Other: ______

Comments:

This is an engineered basin. The culvert outfall supports a small grove of trees for a short distance. Beyond the outer canopy edge the basin is non-native upland grasses.

Photo Documentation Site 46 – Laughlin Drive and Dry Creek Court



3. Site 47 Sediment and Vegetation Outfall Management at Lake Drive

3.1 Delineation Map

This section includes a map of delineated aquatic resources ("Aquatic Resources Delineation Map") at the unnamed Bear Creek Basin at Lake Drive ARDA.

To avoid cluttering the Aquatic Resources Delineation Maps, the requested reference block identifying the individual(s) who conducted the delineation, date(s) of the maps, and date(s) of any revisions is provided here as follows:

Map Reference Block for ARD Site 47 Sediment and Vegetation Outfall Management at Lake Drive

Delineation date:	March 5, 2021
Delineators:	Natasha Dvorak/ Swaim Biological, Inc. Bridget Sousa/ Swaim Biological, Inc.
GIS & Map Preparers:	Chris Swaim/ Swaim Biological, Inc. Natasha Dvorak/ Swaim Biological, Inc.
Map Imagery Data:	ESRI ArcGIS Basemap World Imagery Local Imagery date: 1993-2020
Date Maps Prepared:	Field delineation results were mapped in GIS in March 2021.
	Reports maps were prepared in March 2021.

Note: Mapping on Figure 3-1 to show Sites 46 and 47 in proximity to eachother.

Figure 3-1 - Site 47 Lake Drive at Bear Creek Basins

City of Livermore - Stream Maintenance Program

March 2021

SBI

3.2 Aquatic Resources

Table 3-1. Aquatic Resources Site 47 Sediment and Vegetation Outfall Management at Lake Drive

Aquatic Resource Name	Aquatic Resources Classification				Aquatic Resource Size* (acre) Required for all resources	Aquatic Resource Size (linear feet) Required for only stream channels
	Cowardin	Location (lat/long) UTM 10S				
Unnamed Bear Creek Basin at Lake Dr.	R6	Upstream	613432	4176513	**0.04**	**8**
		Downstream	613432	4176513		

R6: Cowardin wetland classification code meaning Riverine Ephemeral (Cowardin et al., 1979).
* Active Floodplain/area between Ordinary High Waters

Other Waters

The ARDA is a 0.05-acre culvert outfall area in the the east Bear Creek Basin, south of Lake Drive. The area encompasses a 10-foot reach of downslope from the culvert. As described in the Summary, Site 47 was evaluated as an Other Waters and is presumed to have hydrological connectivity to Arroyo Las Positas via unnamed tributary connections to Altamont Creek. Arroyo Las Positas connects to Arroyo Mocho engineered channel near the Chain of Lakes, and then connects to Arroyo de la Laguna thence Alameda Creek thence San Francisco Bay and ultimately the Pacific Ocean. Both Alameda Creek in its lower 5.6-mile reach and San Francisco Bay are Navigable Waterways (Corps 1971).

Delineators completed the Arid West Ephemeral and Intermittent Streams Datasheet for this location. Data were collected for 1 cross-section, documenting a simple culvert outfall. Total vegetative cover was 90%, with 80% formed by two species of willows in a tree overstory and 10% formed by shrubby willow saplings. The Ordinary High Water Mark (OHWM) was determined by examining the leaf litter for signs of ponding and siltation. The channel was not ponded or flowing at the time of the delineation, and the bathymmetry was hidden by a 2-foot layer of leaf litter.

3.3 Soil Survey and Hydric Soil Information

The NRCS Web Soil Survey (USDA, 2021) was consulted to determine the soil types occurring within the ARDA. The soil type *Linne clay loam, 3 to 15 percent slopes* occurs at this location. Figure 2- Soils in the Delineation Area provides a map of soil types overlaid on ARDA imagery. The NRCS Web Soil Survey is provided in **Appendix B.**

3.4 Vegetation

Vegetation is previously described in the Summary and includes ornamental sycamore or maple on Lake Drive and willow, coast live oak saplings, and California rose in the basin. The basin was filled with a dense layer of leaf litter up to two feet deep in places. The culvert was barely visible.

3.5 Data Sheets

There is 1 *Arid West Ephemeral and Intermittent Streams OHWM Datasheets* for the ARDA for Site 47 consisting of data for 1 cross-section (A-A').

3.6 Representative Photographs

Following the Datasheets is a pictorial map and photo guide for Sites 47/48.

Data Sheets for Site 47 Sediment and Vegetation Outfall Management at Lake Drive

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: CoL SMP 2021
Project Number:
Stream: Lake Drive
Investigator(s): N. Dvorak, B. Souza

Date: 3/5/21
Town: Livermore
Photo begin file#:
Time:
State: CA
Photo end file#:

Y ☐ / N ☒ Do normal circumstances exist on the site?

Y ☐ / N ☒ Is the site significantly disturbed?

Location Details: 37.728872, -121.712 799

Projection:
Datum:
Coordinates: WGS 84

Potential anthropogenic influences on the channel system:
Historic floodplain incorporated into an engineered neighborhood drainage system.

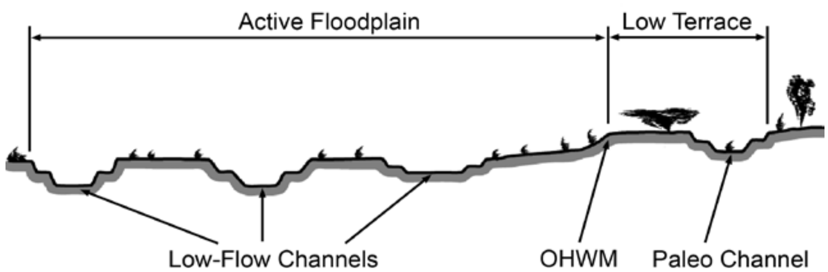
Brief site description:
Culvert under Lake Dr. buried under sediment + clogged.

Checklist of resources (if available):

- ☒ Aerial photography
  Dates: 1985-2020
- ☐ Topographic maps
- ☐ Geologic maps
- ☐ Vegetation maps
- ☐ Soils maps
- ☐ Rainfall/precipitation maps
- ☐ Existing delineation(s) for site
- ☒ Global positioning system (GPS)
- ☐ Other studies

- ☐ Stream gage data
  Gage number:
  Period of record:
  - ☐ History of recent effective discharges
  - ☐ Results of flood frequency analysis
  - ☐ Most recent shift-adjusted rating
  - ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units

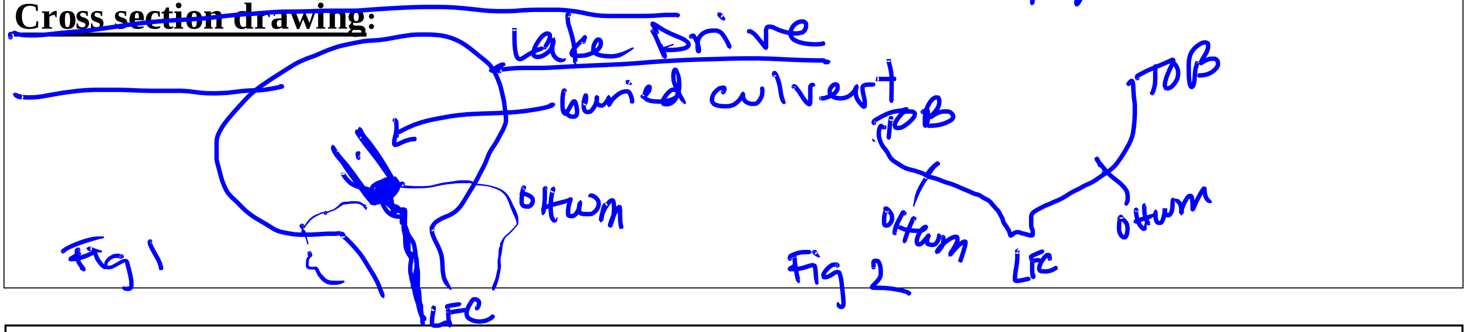


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - ☐ Mapping on aerial photograph
   - ☐ Digitized on computer
   - ☐ GPS
   - ☒ Other: Trimble

Project ID: COL 2021 SMP **Cross section ID:** Lake Dr. **Date:** 3/5/21 **Time:**

~~**Cross section drawing:**~~



OHWM

GPS point: 37.728880, -121.712768

Indicators:

- ☐ Change in average sediment texture
- ☐ Change in vegetation species
- ☐ Change in vegetation cover
- ☐ Break in bank slope
- ☒ Other: leaf texture
- ☐ Other: ____________

Comments: The area is bowl-shaped around the culvert. Leaves are 2.5 ft. deep. Leaves within OHWM are "tamped down" with a subtle silt/water mark.

Floodplain unit: ☒ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: 37.728879, -121.712797

Characteristics of the floodplain unit:

Average sediment texture: culvert

Total veg cover: 90 % Tree: 80 % Shrub: 10 % Herb: 0 %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☒ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☒ Other: culvert
- ☐ Other: ____________
- ☐ Other: ____________

Comments: LFC is buried under 2.5 ft. of leaves.

Project ID: **Cross section ID:** **Date:** **Time:**

Floodplain unit: ☐ Low-Flow Channel ☒ Active Floodplain ☐ Low Terrace

GPS point: 37.728883, -121.712764

Characteristics of the floodplain unit:

Average sediment texture: unknown – leaf substrate

Total veg cover: 70 % Tree: 60 % Shrub: 10 % Herb: 0 %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☒ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☒ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☒ Surface relief
- ☒ Other: leaves show
- ☐ Other: evidence of
- ☐ Other: ponding

Comments:

OHWM based on evidence of ponding or water/silt influence on leaf litter & water line on willow trunks. Overstory of Salix; saplings & Rosa sp. are shrubs.

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: ______________________

Characteristics of the floodplain unit:

Average sediment texture: ______________

Total veg cover: _____ % Tree: _____% Shrub: _____% Herb: _____%

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: ________________
- ☐ Other: ________________
- ☐ Other: ________________

Comments:

Photo Documentation Site 47 – Lake Drive

Blocked outfall

Looking south standing above outfall

4. Site 48 Sediment and Vegetation Outfall Management at Meadow Glen Drive

4.1 Delineation Map

This section includes a map of delineated aquatic resources ("Aquatic Resources Delineation Map") at the Bear Creek Basin BS-1.6 ARDA.

To avoid cluttering the Aquatic Resources Delineation Maps, the reference block identifying individual(s) who conducted the delineation, date(s) of the maps, and date(s) of any revisions is provided here as follows:

Map Reference Block for ARDA Site 48 Sediment and Vegetation Outfall Management at Meadow Glen Drive

Delineation date:	March 5, 2021
Delineators:	Natasha Dvorak/ Swaim Biological, Inc. Bridget Sousa/ Swaim Biological, Inc.
GIS & Map Preparers:	Chris Swaim/ Swaim Biological, Inc. Natasha Dvorak/ Swaim Biological, Inc.
Map Imagery Data:	ESRI ArcGIS Basemap World Imagery Local Imagery date: 1993-2020
Date Maps Prepared:	Field delineation results were mapped in GIS in March 2021.
	Reports maps were prepared in March 2021.

Aquatic Resource Features

- LFC
- OHWM
- TOB
- Active Floodplain

Area not delineated but drawn in for context.

- Basin Floor

Figure 4-1 - Site 48 - Meadow Glen at Bear Creek Basins

City of Livermore - Stream Maintenance Program

March 2021

N

0 50 100 Feet

SBI Swaim Biological Inc

7. Site 51A/B Sediment, Vegetation, and Debris Management between Stanley Blvd Bridge and Active Railroad Bridge along Arroyo Mocho

2022
Site 64

7.1 Delineation Map

This section includes an overview map and detail maps of all delineated aquatic resources ("Aquatic Resources Delineation Map") in the Site 51A/B Sediment, Vegetation, and Debris Management between Stanley Blvd Bridge and Active Railroad Bridge along Arroyo Mocho ARDA.

To avoid cluttering the Aquatic Resources Delineation Maps, the requested reference block identifying the individual(s) who conducted the delineation, date(s) of the maps, and date(s) of any revisions is provided here as follows:

Map Reference Block for ARD Site 51A/B Sediment, Vegetation, and Debris Management between Stanley Blvd Bridge and Active Railroad Bridge along Arroyo Mocho

Delineation date:	March 4, 2021
Delineators:	Natasha Dvorak Swaim Biological, Inc. Bridget Sousa Swaim Biological, Inc.
GIS & Map Preparers:	Chris Swaim/ Swaim Biological, Inc. Natasha Dvorak/ Swaim Biological, Inc.
Map Imagery Data:	ESRI ArcGIS Basemap World Imagery Local Imagery date: 1993-2020
Date Maps Prepared:	Field delineation results were mapped in GIS in March 2021.
	Reports maps were prepared in March 2021.

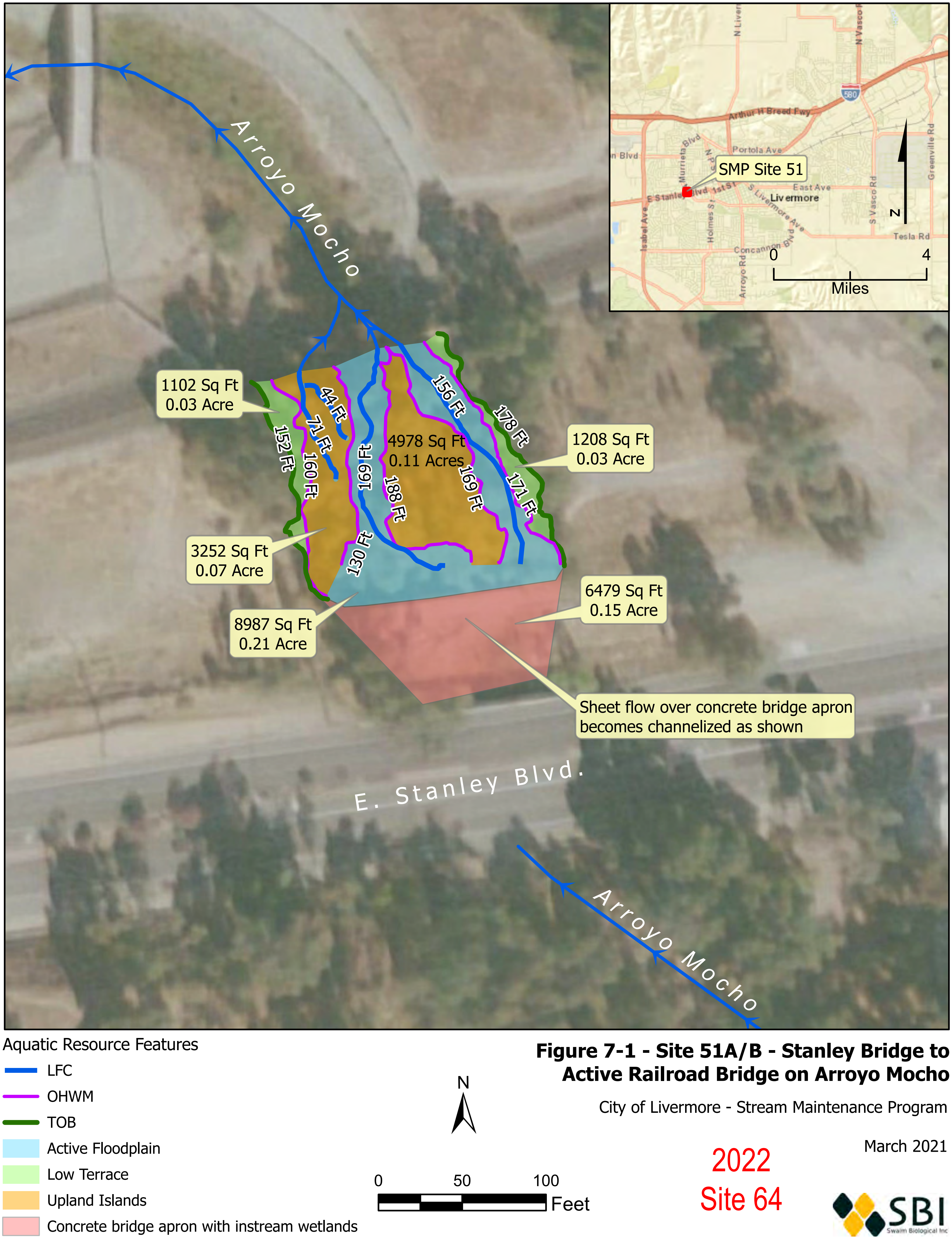


Figure 7-1 - Site 51A/B - Stanley Bridge to Active Railroad Bridge on Arroyo Mocho

City of Livermore - Stream Maintenance Program

March 2021

2022

Site 64

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7.2 Aquatic Resources

2022 Site 64

Table 7-1. Aquatic Resources Site 51A/B Sediment, Vegetation, and Debris Management between Stanley Blvd Bridge and Active Railroad Bridge along Arroyo Mocho

Aquatic Resource Name	Aquatic Resources Classification				Aquatic Resource Size* (acre) Required for all resources	Aquatic Resource Size (linear feet) Required for only stream channels
	Cowardin	Location (lat/long) UTM 10S				
Stanley Bridge Arroyo Mocho	R4SB3	Upstream	606799	4170774	**0.49**	**520**
		Downstream	606750	4170854		

R4SB3: Cowardin wetland classification code meaning Riverine Intermittent Cobble-Gravel Streambed (Cowardin et al., 1979).
* Active Floodplain/area between Ordinary High Waters

Other Waters

The ARDA at Site 51A/B is 2-acre study area of which approximately 1.0 acres is upland habitat that will be used for staging. Another 0.25 acre is a concrete apron that facilitates flows under the Stanley Bridge; sediment deposits have resulted in in-stream wetlands atop the concrete apron that are vegetated with cattails, mulefat, and willow saplings. The remaining acreage is a 150-foot reach of Arroyo Mocho natural channel bed.

Arroyo Mocho is a large trapezoidal engineered flood control channel approximately 200 feet wide, sized to handle large flows. The concrete apron facilitates flows under the Stanley Bridge, after which the channel returns to a natural substrate. Due to the abrupt elevational and textural change at the end of the apron, the northwest corner continues to have an unvegetated scour pool within the channel bed, with large cobble and boulder. The channel overall immediately becomes a braided stream channel flowing among instream islands of soil deposit that are high enough to support mature non-riparian Eucalyptus trees. There are two continuous Low Flow Channels (LFCs) in the middle and on the east side of the creek, and two disjointed LFCs on the west side that are narrow (~ 18 inches) and occur within an otherwise instream high point.

Arroyo Mocho is a Relatively Permanent Waters with a nexus to San Francisco Bay: Arroyo Mocho is tributary to Arroyo de la Laguna thence Alameda Creek thence San Francisco Bay and ultimately the Pacific Ocean. Both Alameda Creek in its lower 5.6-mile reach and San Francisco Bay are Navigable Waterways (Corps 1971).

Delineators completed the Arid West Ephemeral and Intermittent Streams Datasheet for this location. Data were collected along two transects (A-A') and (B-B') across Arroyo Mocho- one at the end of the concrete bridge apron, and one at the railroad bridge downstream. Total vegetation cover in the Low Terrace was 85%, with 60% provided by tree canopy and 25% provided by herbaceous species. Total vegetation coverage in the AF was 80%, with 60% provided by trees and 20% provided by herbaceous vegetation. Water staining on riprap and concrete wingwalls, presence of bed and bank, drift and debris deposits, soil development, and surface relief were used to identify the OHWM.

7.3 Soil Survey and Hydric Soil Information

The NRCS Web Soil Survey (USDA, 2021) was consulted to determine the soil types occurring within the study area. The soil types *Riverwash* and *Livermore very gravelly coarse sandy loam* occur at this location. Figure 2- Soils in the Delineation Area provides a map of soil types overlaid on study area imagery. The NRCS Web Soil Survey is provided in **Appendix B.**

7.4 Vegetation

Vegetation is previously described in the Summary and includes mulefat, willow, cattails, willows, Oregon ash, two-petaled ash, California sycamore, buckeye, *Eucalyptus*, English elm, privet, Mexican fan palm, Canary Island date palm, toyon, cottoneaster, sugarberry, coast live oak, smilo grass, perennial pepperweed, mugwort, gumplant, Himalayan blackberry, and Russian thistle.

7.5 Data Sheets

Arid West Ephemeral and Intermittent Streams OHWM Datasheets for the ARDA at Site 51A/B consists of data for 2 cross-sections (A-A') and (B-B').

7.6 Representative Photographs

Following the Datasheets is a pictorial map and photo guide.

Data Sheets for Site 51A/B Sediment, Vegetation, and Debris Management between Stanley Blvd Bridge and Active Railroad Bridge along Arroyo Mocho

2022 Site 64

2022 Site 64

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: City of Livermore SMP 2021
Project Number: Site 51 Stanley
Stream: Arroyo Mocho
Investigator(s): N. Dvorak, B. Souza

Date: 3/4/2021
Town: Livermore
Photo begin file#:

Time:
State: CA
Photo end file#:

Y [ ] / N [x] Do normal circumstances exist on the site?

Y [ ] / N [x] Is the site significantly disturbed?

Location Details: Site 51 Stanley Bridge

Projection:
Datum:
Coordinates:

Potential anthropogenic influences on the channel system:
Heavily engineered stretch of Arroyo Mocho with several bends & bridges & a long concrete apron.

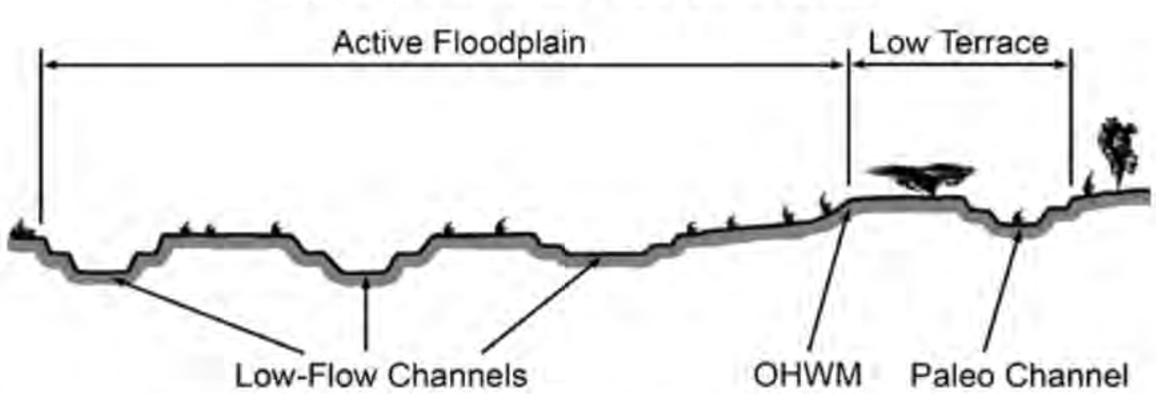
Brief site description: Braided channel w/ mostly Eucalyptus tree canopy, minimal shrub. Cobble bed. Dry.

Checklist of resources (if available):

- [x] Aerial photography
  Dates: 1993 to present.
- [x] Topographic maps
- [ ] Geologic maps
- [ ] Vegetation maps
- [x] Soils maps
- [ ] Rainfall/precipitation maps
- [ ] Existing delineation(s) for site
- [x] Global positioning system (GPS)
- [ ] Other studies

- [ ] Stream gage data
  Gage number:
  Period of record:
  - [ ] History of recent effective discharges
  - [ ] Results of flood frequency analysis
  - [ ] Most recent shift-adjusted rating
  - [ ] Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units

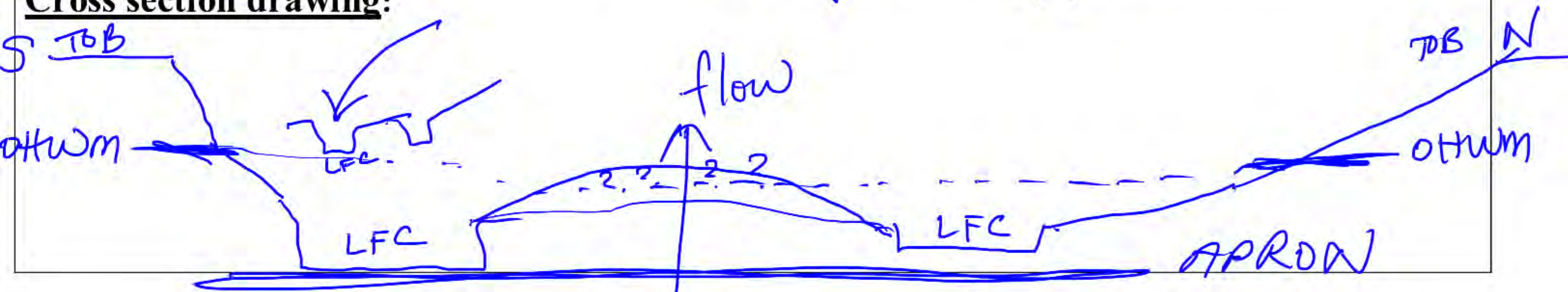


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - [ ] Mapping on aerial photograph
   - [x] Digitized on computer
   - [x] GPS
   - [ ] Other:

Project ID: CoL 2021 SMP **Cross section ID:** #57 Stanley 2022 Site 64 **Date:** 3/4/2021 **Time:**

Cross section drawing:



OHWM

GPS point: 37.678494, -121.789203

Indicators:

- [x] Change in average sediment texture
- [ ] Change in vegetation species
- [x] Change in vegetation cover
- [x] Break in bank slope
- [ ] Other: ____________
- [ ] Other: ____________

Comments: stream terraces are very sandy. Apparently high flows go to TOB. OHWM difficult to distinguish due to so much human distortion but there are scour marks, water staining, & debris deposits.

Floodplain unit:

- [x] Low-Flow Channel
- [ ] Active Floodplain
- [ ] Low Terrace

GPS point: 37.678477, -121.789223 and 37.678429, -121.789406 are two main channels.

Characteristics of the floodplain unit:

Average sediment texture: 5" cobble to pea gravel

Total veg cover: 60 % Tree: 60 % Shrub: 0 % Herb: 0 %

Community successional stage:

- [x] NA
- [ ] Early (herbaceous & seedlings)
- [ ] Mid (herbaceous, shrubs, saplings)
- [ ] Late (herbaceous, shrubs, mature trees)

Indicators:

- [ ] Mudcracks
- [ ] Ripples
- [ ] Drift and/or debris
- [ ] Presence of bed and bank
- [ ] Benches
- [ ] Soil development
- [x] Surface relief
- [x] Other: No vegetation
- [ ] Other: ____________
- [ ] Other: ____________

Comments: Braided channel through stream terraces & high points maybe just above OHWM. Stream dry.

2022

Project ID: SMP 2021 **Cross section ID:** #51 / Site 64 **Date:** 3/4/2021 **Time:**

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☒ Low Terrace

GPS point: 37.678405, -121.789760

Characteristics of the floodplain unit:

Average sediment texture: Soil + asphalt

Total veg cover: 85 % Tree: 60 % Shrub: 0 % Herb: 25 %

Community successional stage:

- ☒ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☒ Drift and/or debris
- ☐ Presence of bed and bank
- ☒ Benches
- ☐ Soil development
- ☒ Surface relief
- ☐ Other: ____________
- ☐ Other: ____________
- ☐ Other: ____________

Comments: very engineered, heavily rip-rapped & asphalted. Only trees + herbaceous — no shrubs. Eucalyptus + sycamore trunks at TOB/high flow line.

Floodplain unit: ☐ Low-Flow Channel ☒ Active Floodplain ☐ Low Terrace

GPS point: 37.678508, -121.789291

Characteristics of the floodplain unit:

Average sediment texture: pea gravel to soil

Total veg cover: 80 % Tree: 60 % Shrub: 0 % Herb: 20 %

Community successional stage:

- ☐ NA
- ☒ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

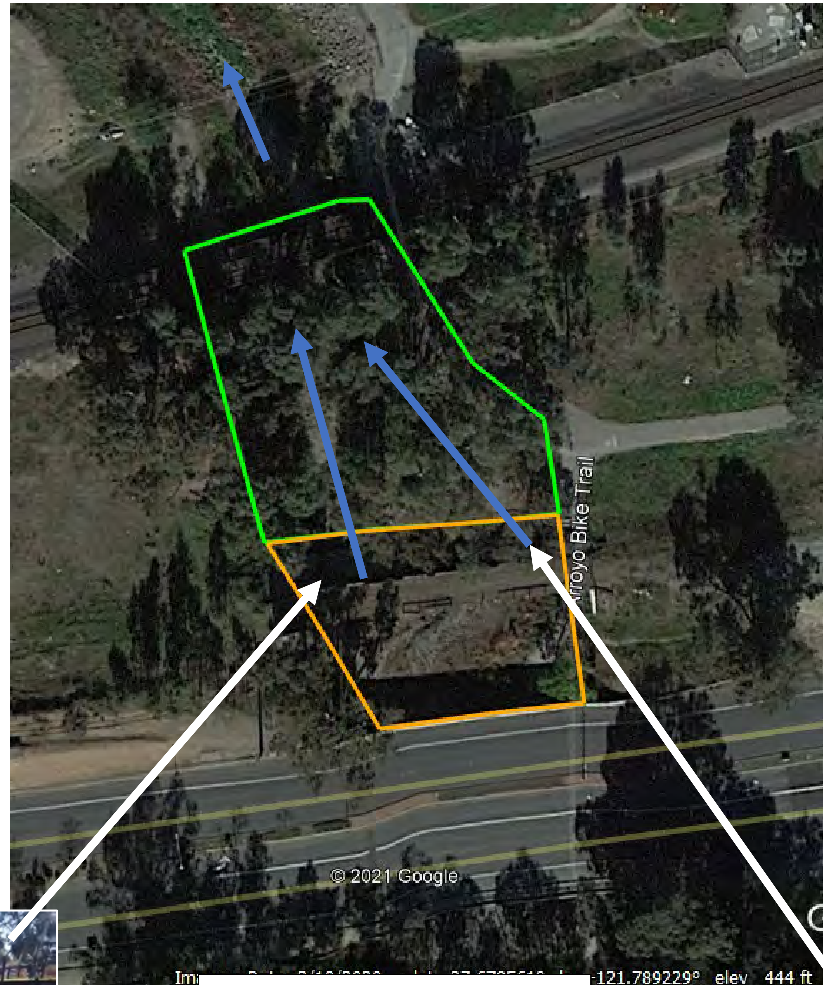
Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☒ Drift and/or debris
- ☒ Presence of bed and bank
- ☐ Benches
- ☒ Soil development
- ☒ Surface relief
- ☐ Other: ____________
- ☐ Other: ____________
- ☐ Other: ____________

Comments: shrub layer essentially absent. mature tree overstory & annual herbaceous cover on sediment deposits.

Photo Documentation Site 51 – Stanley Blvd Bridge to Active Railroad Bridge, Arroyo Mocho

2022 Site 64



Concrete apron and scour pool

Low flow channel west side

Low flow channel east side

8. Site 52 Invasive Vegetation and Debris Management at Arroyo Mocho Outfalls

2022 Site 63

8.1 Delineation Map

This section includes a map of all delineated aquatic resources ("Aquatic Resources Delineation Map") in the Site 52 Invasive Vegetation and Debris Management at Arroyo Mocho Outfalls ARDA.

To avoid cluttering the Aquatic Resources Delineation Maps, the requested reference block identifying the individual(s) who conducted the delineation, date(s) of the maps, and date(s) of any revisions is provided here as follows:

Map Reference Block for ARD Site 52 Invasive Vegetation and Debris Management at Arroyo Mocho Outfalls

Delineation date:	March 4, 2021
Delineators:	Natasha Dvorak/ Swaim Biological, Inc. Bridget Sousa/ Swaim Biological, Inc.
GIS & Map Preparers:	Chris Swaim/ Swaim Biological, Inc. Natasha Dvorak/ Swaim Biological, Inc.
Map Imagery Data:	ESRI ArcGIS Basemap World Imagery Local Imagery date: 1993-2020
Date Maps Prepared:	Field delineation results were mapped in GIS in March 2021.
	Reports maps were prepared in March 2021.

2022 Site 63

Figure 8-1 - Site 52 - Robertson Park Outfalls along Arroyo Mocho

City of Livermore - Stream Maintenance Program

SBI Swaim Biological Inc

March 2021

8.2 Aquatic Resources 2022 Site 63

Table 8-1. Aquatic Resources Site 52 Invasive Vegetation and Debris Management at Arroyo Mocho Outfalls

Aquatic Resource Name	Aquatic Resources Classification				Aquatic Resource Size* (acre) Required for all resources	Aquatic Resource Size (linear feet) Required for only stream channels
	Cowardin	Location (lat/long) UTM 10S				
Culvert tributaries to Arroyo Mocho	R4SB3	Upstream	0609154	4170083	**0.32**	**222**
		Downstream	0609021	4170089		

R4SB3: Cowardin wetland classification code meaning Riverine Intermittent Cobble-Gravel Streambed (Cowardin et al., 1979).
* Active Floodplain/area between Ordinary High Waters

Other Waters

The ARDA at Site 52 North is a culvert outfall measuring approximately 600 square feet that debouches into Arroyo Mocho at a distance of approximately 40 feet. Site 52 South is a culvert outfall into Arroyo Mocho's AF and it is hidden within a blackberry thicket. The work area extends for approximately 150 feet into the AF through the blackberry thicket, across some sediment deposit high points, and ends at the unvegetated creek channel.

Arroyo Mocho is a Relatively Permanent Waters with a nexus to San Francisco Bay: Arroyo Mocho is tributary to Arroyo de la Laguna thence Alameda Creek thence San Francisco Bay and ultimately the Pacific Ocean. Both Alameda Creek in its lower 5.6-mile reach and San Francisco Bay are Navigable Waterways (Corps 1971).

Delineators completed the Arid West Ephemeral and Intermittent Streams Datasheet for this location. Data were collected for 2 cross-sections (the outfall at Site 52 North and Arroyo Mocho at Site 52 South. Within the outfall study area, the culvert flow has created two erosional features in the Arroyo Mocho streambank. Their bathymmetry is hidden by blackberry; total vegetative cover was 90%, with no tree layer, and cover was provided mostly by Himalayan blackberry. Ten percent of herbaceous cover was provided by dock, poison hemlock, black mustard, and bittercress. The Ordinary High Water Mark (OHWM) was determined to be the outer edge of the blackberry line. The outfall was dry at the time of the delineation. At the Arroyo Mocho 52 South location, the bathymmetry was also concealed by blackberry thicket. Total vegetative cover was 80%, with tree overstory comprising 20% and Himalayan blackberry the other 60%. The blackberry thicket dissipated into other vegetation before disappearing entirely at the unvegetated LFC; other vegetation growing on the ample in-stream sediment deposits included smilo grass, poison hemlock, bindweed, willow, mulefat, mugwort, cocklebur, California sycamore, and *Eucalyptus*. The Ordinary High Water Mark (OHWM) was determined by a break in bank slope, and changes in sediment texture, species composition, and percent cover, and ultimately was determined to align with the outer edge of blackberry thicket on the south bank where there is an abrupt transition to upland grasses. Arroyo Mocho was dry at the time of the delineation.

8.3 Soil Survey and Hydric Soil Information

The NRCS Web Soil Survey (USDA, 2017) was consulted to determine the soil types occurring within the study area. The soil type *Riverwash* occurs at this location. Figure 2- Soils in the Delineation Area provides a map of soil types overlaid on study area imagery. The NRCS Web Soil Survey is provided in **Appendix B.**

8.4 Vegetation

Vegetation is previously described in the Summary and includes *Eucalyptus*, ornamental *Prunus*, coast live oaks, willows, California sycamore, Fremont cottonwood, Himalayan blackberry, mulefat, smilo grass, mugwort, cocklebur, bindweed, dock, poison hemlock, black mustard, and bittercress.

8.5 Data Sheets

Arid West Ephemeral and Intermittent Streams OHWM Datasheets for the ARDA at Site 52 consists of data for 1 cross-section at 52 North (A-A') and 1 cross-section at 52 South (B-B').

8.6 Representative Photographs

Following the Datasheets is a pictorial map and photo guide.

Data Sheets for Site 52 Invasive Vegetation and Debris Management at Arroyo Mocho Outfalls

2022 Site 63

2022 Site 63

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: CoL SMP 2021
Project Number: Site 52 South
Stream: Arroyo Mocho
Investigator(s): N. Dvorak, B. Souza

Date: 3/4/2021 **Time:**
Town: Livermore **State:** CA
Photo begin file#: **Photo end file#:**

Y ☒ / N ☐ Do normal circumstances exist on the site?

Y ☐ / N ☒ Is the site significantly disturbed?

Location Details: 37.671278, -121.763250

Projection: **Datum:**
Coordinates: WGS 84

Potential anthropogenic influences on the channel system: Semi-engineered stream channel that has a wide floodplain in this reach.

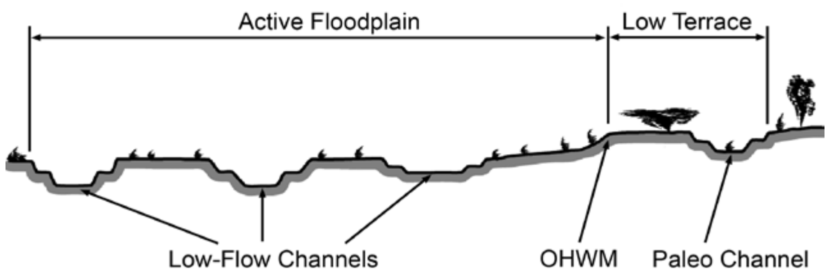
Brief site description: A relatively broad floodplain of most Himalayan blackberry thicket.

Checklist of resources (if available):

- ☒ Aerial photography
  Dates: 1985-2020
- ☐ Topographic maps
- ☐ Geologic maps
- ☐ Vegetation maps
- ☐ Soils maps
- ☐ Rainfall/precipitation maps
- ☐ Existing delineation(s) for site
- ☒ Global positioning system (GPS)
- ☐ Other studies

- ☐ Stream gage data
  Gage number:
  Period of record:
  - ☐ History of recent effective discharges
  - ☐ Results of flood frequency analysis
  - ☐ Most recent shift-adjusted rating
  - ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units



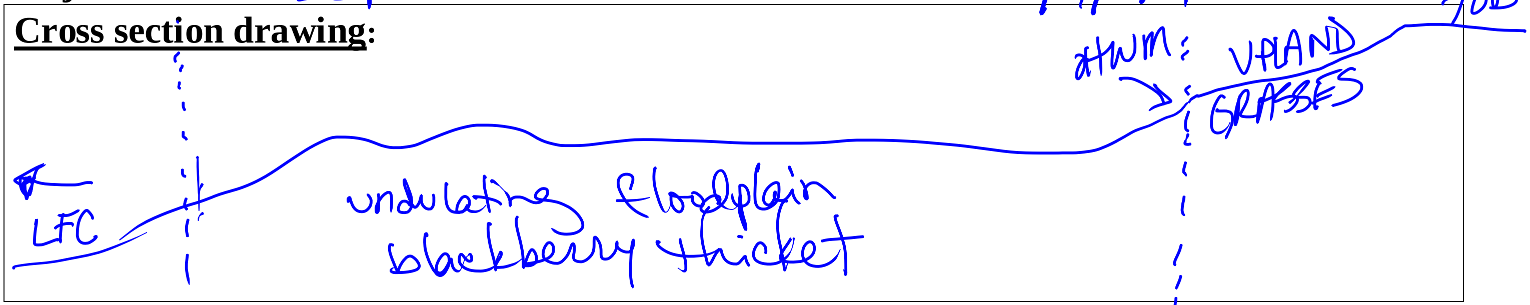
Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - ☐ Mapping on aerial photograph
   - ☐ Digitized on computer
   - ☐ GPS
   - ☒ Other: Trimble

2022 Site 63

Project ID: COL SMP 2021 **Cross section ID:** 52 S **Date:** 3/4/21 **Time:**

Cross section drawing:



OHWM

GPS point: 37.671352, -121.763690

Indicators:

- [ ] Change in average sediment texture
- [x] Change in vegetation species
- [x] Change in vegetation cover
- [x] Break in bank slope
- [ ] Other: ____________
- [ ] Other: ____________

Comments: Himalayan blackberry thicket ends abruptly at a slope change with upland grasses.

Floodplain unit: [x] Low-Flow Channel [ ] Active Floodplain [ ] Low Terrace

GPS point: 37.671765, -121.763752

Characteristics of the floodplain unit:

Average sediment texture: Boulder +

Total veg cover: 15 % Tree: 15 % Shrub: 0 % Herb: 0 %

Community successional stage:

- [x] NA
- [ ] Early (herbaceous & seedlings)
- [ ] Mid (herbaceous, shrubs, saplings)
- [ ] Late (herbaceous, shrubs, mature trees)

Indicators:

- [ ] Mudcracks
- [ ] Ripples
- [ ] Drift and/or debris
- [x] Presence of bed and bank
- [ ] Benches
- [ ] Soil development
- [ ] Surface relief
- [ ] Other: ____________
- [ ] Other: ____________
- [ ] Other: ____________

Comments: Dry low flow channel of large cobble/boulder. Beyond the work area, which focuses on the south bank active floodplain.

2022 Site 63

Project ID: smp 2021 **Cross section ID:** 52S **Date:** 3/A/21 **Time:**

Floodplain unit: ☐ Low-Flow Channel ☒ Active Floodplain ☐ Low Terrace

GPS point: 37.61736, -121.763752

Characteristics of the floodplain unit:
Average sediment texture: coarse silt
Total veg cover: 110 % Tree: 10 % Shrub: 80 % Herb: 20 %
Community successional stage:
- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☒ Late (herbaceous, shrubs, mature trees)

Indicators:
- ☐ Mudcracks
- ☐ Ripples
- ☒ Drift and/or debris
- ☒ Presence of bed and bank
- ☒ Benches
- ☒ Soil development
- ☒ Surface relief
- ☐ Other: ____
- ☐ Other: ____
- ☐ Other: ____

Comments: The Active Floodplain is primarily a dense Himalayan blackberry thicket precluding closer inspection. There are some mature trees rooted in high points.

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☒ Low Terrace

GPS point: 37.671321, -121.763690

Characteristics of the floodplain unit:
Average sediment texture: coarse/silt
Total veg cover: 140 % Tree: 60 % Shrub: 0 % Herb: 80 %
Community successional stage:
- ☒ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:
- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☒ Surface relief
- ☐ Other: ____
- ☐ Other: ____
- ☐ Other: ____

Comments: A narrow vegetated band between the paved pedestrian trail and the blackberry thicket. It is slightly sloped toward Arroyo Mocho.

Photo Documentation Site 52 – Outfall Maintenance Robertson Park, Arroyo Mocho

10. Site 54/55 Sediment, and Vegetation Management at Bluebell Drive Along Arroyo Las Positas

2022 Site 60

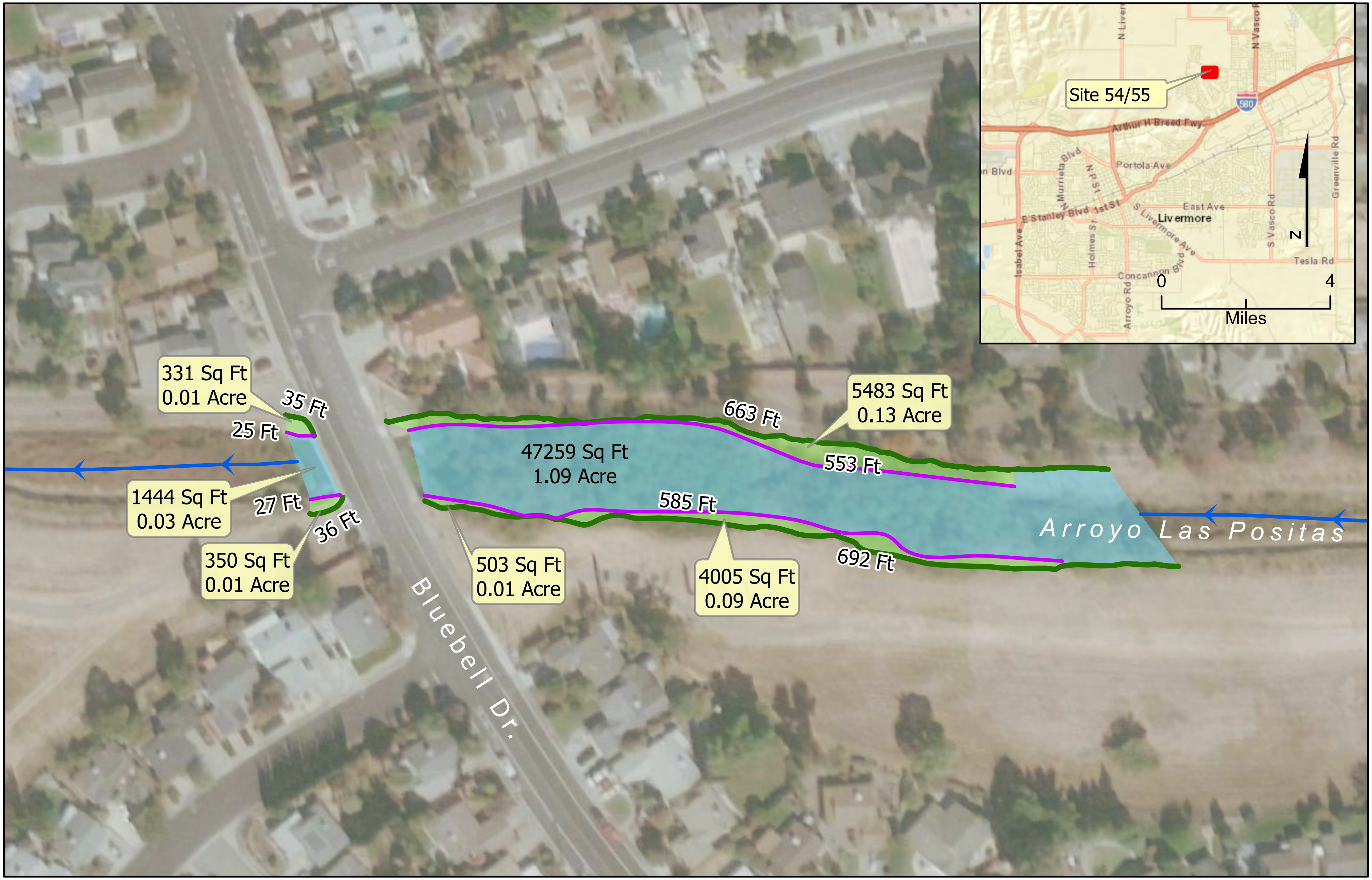
10.1 Delineation Map

This section includes a map of delineated aquatic resources ("Aquatic Resources Delineation Map") at the Site 54/55 Sediment, and Vegetation Management at Bluebell Drive Along Arroyo Las Positas ARDA.

To avoid cluttering the Aquatic Resources Delineation Maps, the requested reference block identifying the individual(s) who conducted the delineation, date(s) of the maps, and date(s) of any revisions is provided here as follows:

Map Reference Block for ARD Site 54/55 Sediment, and Vegetation Management at Bluebell Drive Along Arroyo Las Positas

Delineation date:	March 5, 2021
Delineators:	Natasha Dvorak/ Swaim Biological, Inc. Bridget Sousa/ Swaim Biological, Inc.
GIS & Map Preparers:	Chris Swaim/ Swaim Biological, Inc. Natasha Dvorak/ Swaim Biological, Inc.
Map Imagery Data:	ESRI ArcGIS Basemap World Imagery Local Imagery date: 1993-2020
Date Maps Prepared:	Field delineation results were mapped in GIS in March 2021.
	Reports maps were prepared in March 2021.



Aquatic Resource Features

- LFC
- OHWM
- TOB
- Active Floodplain
- Low Terrace

N

0 100 200 Feet

2022 Site 60

Figure 10-1 - Site 54/55 - Bluebell Drive along Arroyo Las Positas

City of Livermore - Stream Maintenance Program

SBI Swaim Biological Inc

March 2021

10.2 Aquatic Resources 2022 Site 60

Table 10-1. Aquatic Resources Site 54/55 Sediment, and Vegetation Management at Bluebell Drive Along Arroyo Las Positas

Aquatic Resource Name	Aquatic Resources Classification				Aquatic Resource Size* (acre) Required for all resources	Aquatic Resource Size (linear feet) Required for only stream channels
	Cowardin	Location (lat/long) UTM 10S				
Bluebell Drive, Arroyo Las Positas	R4SB7	Upstream	610991	4175051	**0.10**	**72**
		Downstream	610953	4175054		
	R4SB7	Upstream	611145	4175039	**1.09**	**656**
		Downstream	610953	4175054		

R4SB7: Cowardin wetland classification code meaning Riverine Seasonally Flooded/Saturated with Vegetated Stream Bed; RIEM: Riverine Intermittent Emergent (Cowardin et al., 1979).
* Active Floodplain/area between Ordinary High Waters

Other Waters

The ARDA includes 3 locations: immediately downstream of the bridge, immediately upstream of the bridge, and an approximately 500-foot reach of Arroyo Las Positas upstream from the bridge. On each side of the bridge is a 0.01-acre area within the Arroyo Las Positas channel; each stream reach is approximately 30 linear feet. Arroyo Las Positas is a Relatively Permanent Waters with a nexus to San Francisco Bay: Arroyo Las Positas connects to Arroyo Mocho engineered channel near the Chain of Lakes, and then connects to Arroyo de la Laguna thence Alameda Creek thence San Francisco Bay and ultimately the Pacific Ocean. Both Alameda Creek in its lower 5.6-mile reach and San Francisco Bay are Navigable Waterways (Corps 1971).

Delineators completed the Arid West Ephemeral and Intermittent Streams Datasheet for this location. Data were collected for 3 cross-sections: one immediately upstream of the bridge, one immediately downstream of the bridge, and one approximately 280 feet upstream from the bridge. Total vegetative cover in the downstream bridge area was 20%, comprised of cattails and watercress. The open water was shallow and still (<6 inches) and heavy siltation was readily observed. Vegetation in the upstream bridge area was the opposite, with approximately 85% cover by watercress and 15% flowing open water. The Ordinary High Water Mark (OHWM) was determined by water staining on the bridge wing walls. Arroyo Las Positas was slightly below average flows during the delineation based on the OHWM.

The 500-foot reach upstream is a complex braided channel through willow thickets and large Canary Island palms with fronds hanging into the water. Total vegetative cover was 120%, with 90% provided by trees (includes the willow thickets) and 30% provided by the herbaceous layer. While willow sapling sticks were observed, no shrubs were observed. The lower edges of streambanks and instream sediment deposits support early-growth grasses that were not identified due to lack of telling features, along with fiddle dock, broadleaf dock, plantain (*Plantago major*), cheeseweed, smallage (*Apium nodiflorum*), cattails, and tules. There are multiple pools of clear open water, one approximately 2.5 feet deep while the rest were shallow (<1 foot). The OHWM was hidden by the dense trees, but was determined by debris deposits, bank scouring, and a change in species cover and compoisition. Arroyo Las Positas was flowing at the time of the delineation.

10.3 Soil Survey and Hydric Soil Information

The NRCS Web Soil Survey (USDA, 2017) was consulted to determine the soil types occurring within the study area. Soil type *Solano fine sandy loam* occurs at this location. Figure 2- Soils in the Delineation Area provides a map of soil types overlaid on study area imagery. The NRCS Web Soil Survey is provided in **Appendix B.**

10.4 Vegetation

Vegetation is previously described in the Summary and includes a willow thicket that makes up the majority of the riparian shrub layer, Canary Island palm, Washington fan palm, olive, non-native ornamental *Prunus*, *Cottoneaster*, privet, cattails, tules, smilo grass, dock, flattop sedge, watercress, plantain, smallage, cork oak, coast live oak, pepper tree, *Eucalyptus*, black mustard, English ivy, velvet grass, and salt grass.

10.5 Data Sheets

Arid West Ephemeral and Intermittent Streams OHWM Datasheets for the ARDA at Site 54/55 consists of data for 3 cross-sections: downstream of the bridge (A-A'), immediately upstream of the bridge (B-B'), and approximately 280 feet upstream from the bridge (C-C').

10.6 Representative Photographs

Following the Datasheets is a pictorial map and photo guide.

Data Sheets for Site 54/55 Sediment, and Vegetation Management at Bluebell Drive Along Arroyo Las Positas

2022 Site 60

2022 Site 60

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

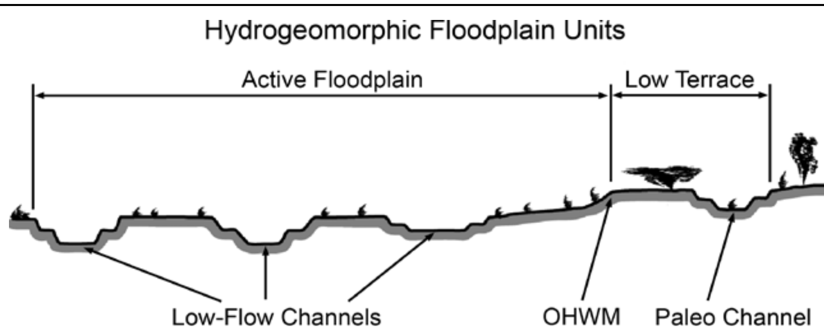
Project: COL SMP 2021 **Project Number:** Bluebell Drive **Stream:** Arroyo las Positas **Investigator(s):** N. Dvorak, B. Souza	**Date:** 3/5/21 **Time:** **Town:** Livermore **State:** CA **Photo begin file#:** **Photo end file#:**
Y ☒ / N ☐ Do normal circumstances exist on the site? Y ☐ / N ☒ Is the site significantly disturbed?	**Location Details:** 37.716024, -121.740895 & 500' upstream **Projection:** **Datum:** **Coordinates:** WGS 84

Potential anthropogenic influences on the channel system:
semi-engineered & channelized stream.

Brief site description:
willow riparian stretch of Arroyo las Positas w/ braided stream channel. Some emergent veg. Several large non-native palms.

Checklist of resources (if available):

- ☒ Aerial photography
  Dates: 1985-2020
- ☐ Topographic maps
- ☐ Geologic maps
- ☐ Vegetation maps
- ☐ Soils maps
- ☐ Rainfall/precipitation maps
- ☐ Existing delineation(s) for site
- ☒ Global positioning system (GPS)
- ☐ Other studies
- ☐ Stream gage data
  Gage number:
  Period of record:
  - ☐ History of recent effective discharges
  - ☐ Results of flood frequency analysis
  - ☐ Most recent shift-adjusted rating
  - ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event



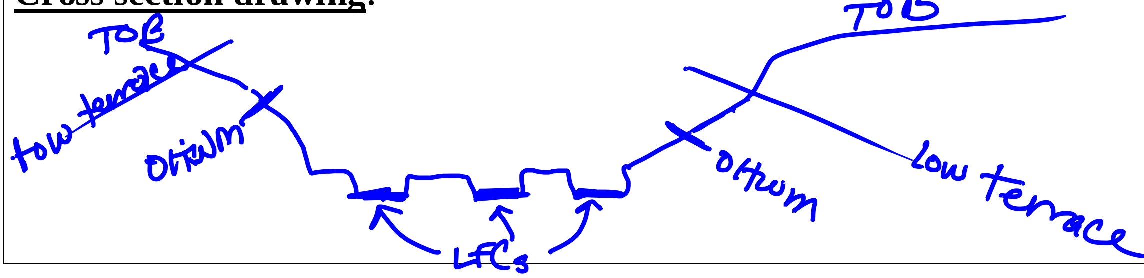
Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - ☐ Mapping on aerial photograph
   - ☐ Digitized on computer
   - ☐ GPS
   - ☒ Other: Trimble

2022 Site 60

Project ID: COL SMP 2021 **Cross section ID:** Bluebell **Date:** 3/5/21 **Time:**

Cross section drawing:



OHWM

GPS point: 37.716124, -121.740657

Indicators:

- [x] Change in average sediment texture
- [x] Change in vegetation species
- [x] Change in vegetation cover
- [ ] Break in bank slope
- [x] Other: Debris line
- [ ] Other: ____________

Comments: Abrupt change in veg species & break in slope hidden by cattails @ downstream area. Upstream, the OHWM is less distinct going from a few herbaceous forbs to non-native annual grassland.

Floodplain unit: [x] Low-Flow Channel [ ] Active Floodplain [ ] Low Terrace

GPS point: 37.716047, -121.740737

Characteristics of the floodplain unit:

Average sediment texture: muck

Total veg cover: 0-100 % Tree: 0-100 % Shrub: 0 % Herb: 0 %

Community successional stage:

- [x] NA
- [ ] Early (herbaceous & seedlings)
- [ ] Mid (herbaceous, shrubs, saplings)
- [x] Late (~~herbaceous, shrubs~~, mature trees)

Indicators:

- [ ] Mudcracks
- [ ] Ripples
- [ ] Drift and/or debris
- [ ] Presence of bed and bank
- [ ] Benches
- [ ] Soil development
- [x] Surface relief
- [x] Other: open water
- [ ] Other: ____________
- [ ] Other: ____________

Comments: In work locations, LFC is shallow open water with silty mud bottom. Rest of channel downstream is a wetland tributary w/ cattails, bulrush, & nasturtium. Upstream is open running water up to 2'-3' deep in some areas.

2022 Site 60

Project ID: COL SMP 2021 **Cross section ID:** Bluebell **Date:** 3/5/21 **Time:**

Floodplain unit: ☐ Low-Flow Channel ☒ Active Floodplain ☐ Low Terrace

GPS point: 37.716084, -121.740642

Characteristics of the floodplain unit:

Average sediment texture: silt

Total veg cover: 0-100% Tree: 0-100% Shrub: 0% Herb: 30-100%

Community successional stage:

- ☐ NA
- ☒ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☒ Late (herbaceous, ~~shrubs~~, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☒ Drift and/or debris
- ☒ Presence of bed and bank
- ☒ Benches
- ☒ Soil development
- ☒ Surface relief
- ☐ Other:
- ☐ Other:
- ☐ Other:

Comments: Holcus lanatus, Rumex, Epilobium, Elymus, saltgrass, dodine bush on outer edges. Vegetated islands among the braided LFCs are Nasturtium officinale, Rumex sp, cattails, tules.

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☒ Low Terrace

GPS point: 37.715899, -121.740459

Characteristics of the floodplain unit:

Average sediment texture: coarse sand

Total veg cover: 90% Tree: 0% Shrub: 0% Herb: 90% (in work area)

Community successional stage:

- ☒ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

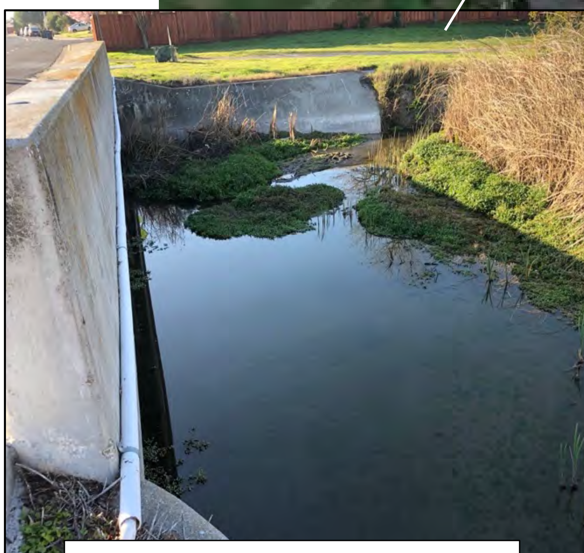
Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☒ Other: engineered trapezoidal channel
- ☐ Other:
- ☐ Other:

Comments: Narrow margin of land between the AF & the low terrace, which seems to match the top of the concrete wing wall.

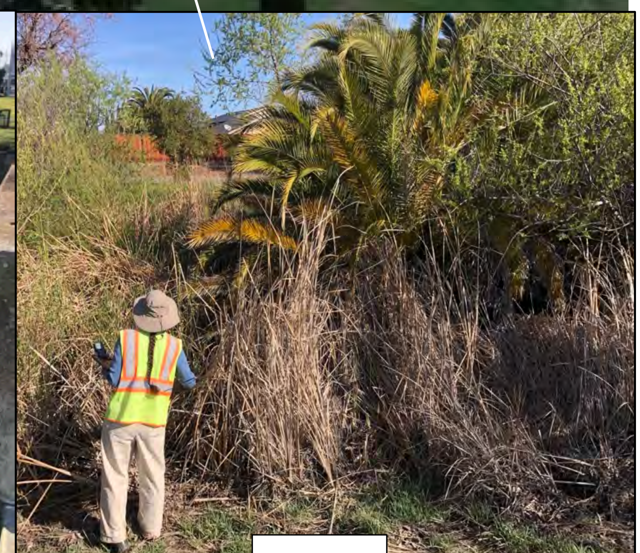
Photo Documentation Site 54/55 – Bluebell Drive Bridge, Arroyo Las Positas

2022 Site 60



Site 54 bridge apron downstream

Site 54 bridge apron upstream



Site 55

11. Site Site YM-1 Holmes Street Bridge Gravel Removal Along Arroyo Mocho

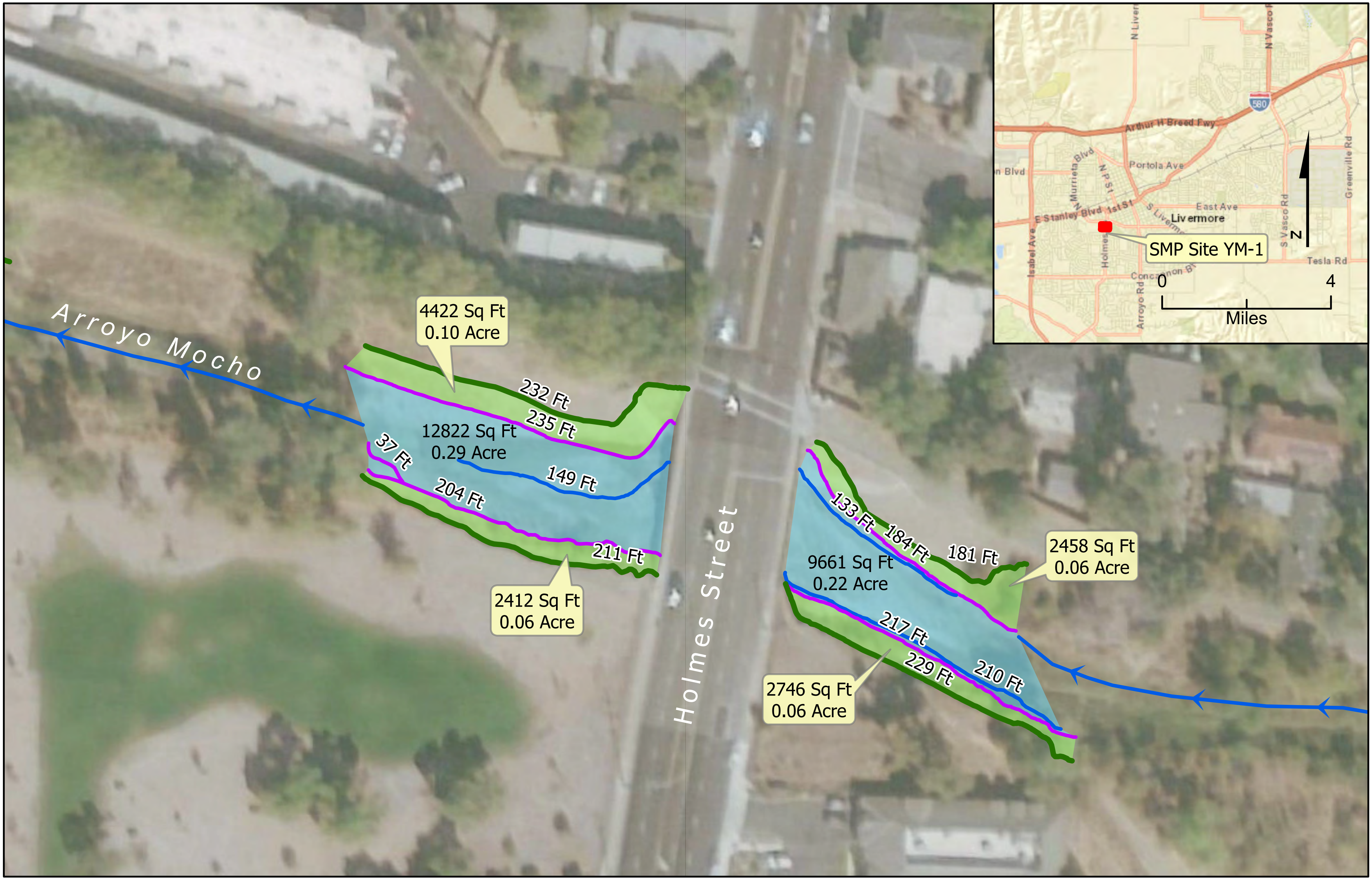
11.1 Delineation Map

This section includes a map of delineated aquatic resources ("Aquatic Resources Delineation Map") at the Site YM-1 Holmes Street Bridge Gravel Removal Along Arroyo Mocho ARDA.

To avoid cluttering the Aquatic Resources Delineation Maps, the requested reference block identifying the individual(s) who conducted the delineation, date(s) of the maps, and date(s) of any revisions is provided here as follows:

Map Reference Block for ARD Site YM-1 Holmes Street Bridge Gravel Removal Along Arroyo Mocho

Delineation date:	March 4, 2021
Delineators:	Natasha Dvorak/ Swaim Biological, Inc. Bridget Sousa/ Swaim Biological, Inc.
GIS & Map Preparers:	Chris Swaim/ Swaim Biological, Inc. Natasha Dvorak/ Swaim Biological, Inc.
Map Imagery Data:	ESRI ArcGIS Basemap World Imagery Local Imagery date: 1993-2020
Date Maps Prepared:	Field delineation results were mapped in GIS in March 2021.
	Reports maps were prepared in March 2021.



Aquatic Resource Features
- LFC
- OHWM
- TOB
- Active Floodplain
- Low Terrace

N

0 50 100 Feet

Figure 11-1 - Site YM-1 - Holmes Street Bridge along Arroyo Mocho

City of Livermore - Stream Maintenance Program

SBI Swaim Biological Inc

March 2021

11.2 Aquatic Resources

Table 11-1. Aquatic Resources Site YM-1 Holmes Street Bridge Gravel Removal Along Arroyo Mocho

Aquatic Resource Name	Aquatic Resources Classification				Aquatic Resource Size* (acre) Required for all resources	Aquatic Resource Size (linear feet) Required for only stream channels
	Cowardin	Location (lat/long) UTM 10S				
Arroyo Mocho	R4SB3	Upstream	607624	4170336	**0.28**	**461**
		Downstream	607504	4170378		

R4SB3: Cowardin wetland classification code meaning Riverine Intermittent Cobble-Gravel Streambed (Cowardin et al., 1979).
* Active Floodplain/area between Ordinary High Waters

Other Waters

The ARDA is a 1-acre area encompassing a 500-foot reach of Arroyo Mocho (250 feet upstream and 250 feet downstream). Arroyo Mocho is a Relatively Permanent Waters with a nexus to San Francisco Bay: Arroyo Mocho is tributary to Arroyo de la Laguna thence Alameda Creek thence San Francisco Bay and ultimately the Pacific Ocean. Both Alameda Creek in its lower 5.6-mile reach and San Francisco Bay are Navigable Waterways (Corps 1971).

Delineators completed the Arid West Ephemeral and Intermittent Streams Datasheet for this location. Data were collected for 2 cross-sections, documenting a gravel and cobble bed stream channel with two low flow channels that became more braided beneath the bridge due to large storm debris. The AF was virtually unvegetated, with 5% herbaceous cover anmd no shrub or tree layer. The LFCs were also unvegetated. The OHWM was determined by subtle scour lines along the banks, supported by water staining on cement wing walls, and debris deposits. Vegetation along the AF included velvet grass, mustards, perennial pepperweed, mulefat twigs, dock, white-stemmed filaree, crabgrass, vetch, and medic. In the low terrace to upland zone, there was 50% herbaceous cover by California poppy, annual lupine, white-stemmed filaree, smilo grass, wild oat, and cheeseweed; willow twigs comprised 5% cover. Arroyo Mocho was dry at the time of the delineation.

11.3 Soil Survey and Hydric Soil Information

The NRCS Web Soil Survey (USDA, 2017) was consulted to determine the soil types occurring within the ARDA. The soil type *Riverwash* occurs at this location. Figure 2- Soils in the Delineation Area provides a map of soil types overlaid on ARDA imagery. The NRCS Web Soil Survey is provided in **Appendix B.**

11.4 Vegetation

The channel was dry and mostly unvegetated at the time of the delineation. Most of the vegetation occurs on the downstream south bank, which has a large bench within the AF that supports the growth of stinkwort, dock, willowherb, California sage, moth mullein, vetch, California poppy, cocklebur, poison hemlock, Himalayan blackberry, cleavers, horehound, tree tobacco, mugwort, perennial pepperweed, smilo grass, and mulefat, willow, and cottonwood saplings. Above the AF/OHWM the banks varied from vertical eroded [unvegetated] slopes to annual upland grasses and herbs including willowherb, stinkwort, California poppy, and early growth of annual grasses. Mature cottonwood, coast live oak, walnut, and willows comprise the tree overstory. Overall, the riparian canopy of cottonwoods, willows, and walnuts is sparse to intermittent and transitions to coast live oak at outer margins.

11.5 Data Sheets

There are 2 *Arid West Ephemeral and Intermittent Streams OHWM Datasheets* for the ARDA for Site YM-1 for work occurring upstream and downstream of the Holmes Street Bridge, consisting of data for 2 cross-sections : 1 upstream (A-A') and 1 downstream (B-B').

11.6 Representative Photographs

Following the Datasheets is a pictorial map and photo guide.

Data Sheets for Site YM-1 Holmes Street Bridge Gravel Removal Along Arroyo Mocho

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: COL SMP 2021 **Project Number:** Holmes St. Bridge **Stream:** Arroyo Mocho **Investigator(s):** N. Dvorak, B. Souza	**Date:** 3/9/2021 **Time:** **Town:** Livermore **State:** CA **Photo begin file#:** **Photo end file#:**
Y ☒ / N ☐ Do normal circumstances exist on the site? Y ☐ / N ☒ Is the site significantly disturbed?	**Location Details:** 150 ft. us & ds of bridge 37.674136, -121.780142. **Projection:** **Datum:** **Coordinates:** WGS 1984

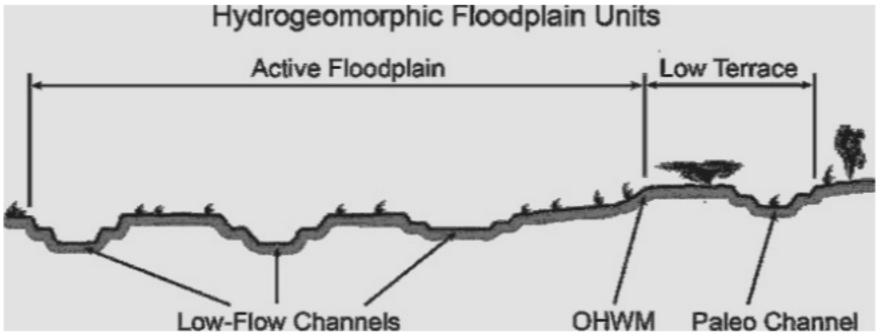
Potential anthropogenic influences on the channel system:
Semi-engineered channel w/ broad floodplain through this reach.

Brief site description:
Dry cobble/boulder low flow channels & active floodplain with minor vegetation.

Checklist of resources (if available):

- ☒ Aerial photography
  Dates: 1985 - 2020
- ☐ Topographic maps
- ☐ Geologic maps
- ☐ Vegetation maps
- ☐ Soils maps
- ☐ Rainfall/precipitation maps
- ☒ Existing delineation(s) for site
- ☒ Global positioning system (GPS)
- ☐ Other studies

- ☐ Stream gage data
  Gage number:
  Period of record:
  - ☐ History of recent effective discharges
  - ☐ Results of flood frequency analysis
  - ☐ Most recent shift-adjusted rating
  - ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

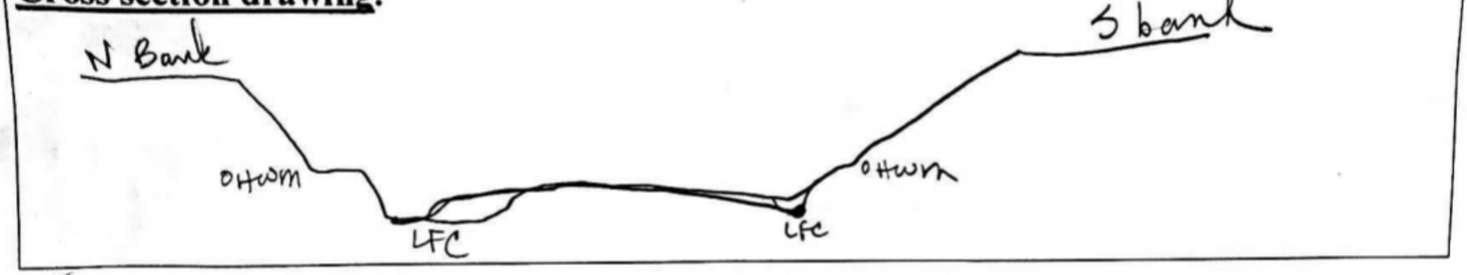


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - ☐ Mapping on aerial photograph
   - ☐ Digitized on computer
   - ☐ GPS
   - ☒ Other: Trimble

Project ID: VS **Cross section ID:** VS **Date:** 3/4/2021 **Time:**

Cross section drawing:



OHWM

GPS point: ~~37.673844, -121.779683~~
37.673988, -121.779710

Indicators:
- [x] Change in average sediment texture
- [x] Change in vegetation species
- [x] Change in vegetation cover
- [x] Break in bank slope
- [ ] Other: ____
- [ ] Other: ____

Comments:
vegetated shelf, debris line, finer sediment deposit

Floodplain unit: [ ] Low-Flow Channel [ ] Active Floodplain [x] Low Terrace

GPS point: 37.677080, -121.779766 Upland veg → poppy, lupinus, Erodium moschatum, Smilo grass, avena barbata Cheeseweed

Characteristics of the floodplain unit:
Average sediment texture: sandy coarse, <1" cobble
Total veg cover: 55 % Tree: 0 % Shrub: 5 % Herb: 50 %
Community successional stage:
- [x] NA
- [ ] Early (herbaceous & seedlings)
- [ ] Mid (herbaceous, shrubs, saplings)
- [ ] Late (herbaceous, shrubs, mature trees)

Indicators:
- [ ] Mudcracks
- [ ] Ripples
- [ ] Drift and/or debris
- [x] Presence of bed and bank
- [x] Benches
- [x] Soil development
- [x] Surface relief
- [ ] Other: ____
- [ ] Other: ____
- [ ] Other: ____

Comments:
Engineered slope. Abrupt transition to upland veg. Willows, Smilo grass, mustards, others listed above

Project ID: **Cross section ID:** US **Date:** **Time:**

Floodplain unit: ☐ Low-Flow Channel ☒ Active Floodplain ☐ Low Terrace

GPS point: ~~37.674044, -121.779873~~
37.673899, -121.779893

Characteristics of the floodplain unit:
Average sediment texture: 8" cobble & lower
Total veg cover: 5 % Tree: 0 % Shrub: 0 % Herb: 5 %
Community successional stage:
☐ NA
☒ Early (herbaceous & seedlings)
☐ Mid (herbaceous, shrubs, saplings)
☐ Late (herbaceous, shrubs, mature trees)

Indicators:
☐ Mudcracks
☐ Ripples
☒ Drift and/or debris
☒ Presence of bed and bank
☒ Benches
☒ Soil development
☒ Surface relief
☐ Other: ______
☐ Other: ______
☐ Other: ______

Comments: lightly vegetated on the margins by Holcus lanatus, brassica sp, Lepidium latifolium, malfat, lagenaria, Rumex sp., Erodium moschatum, Lactuca not serriola, Vicia sp, crabgrass, medicago

Floodplain unit: ☒ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: 37.673915, -121.779930
~~37.674056, -121.779682~~ one LFC at each toe of slope & multiple under bridge

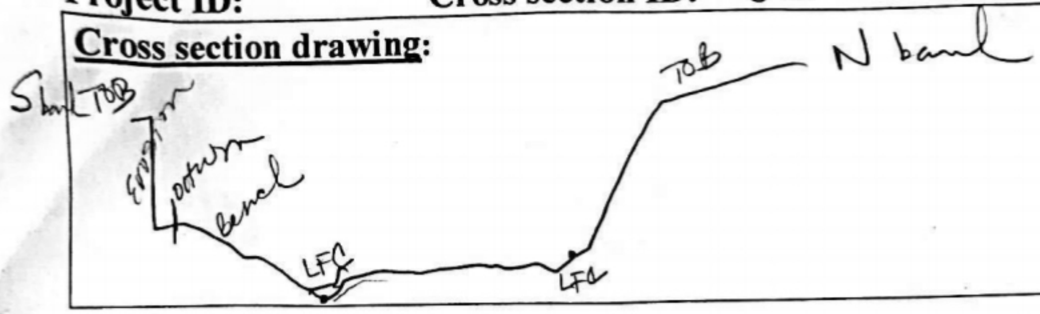
Characteristics of the floodplain unit:
Average sediment texture: ~5" cobble
Total veg cover: 0 % Tree: 0 % Shrub: 0 % Herb: 0 %
Community successional stage:
☒ NA
☐ Early (herbaceous & seedlings)
☐ Mid (herbaceous, shrubs, saplings)
☐ Late (herbaceous, shrubs, mature trees)

Indicators:
☐ Mudcracks
☐ Ripples
☒ Drift and/or debris
☐ Presence of bed and bank
☐ Benches
☐ Soil development
☒ Surface relief
☒ Other: change in sediment texture
☒ Other: no vegetation
☒ Other: LWD

Comments:

Project ID: **Cross section ID:** DS **Date:** **Time:**

Cross section drawing:



OHWM

GPS point: ~~37.674048, -121.780535~~
37.674255, -121.780530

Indicators:
- [ ] Change in average sediment texture
- [x] Change in vegetation species
- [x] Change in vegetation cover
- [x] Break in bank slope
- [x] Other: Debris
- [ ] Other:

Comments:

unvegetated
10" cobble to pea gravel
37.674250, -121.780642
37.674198, -121.780625

engineered
relatively abrupt TOB
poppy, grass
Epilobium
Dittrichia

Floodplain unit: [ ] Low-Flow Channel (2) [x] Active Floodplain [ ] Low Terrace
37.674315
-121.780609

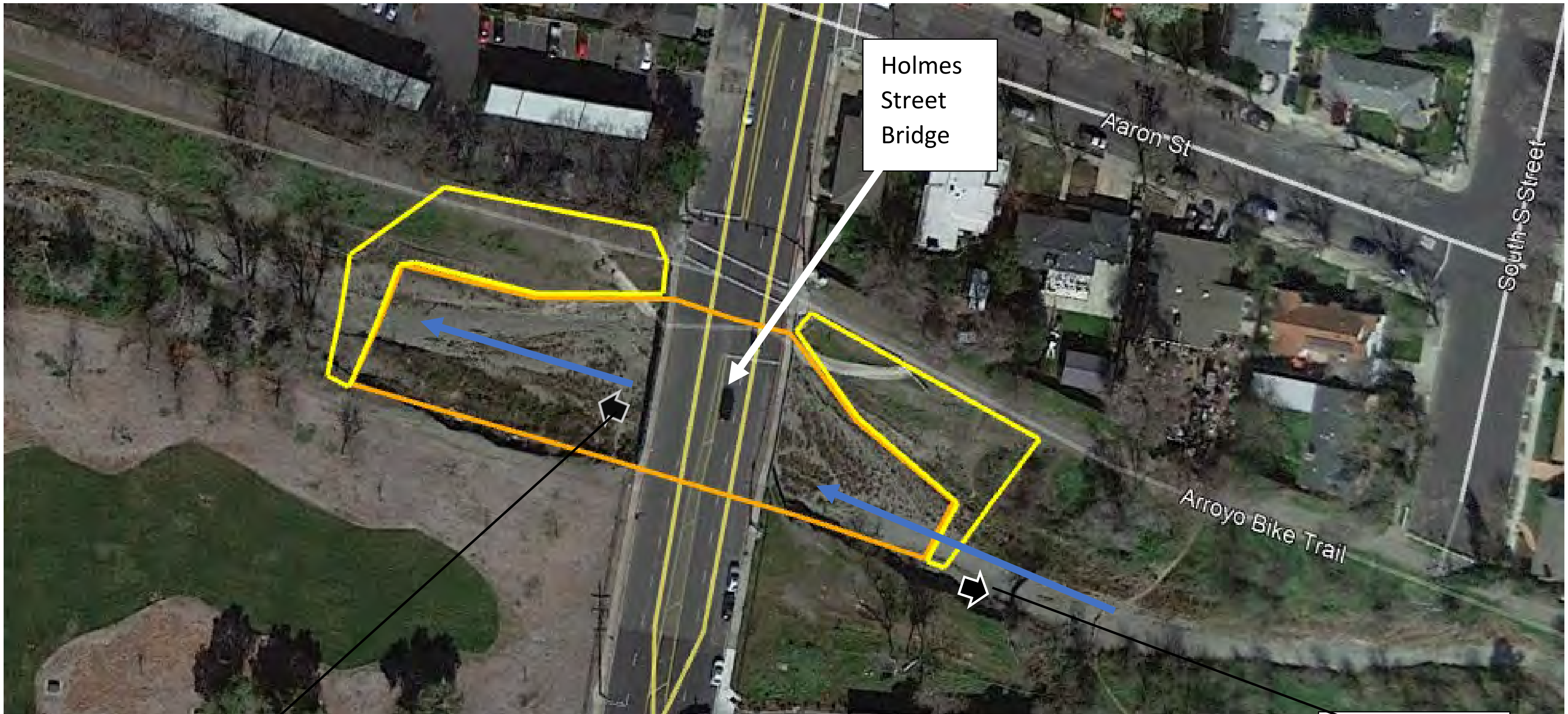
GPS point: ~~37.674103, -121.~~ 780563

Characteristics of the floodplain unit:
Average sediment texture: 5" cobble to pea gravel & coarse sand 3mm
Total veg cover: 30 % Tree: 0 % Shrub: 10 % Herb: 20 %
Community successional stage: Cottonwood 9
- [ ] NA
- [ ] Early (herbaceous & seedlings)
- [x] Mid (herbaceous, shrubs, saplings)
- [ ] Late (herbaceous, shrubs, mature trees)

Indicators:
- [ ] Mudcracks
- [ ] Ripples
- [x] Drift and/or debris
- [x] Presence of bed and bank
- [x] Benches
- [x] Soil development
- [x] Surface relief
- [ ] Other:
- [ ] Other:
- [ ] Other:

Comments:
Most established on South bank.
Smilograss, UNGR, Artemesia CA, mullein, Vicia sp., P.
Xanthium, COMA, mule fat, willow, Rumex, Lepidium, Him blackberry
Gallium
Marrubium vulgare, Nicotiana, mugwort.

Photo Documentation Site YM-1, Holmes Street Bridge, Arroyo Mocho



Downstream

Bridge with gravel and no freeboard, looking downstream

Upstream

Supplemental Attachment A-2

2022 Site 61, previously delineation as Site 41 in 2020

AQUATIC RESOURCE DELINEATION FOR THE

2020 LIVERMORE STREAM MAINTENANCE PROGRAM

SUBMITTED TO:

U.S. Army Corps of Engineers
San Francisco District
1455 Market Street
San Francisco, CA 94103-1398
Contact: Naomi Schowalter

PREPARED FOR:

City of Livermore
Department of Public Works
1052 S. Livermore Avenue
Livermore, CA 94550
Contact: Pam Lung, P.E.
925.960.4538

PREPARED BY:

Swaim Biological, Inc.
4435 First Street, PMB 312
Livermore, California 94551
Contact: Leslie Koenig
(916) 849-0513

March 2020

City of Livermore. 2020. *Aquatic Resource Delineation for the 2020 Livermore Stream Maintenance Program*. Alameda County, California. Prepared by Swaim Biological. Inc., Livermore, California. March 2020.

2022 Site 61

6. Site 41 Golf Drive Creek

6.1 Delineation Map

This section includes an overview map and detail maps of all delineated aquatic resources ("Aquatic Resources Delineation Map") at the Site 41 Golf Drive Creek ARDA.

To avoid cluttering the Aquatic Resources Delineation Maps, the requested reference block identifying the individual(s) who conducted the delineation, date(s) of the maps, and date(s) of any revisions is provided here as follows:

Map Reference Block for Site 41 Golf Drive Creek

Delineation date:	February 20, 2020
Delineators:	Natasha Dvorak/ Swaim Biological, Inc. Adrian Driver/ Swaim Biological, Inc.
GIS & Map Preparers:	Chris Swaim/ Swaim Biological, Inc. Natasha Dvorak/ Swaim Biological, Inc.
Map Imagery Data:	ESRI ArcGIS Basemap World Imagery Local Imagery date: 1998-2018
Date Maps Prepared:	Field delineation results were mapped in GIS in February and March 2020.
	Reports maps were prepared in February and March 2020.

Drainage Transects A-C

Wetland Tributary

Open Water

TOB

39004 Perennial Lake/Pond

2022 Site 61

N

0 100 200 400 600 800 Feet

Figure 6-1 Site 41 Golf Drive Creek Overview

Livermore 2020 Stream Maintenance Plan
March 2020

Drainage Transects A-C

Wetland Tributary

Open Water

TOB

39004 Perennial Lake/Pond

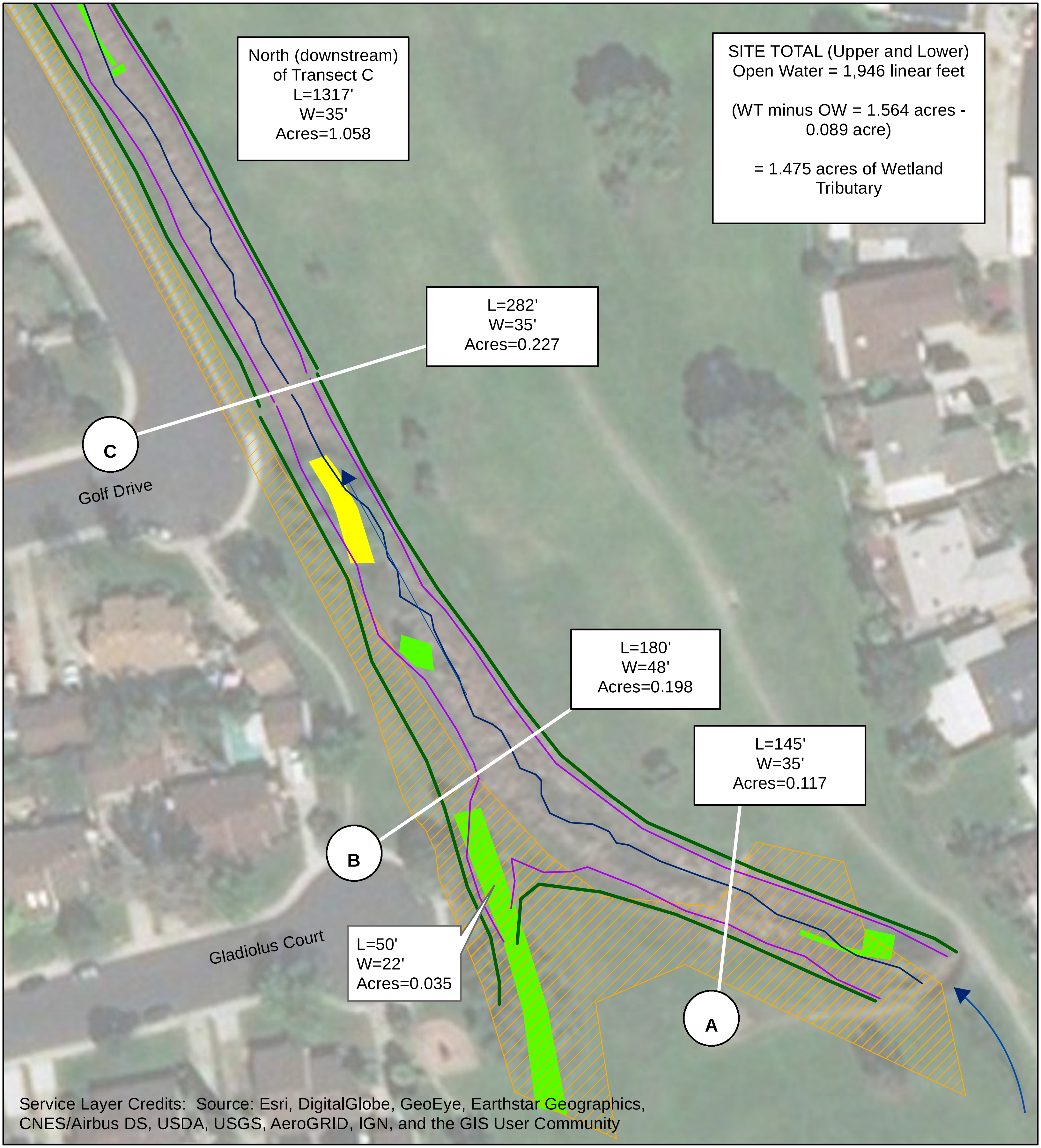
2022 Site 61

N

0 100 200 400 600 800 Feet

Figure 6-1 Site 41 Golf Drive Creek Overview

Livermore 2020 Stream Maintenance Plan
March 2020



- Aquatic Resources Delineation Area (ARDA) = Top of Bank
- Wetland Tributary
- Open Water
- Outfall, Sediment, and Vegetation Mgmt
- Vegetation Management
- Access and Staging
- Stream Transects A-C

2022 Site 61

N

0 30 60 120 180 240 Feet

Figure 6-2 Site 41 Golf Drive Creek Detail - Lower

Livermore 2020 Stream Maintenance Plan
March 2020

Aquatic Resources Delineation Area (ARDA) = Top of Bank

Wetland Tributary

Open Water

Outfall, Sediment, and Vegetation Mgmt

Vegetation Management

Access and Staging

Stream Transects A-C

N

0 45 90 180 270 360 Feet

Figure 6-3 Site 41 Golf Drive Creek Detail - Upper

2022 Site 61

Livermore 2020 Stream Maintenance Plan
March 2020

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Swaim Biological Inc

6.2 Aquatic Resources

Table 6-1. Aquatic Resources Site 41 Golf Drive Creek

2022 Site 61

Aquatic Resource Name	Aquatic Resources Classification				Aquatic Resource Size* (acre) Required for all resources	Aquatic Resource Size (linear feet) Required for only stream channels
	Cowardin	Location (lat/long) UTM 10S				
Unnamed Drainage "Golf Drive Creek"	**R5UB3**	Upstream	0610843	4174687	**0.089**	**1946**
		Downstream	0610742	4174777		
	RPEM	Same as Above			**1.475**	

R5UB3: Cowardin wetland classification code meaning Unknown Perennial Unconsolidated Mud Bottom; RPEM: Perennial Riverine Emergent; (Cowardin et al., 1979).
* Active Floodplain/area between Ordinary High Waters

Other Waters

The Site 41 Golf Drive Creek ARDA is a 1.5-acre study area encompassing a 1946 linear foot reach of an unnamed drainage referred to as "Golf Drive Creek". Approximately 660 linear feet of the drainage was delineated in the field (Stream cross sections A-C), while the remainder (the reach downstream and north of cross section C) was mapped based on extrapolation of field data and satellite imagery, supllemented by site photos. The drainage may have been excavated from uplands during development of the Springtown Golf Course and residential community to convey excess golf course irrigation and urban runoff. The unnamed drainage flows south to north into what once operated as a diversion pond for the Springtown Golf Course. The pond was once seasonally connected to Arroyo Las Positas, a jurisdictional water, via a seasonal impoundment accomplished by a rubber dam and a flow-control-gate between the pond and creek. Once the Springtown Golf Course became defunct, the impoundment was no longer authorized. It is unknown whether seasonal flows in the creek or direct precipitation to the pond ever results in hydrological connection between the two at this time. The drainage has a small 2-foot Open Water Channel along its length and the remainder of area within the OHWM is Freshwater Emergent Wetland consisting of bulrush and cattails.

6.3 Soil Survey and Hydric Soil Information

The NRCS Web Soil Survey (USDA, 2017) was consulted to determine the soil types occurring within the study area. The soil type *Pescadero Clay* occurs at this location. Figure 2- Soils in the Delineation Area provides a map of soil types overlaid on study area imagery. The NRCS Web Soil Survey is provided in **Appendix B.**

6.4 Vegetation

An Open Water low-flow channel was observed at the time of the delineation. It was narrow for its entire observed length, approximately 2 feet wide. The rest of the channel supported a dense growth of bulrush and cattails. Streamside vegetation included rooted willow trees and willowherb. The transition to Low Terrace just above the OHWM was an abrupt transition to thistles, mustards, and wild oats, with an occasional coyote brush. The remainder of the area to Top of Bank was ornamental lawn.

A tree-lined drainage channel extends from the Top of Bank at Gladiolus Court to the unnamed wetland tributary channel. The tree canopy was ornamental boxwood and olive, with a shrub understory of coyote brush. In the herbaceous layer, large grasses- potentially canarygrass or Smilo grass- dominated along with willowherb, dock, and fennel. As it extended downslope into the channel, saltgrass became the dominant species.

6.5 Data Sheets

There are 7 *Arid West Ephemeral and Intermittent Streams OHWM Datasheets* for Site 41 Golf Drive Creek ARDA, consisting of data for 3 cross-sections (A-C). Wetland data sheets were not completed for the instream emergent wetlands, as soils were presumed. Not including the Open Water channel, areas within the OHWM/Active Floodplain were mapped as Wetland Tributary (= Freshwater Emergent Wetland).

6.6 Representative Photographs

Following the Datasheets is an 11x17 pictorial map and photo guide.

Data Sheets for Site 41 Golf Drive Creek

2022 Site 61

2022 Site 61

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: Livermore SMP 2020
Project Number:
Stream: Unnamed wetland tributary to Arroyo las Positas
Investigator(s): N. Dvorak, A. Driver

Date: 02.20.2020 **Time:** 1100
Town: Livermore **State:** CA
Photo begin file#: **Photo end file#:**

Y ☒ / N ☐ Do normal circumstances exist on the site?

Y ☐ / N ☒ Is the site significantly disturbed?

Location Details: Gladiolus Court

Projection: 0610813 **Datum:** UTM 10S
Coordinates: 4174687, 0610742 , 4174777

Potential anthropogenic influences on the channel system:
Possibly a channel constructed out of uplands during construction of the Springtown Golf Course & homes.

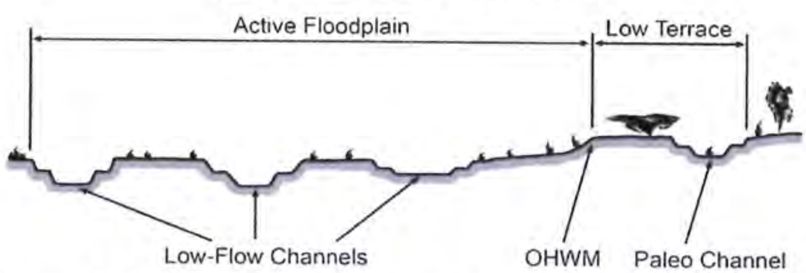
Brief site description:

Checklist of resources (if available):

- ☒ Aerial photography
  Dates: 1993–2018
- ☒ Topographic maps
- ☐ Geologic maps
- ☐ Vegetation maps
- ☒ Soils maps
- ☐ Rainfall/precipitation maps
- ☐ Existing delineation(s) for site
- ☒ Global positioning system (GPS)
- ☐ Other studies

- ☐ Stream gage data
  Gage number:
  Period of record:
  - ☐ History of recent effective discharges
  - ☐ Results of flood frequency analysis
  - ☐ Most recent shift-adjusted rating
  - ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units



Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   ☒ Mapping on aerial photograph ☒ GPS
   ☒ Digitized on computer ☐ Other:

Project ID: Gladiolus Ct. **Cross section ID:** C **Date:** Feb 20 2020 **Time:** 11:00

Cross section drawing:

OHWM

GPS point: UTM 0610761, 4174754

Indicators:

- [x] Change in average sediment texture
- [x] Change in vegetation species
- [x] Change in vegetation cover
- [x] Break in bank slope
- [ ] Other: ______________
- [ ] Other: ______________

Comments:

Floodplain unit: [x] Low-Flow Channel [ ] Active Floodplain [ ] Low Terrace

GPS point: UTM 0610764, 4174748

Characteristics of the floodplain unit:

Average sediment texture: mud

Total veg cover: 0 % Tree: 0 % Shrub: 0 % Herb: 0 %

Community successional stage:

- [x] NA
- [ ] Early (herbaceous & seedlings)
- [ ] Mid (herbaceous, shrubs, saplings)
- [ ] Late (herbaceous, shrubs, mature trees)

Indicators:

- [ ] Mudcracks
- [ ] Ripples
- [ ] Drift and/or debris
- [ ] Presence of bed and bank
- [ ] Benches
- [ ] Soil development
- [ ] Surface relief
- [x] Other: unvegetated flow
- [ ] Other: ______________
- [ ] Other: ______________

Comments:

Narrow <24" open water channel amid emergent cattails & rush.

Project ID: Gladiolus **Cross section ID:** C **Date:** 2-20-2020 **Time:** 11:00

Floodplain unit: ☐ Low-Flow Channel ☒ Active Floodplain ☐ Low Terrace

GPS point: UTM 0610758, 4174745

Characteristics of the floodplain unit:

Average sediment texture: mud

Total veg cover: 180 % Tree: 90 % Shrub: 0 % Herb: 90 %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☒ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☒ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☒ Surface relief
- ☐ Other: ______
- ☐ Other: ______
- ☐ Other: ______

Comments: The AF is mostly vegetated with emergent cattails & bulrush. There is a ~~gravel~~ mud bar at this cross-section. Willows grow in the AF.

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☒ Low Terrace

GPS point: UTM 0610750, 4174749

Characteristics of the floodplain unit:

Average sediment texture: Soil

Total veg cover: 180 % Tree: 90 % Shrub: 0 % Herb: 90 %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☒ Late (herbaceous, shrubs, mature trees)

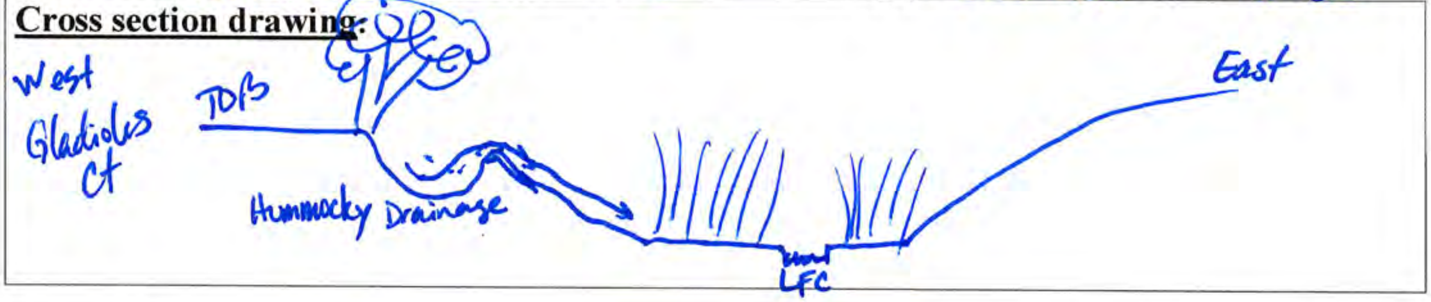
Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☒ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☒ Surface relief
- ☐ Other: ______
- ☐ Other: ______
- ☐ Other: ______

Comments: Pretty distinct break between upland veg of low terrace, OHWM as it descends into channel of emergent veg.

Project ID: Gladiolus **Cross section ID:** B **Date:** 2-20-2020 **Time:** 11:30

Cross section drawing:



OHWM

GPS point: 0610771, 4174709

Indicators:

- ☐ Change in average sediment texture
- ☒ Change in vegetation species
- ☒ Change in vegetation cover
- ☒ Break in bank slope
- ☐ Other: ________
- ☐ Other: ________

Comments:
A small drainage area fans out into the creek channel at this location, widening the OHWM associated with the creek and adding zone around drainage.

Floodplain unit: ☒ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: UTM 0610784, 4174716

Characteristics of the floodplain unit:

Average sediment texture: mud

Total veg cover: 0 % Tree: 0 % Shrub: 0 % Herb: 0 %

Community successional stage:

- ☒ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☒ Other: open water channel
- ☐ Other: ________
- ☐ Other: ________

Comments:
Narrow ≤24" open water channel through dense emergent cattails + bulrush.

Project ID: Gladiolus **Cross section ID:** 6 **Date:** 2.20.2020 **Time:** 11:30

Floodplain unit: ☐ Low-Flow Channel ☒ Active Floodplain ☐ Low Terrace

GPS point: UTM 0610776, 4174711

Characteristics of the floodplain unit:
Average sediment texture: mud/silt
Total veg cover: 110 % Tree: 10 % Shrub: 0 % Herb: 100 %
Community successional stage:
- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☒ Late (herbaceous, shrubs, mature trees)

Indicators:
- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☒ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☒ Surface relief
- ☒ Other: veg change
- ☐ Other:
- ☐ Other:

Comments: The drainage that fans out into the creek channel supports more hydrophytic veg than the adjacent upland grasses. On the east bank, there is a distinct vegetative & elevation transition from the emergent veg to upland bank.

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☒ Low Terrace

GPS point: 0610790, 4174121

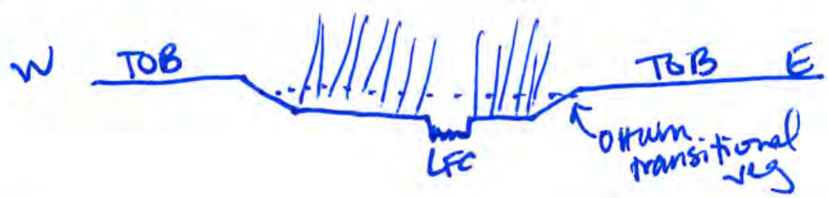
Characteristics of the floodplain unit:
Average sediment texture: silt
Total veg cover: 90 % Tree: 0 % Shrub: 0 % Herb: 90 %
Community successional stage:
- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☒ Late (herbaceous, shrubs, mature trees)

Indicators:
- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☒ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☒ Surface relief
- ☐ Other:
- ☐ Other:
- ☐ Other:

Comments: The LT on the west bank would be comprised of upland grasses between the TOB + OHWM. On the east bank there is an abrupt transition from emergent channel veg to top of bank.

Project ID: Gladiolus **Cross section ID:** A **Date:** 2·20·2020 **Time:** 11:45

Cross section drawing:



OHWM

GPS point: UTM 0610816, 4174695

Indicators:

- [ ] Change in average sediment texture
- [x] Change in vegetation species
- [x] Change in vegetation cover
- [x] Break in bank slope
- [ ] Other: ____
- [ ] Other: ____

Comments:
The OHWM on both banks, but more visibly on the west bank because the AF is wider, is shown by transitional vegetation from upland to wetland.

Floodplain unit: [x] Low-Flow Channel [ ] Active Floodplain [ ] Low Terrace

GPS point: 0610818, 4174700

Characteristics of the floodplain unit:
Average sediment texture: mud
Total veg cover: 0 % Tree: 0 % Shrub: 0 % Herb: 0 %
Community successional stage:

- [x] NA
- [ ] Early (herbaceous & seedlings)
- [ ] Mid (herbaceous, shrubs, saplings)
- [ ] Late (herbaceous, shrubs, mature trees)

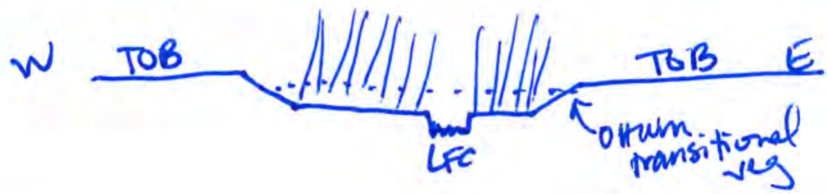
Indicators:

- [ ] Mudcracks
- [ ] Ripples
- [ ] Drift and/or debris
- [ ] Presence of bed and bank
- [ ] Benches
- [ ] Soil development
- [ ] Surface relief
- [x] Other: open water channel
- [ ] Other: ____
- [ ] Other: ____

Comments:
Small (2' open water channel amid emergent vegetation.

Project ID: Gladiolus **Cross section ID:** A **Date:** 2·20·2020 **Time:** 11:45

Cross section drawing:



OHWM

GPS point: UTM 0610816, 4174695

Indicators:

- ☐ Change in average sediment texture
- ☒ Change in vegetation species
- ☒ Change in vegetation cover
- ☒ Break in bank slope
- ☐ Other: ______
- ☐ Other: ______

Comments:
The OHWM on both banks, but more visibly on the west bank because the AF is wider, is shown by transitional vegetation from upland to wetland.

Floodplain unit: ☒ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: 0610818, 4174700

Characteristics of the floodplain unit:
Average sediment texture: mud
Total veg cover: 0 % Tree: 0 % Shrub: 0 % Herb: 0 %
Community successional stage:

- ☒ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☒ Other: open water channel
- ☐ Other: ______
- ☐ Other: ______

Comments:
Small <2' open water channel amid emergent vegetation.

Project ID: Gladiolus **Cross section ID:** A **Date:** 2.20.2020 **Time:** 11:45

Floodplain unit: ☐ Low-Flow Channel ☒ Active Floodplain ☐ Low Terrace

GPS point: 06 10817, 4174695

Characteristics of the floodplain unit:

Average sediment texture: mud

Total veg cover: 100 % Tree: 0 % Shrub: 0 % Herb: 100 %

Community successional stage:

- ☐ NA
- ☒ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☒ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☒ Surface relief
- ☐ Other: ______
- ☐ Other: ______
- ☐ Other: ______

Comments:

channel bed is thick w/ emergent wetland veg. with narrow edging of transitional veg.

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☒ Low Terrace

GPS point: 2 feet upslope from prior point (above)

Characteristics of the floodplain unit:

Average sediment texture: silt

Total veg cover: 0 % Tree: 0 % Shrub: 0 % Herb: 100 %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☒ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☒ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☒ Surface relief
- ☐ Other: ______
- ☐ Other: ______
- ☐ Other: ______

Comments:

Fairly distinct bed & bank & vegetation transition from upland to AF/wetland tributary.

Photodocumentation
Site 41 Golf Drive
Creek

2022 Site 61

Aquatic Resource Delineation for the

2022 Livermore Stream Maintenance Program

Submitted to:

U.S. Army Corps of Engineers
San Francisco District
1455 Market Street
San Francisco, CA 94103-1398
Contact: Elise Piazza

Prepared for:

City of Livermore
Department of Public Works
1052 S. Livermore Avenue
Livermore, CA 94550
Contact: Edward Reyes
(925) 960-4527

Prepared by:

Swaim Biological, Inc.
4435 First Street, PMB 312
Livermore, California 94551
Contact: Leslie Koenig
(916) 849-0513

March 2022

City of Livermore. 2022. *Aquatic Resource Delineation for the 2022 Livermore Stream Maintenance Program*. Alameda County, California. Prepared by Swaim Biological. Inc., Livermore, California. March 2022.

Contents

TABLES

FIGURES

Appendix A: Livermore Precipitation Reports
Appendix B: Soils Reports
Supplemental Attachment A: 2022 SMP Sites Previously Delineated In 2021

Acronyms and Abbreviations

AF	Active Floodplain
ARDA	Aquatic Resources Delineation Area
City	City of Livermore
Corps	U.S. Army Corps of Engineers
FAC	Facultative
FACU	Facultative Upland
FACW	Facultative Wetland
GIS	Geographic Information System
GPS	Global Positioning System
HMP	Hydromodification Management Plan
HUC	Hydrologic Unit Code
LFC	Low Flow Channel
MLRA	Major Land Resource Area
NOAA	National Oceanic and Atmospheric Administration
NRCS	Natural Resources Conservation Service
NL	No indicator
NWI	National Wetland Inventory
NWPL	National Wetland Plant List
NWS	National Weather Service
OBL	Obligate
OHWM	Ordinary High Water Mark
SMP	Stream Maintenance Program
UPL	Obligate upland
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
UTM	Universal Transverse Mercator coordinate system
WETS	Climate Analysis for Wetlands
YM	Yearly Maintenance Site

1. Summary & Regional Data

1.1 Summary of Aquatic Resources in the SMP 2022 Delineation Area

The Aquatic Resources Delineation Area (ARDA) evaluates six (6) 2022 SMP project locations and includes one sediment basin associated with an unnamed stormwater basin system which was constructed to manage stormwater flow associated with Bear Creek Basins and The Bluffs Development near Frick Lake (Site 56); two linear conveyance channels constructed to manage stormwater flow associated with The Saddleback Development near Springtown Alkali Sink and a roadside ditch that outfalls into Springtown Alkali Sink (Site 57); Arroyo Las Positas (Site 58 and 60); an unnamed outfall tributary to the Arroyo Mocho floodplain (Site 63); Arroyo Mocho Low Flow Channel (Site 66); and Altamont Creek (Site 68). The Arroyo Las Positas, Arroyo Mocho. and Altamont Creek flow into the Arroyo de la Laguna which connects to Alameda Creek thence San Francisco Bay, a Traditional Navigable Waterway. The Bear Creek Basin stormwater basins at Site 56 have hydrological connectivity to Arroyo Las Positas by way of unnamed tributaries to Altamont Creek. The Saddleback stormwater features at Site 57 have hydrological connectivity to Arroyo Las Positas by way of unnamed tributaries through Springtown Alkali Sink. The length of streams, culvert-outlet tributaries, and other drainages in the ARDA totals 2164 linear feet. Waters within the Ordinary High-Water Mark (OHWM) total 0.80 acres.

Table 1-1: Aquatic Resources Summary

Location	Aquatic Resource Type	Aquatic Resource Size (acre) Required for all resources	Aquatic Resource Size (linear feet) Required for only stream channels
Site 56 Hillstone Court Outfall at Bear Creek Basins	Other Waters	0.07	205
Site 57A/B/C Saddleback Features	Other Waters	0.12	889
Site 58 Heather Lane Bridge Culvert on Arroyo Las Positas	Other Waters	0.44	566
Site 62 Outfall at Robertson Dog Park on Arroyo Mocho	Other Waters	0.03	210
Site 66 Rockrose Outfall on Arroyo Mocho Low Flow Channel	Other Waters	0.02	82
Site 68 Laughlin Road Bridge Culvert on Altamont Creek	Other Waters	0.13	232
ALL SITES	***TOTAL***	***0.81***	***2184***

This delineation of perennial, intermittent, and ephemeral tributaries and drainages has been conducted in accordance with the *Field Guide to the Identification of the Ordinary High-Water Mark (OHWM) in the Arid West Region of the Western United States* (2008) (Lichvar and McColley 2008) and the *Updated Datasheet for the Identification of the Ordinary High-Water Mark (OHWM) in the Arid West Region of the Western United States* (Curtis and Lichvar 2010).

1.2 Introduction

This report presents the results of an Aquatic Resources Delineation (ARD) conducted for the Livermore Stream Maintenance Program (SMP) 2022 Annual Notification (Project). The City of Livermore (City) proposes to conduct stream maintenance activities at six locations in the city. One location consists of three sub-sites (57A/B/C).

This report was prepared in accordance with U.S. Army Corps of Engineers (USACE) San Francisco District guidelines (U.S. Army Corps of Engineers 2016a). All conclusions regarding the potential extent of waters of the United States described in this report will not be considered final until verified in writing by USACE.

There are at total of 14 SMP Sites that have potential impacts to potentially jurisdictional resources in the 2022 SMP. Eight (8) of these locations were previously delineated in 2020 or 2021. The conditions at these sites have not changed significantly since the previous delineation and therefore a full delineation was not conducted this year. Instead, the delineations from 2020 and 2021 are included in the Supplemental Attachment to this ARD as reference.

Summary of previously delineated 2022 SMP sites:

Site	Year delineated	Former Site No.
46	2021	--
47	2021	--
48	2021	--
60	2021	54 (Bluebell)
61	2020	41 Transect A
63	2021	52 South
64	2021	51A (Stanley)
YM-1 (Holmes)	2021	YM-1 (Holmes)

1.3 Contact Information

Project Applicant

City of Livermore
Department of Public Works
1052 S. Livermore Avenue
Livermore, CA 94550
Contact: Edward Reyes, P.E.
(925) 960-4538

Delineation Preparer

Swaim Biological, Inc.
4435 First Street, PMB 312
Livermore, CA 94551
Natasha Dvorak and Leslie Koenig
(707) 583-3736 / (916) 849-0513

1.4 Site Description and Location

Livermore is located in the Diablo Range in eastern Alameda County. Under the 2022 Annual Notification, 6 project activities have been identified for maintenance in the 2022 SMP Work Cycle. These projects include sediment, vegetation, and debris management as described in Sections 2.0 through 9.0) (**Figure 1-1— Aquatic Resources Delineation Area**). Specifically, the project includes stream maintenance activities at the following locations:

1. Site 56 Hillstone Court Outfall at Bear Ceek Basins
2. Site 57A/B/C Saddleback Features
    a. Saddleback Grassed Swale and Outfall - Raymond Road to Martingale Lane
    b. Saddleback Grassed Swale- Martingale Lane to Saddleback Basin
    c. Saddleback V-ditch along Ames Street
3. Site 58 Heather Lane Bridge Culvert on Arroyo Las Positas
4. Site 62 Outfall at Robertson Dog Park on Arroyo Mocho
5. Site 66 Rockrose Outfall on Arroyo Mocho Low Flow Channel
6. Site 68 Laughlin Road Bridge Culvert on Altamont Creek

2022 SMP ARD Sites

N

0 1 2 Miles

Figure 1-1 2022 SMP Work Sites

City of Livermore - Stream Maintenance Program

February 2022

SBI

Driving directions from the U.S. Army Corps of Engineers' San Francisco District Office located at 1455 Market Street, #16, San Francisco, CA 94103 are as follows:

City of Livermore:
In Livermore via Interstate 580, the project sites are accessible from various municipal streets (**Figure 1**) detailed as follows.

Site 56 Hillstone Court Outfall at The Bluffs Unnamed Stormwater Basin: Take I-580 E to N Vasco Rd in Livermore. Take exit 55 from I-580 E. Take Northfront Rd and Laughlin Rd to Hillstone Ct, 5 min (2.2 mi)

Site 57A/B/C Saddleback Features: Take I-580 E to N Livermore Ave in Alameda County. Take exit 52 from I-580 E. Continue on N Livermore Ave. Take Hartford Ave and Raymond Rd to Martingale Ln in Livermore, 6 min (4.2 mi)

Site 58 Heather Lane Bridge Culvert on Arroyo Las Positas: Take I-580 E to First St in Livermore. Take exit 54 from I-580 E. Take Bluebell Dr to Heather Ln, 3 min (1.2 mi)

Site 62 Outfall at Robertson Dog Park on Arroyo Mocho: Take I-580 E to N Livermore Ave in Alameda County. Take exit 52 from I-580 E. Continue on N Livermore Ave to your destination in Livermore, 9 min (2.9 mi)

Site 66 Rockrose Outfall on Arroyo Mocho Low Flow Channel: Take I-580 E to CA-84/Isabel Ave in Livermore. Take exit 51 from I-580 E. Continue on CA-84. Take Hagemann Dr to Rockrose St, 5 min (1.9 mi)

Site 68 Laughlin Road Bridge Culvert on Altamont Creek: Take I-580 E to N Vasco Rd in Livermore. Take exit 55 from I-580 E. Take Northfront Rd to Laughlin Rd, 3 min (1.5 mi)

1.5 Livermore Precipitation and Growing Season [WETS]

The Livermore Valley has a Mediterranean climate with hot, dry summers and cool, wet winters. The National Weather Service (NWS) Livermore climate station is most centrally located to the ARDA and provides the longest dataset (1971-2022) but lacked rainfall data for June through November 2020. The Livermore Municipal Airport climate station had rainfall data for the missing months, but a shorter overall dataset (1998-2022). There are slight differences between the 2021 rainfall totals from each station, with Livermore reporting 12.05 inches of rain during 2021 while the Livermore Airport station reported 14.94 inches of total rainfall for 2021 (AgACIS 2022). Reports from both stations are provided in **Appendix A**.

Average annual precipitation in Livermore is reported between 13.47 and 15.18 inches (AgACIS 2021; NOAA 2021), with most falling as rain between December and March (**Table 1-2**; Appendix A). Based on NWS and NOAA station data as of February 28, 2022, Livermore is at normal average rainfall totals. A normal water-year[1]-to-date average from October 1 through February 28 is 10.88 inches. Reported rainfall from October 1, 2021 through February 28, 2022 is 10.83 inches (NOAA 2022), or 100% of normal. The average daily temperature is approximately 60.3 degrees Fahrenheit (AgAcis 2022). Due to the temperate climate, the growing season is nearly year-round.

At the time of the late February 2022 field surveys, vegetation and indicators of wetland hydrology were identifiable.

Table 1-2: Livermore WETS Table

AgACIS for Alameda County

AgACIS

WETS Station: LIVERMORE, CA

Requested years: 1971 - 2022

Month	Avg Max Temp	Avg Min Temp	Avg Mean Temp	Avg Precip
Jan	57.4	38.1	47.8	2.62
Feb	62.0	40.5	51.2	2.48
Mar	66.1	42.8	54.5	2.24
Apr	71.3	44.9	58.1	1.04
May	77.5	49.2	63.4	0.40
Jun	84.6	53.3	68.9	0.09
Jul	89.6	55.9	72.8	0.02
Aug	88.9	55.7	72.3	0.06
Sep	86.3	54.0	70.1	0.19
Oct	77.9	49.0	63.5	0.85
Nov	65.3	42.5	53.9	1.65
Dec	57.3	38.0	47.6	2.45
Annual:				
Average	73.7	47.0	60.3	-
Total	-	-	-	14.09

GROWING SEASON DATES

Years with missing data:	*24 deg = 7*	*28 deg = 10*	*32 deg = 9*
Years with no occurrence:	*24 deg = 41*	*28 deg = 8*	*32 deg = 0*
Data years used:	*24 deg = 45*	*28 deg = 42*	*32 deg = 43*
Probability	**24 F or higher**	**28 F or higher**	**32 F or higher**
50 percent *	No occurrence	1/15 to 12/22: 341 days	2/20 to 12/3: 286 days
70 percent *	No occurrence	1/1 to 1/5: 369 days	2/10 to 12/13: 306 days

** Percent chance of the growing season occurring between the Beginning and Ending dates.*

[1] A water-year is defined as October 1 of any given year through September 30 of the following year.

1.6 ARDA Soils

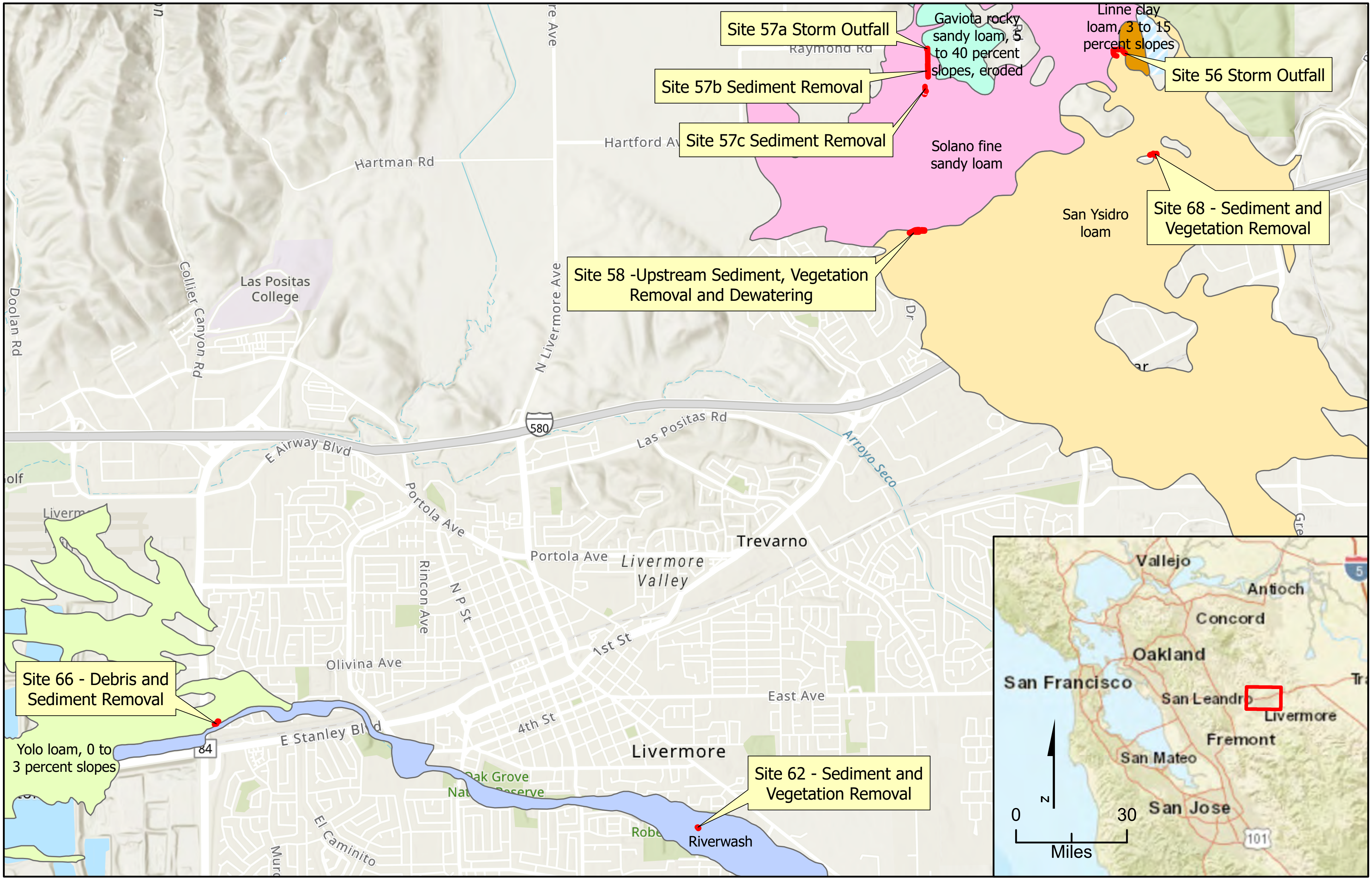
The ARDA includes 5 soil map units plus Riverwash (**Figure 1-2— Soil Types in the Aquatic Resources Delineation Area**; **Table 1-3**; **Appendix B**) as identified by the U.S. Department of Agriculture, Natural Resources Conservation Service (2021) and described below.

Table 1-3: Soils Summary

Soil Map Unit	Hydric	Site
(GaE2) Gaviota rocky sandy loam, 5 to 40 percent slopes, eroded	no	Site 57A Saddleback Grassed Swale and Outfall - Raymond Road to Martingale Lane
(LaC) Linne clay loam, 3 to 15 percent slopes	no	Site 56 Hillstone Court Outfall at The Bluffs Unnamed Stormwater Basin
(Rh) Riverwash	YES	Site 62 Outfall at Robertson Dog Park on Arroyo Mocho
(Sa) San Ysidro loam, 0 to 2 percent slopes, MRLA 14	no	Site 56 Hillstone Court Outfall at The Bluffs Unnamed Stormv Basin Site 68 Laughlin Road Bridge Culvert on Altamont Creek Site 58 Heather Lane Bridge Culvert on Arroyo Las Positas
(Sf) Solano find sandy loam	no	Site 56 Hillstone Court Outfall at The Bluffs Unnamed Stormwater Basin Site 57A/B/C Saddleback Features Site 58 Heather Lane Bridge Culvert on Arroyo Las Positas
(YmA) Yolo loam, calcareous substratum, 0 to 6 percent slopes, MRLA 14	no	Site 66 Rockrose Outfall on Arroyo Mocho Low Flow Channel

Source: NRCS, 2022

- **Gaviota rocky sandy loam, 5 to 40 percent slopes, eroded** is not listed as hydric. Thi map unit consists of 35% minor components Rock outcrop, Los osos, Vallecitos, and Unnamed. See Appendix B for a description of which minor components are hydric soils. This soil is somewhat excessively drained, has very high runoff, and does not flood nor pond. It forms Shallow Loamy Uplands ecological sites.
- **Linne clay loam, 3 to 15 percent slopes**, is not listed as hydric. This map unit consists of 15% minor components Altamont, Diablo, Clear lake, and Pescadero soil series. See Appendix B for a description of which minor components are hydric soils. This soil is well drained, has medium run off, and does not frequently flood nor pond. This soil type is a Farmland of Statewide Importance. It forms Hills ecological sites.
- **Riverwash** is listed as hydric. This soil is excessively drained, has negligible run off, and depth to the water table ranges from 0 to 24 inches.



2022 SMP ARD Sites

N

0 1 2 Miles

Figure 1-2 2022 SMP Soils

City of Livermore - Stream Maintenance Program

February 2022

SBI

- **(Sa) San Ysidro loam, 0 to 2 percent slopes, MRLA 14** is not listed as hydric. This map unit consists of 15% minor components, including Arbuckle, Solano, Pleasanton loam, Rincon, Pescadero, Palexeralfs, and Cropley clay. See Appendix B for a description of which minor components are hydric soils. This soil is moderately well-. drained, has low run off, and does not frequently flood or pond. It forms Loamy Claypan ecological sites

- **(Sf) Solano find sandy loam** is not listed as hydric. This map unit consists of 15% minor components Rincon, San ysidro, and Pescadero. See Appendix B for a description of which minor components are hydric soils. This soil is somewhat poorly drained, has a low run off classification, and does not frequently flood nor pond. It forms Dry Loamy Terrace ecological sites.

- **(YmA) Yolo loam, calcareous substratum, 0 to 6 percent slopes, MLRA 14** is not listed as hydric. This map unit consists of 15% minor components Unnamed, Livermore, and Sycamore soil series. See Appendix B for a description of which minor components are hydric soils. This soil is well drained, has low runoff, rarely floods, and does not pond. This soil type is Prime farmland if irrigated.

1.7 ARDA Hydrology

The ARDA is located in the San Francisco Bay Watershed hydrologic unit (hydrologic unit code [HUC] 18050004). HUCs correspond to the natural divisions between watershed boundaries and are based on the U.S. Environmental Protection Agency's hydrologic unit maps (U.S. Environmental Protection Agency 2018).

The ARDA encompasses stream portions within Altamont Creek, Arroyo Las Positas, Arroyo Mocho, stormwater basins located in north Livermore referred to as the "The Bluffs Unnamed Stormwater Basin", and stormwater conveyance channels located in north Livermore referred to as the "Saddleback" features (**Figure 1-3 — Hydrology of the Aquatic Resources Delineation Area**). Altamont Creek flows into Arroyo Las Positas in northeast Livermore. The Arroyo Las Positas flows into the Arroyo Mocho near the Chain of Lakes which flows into the Arroyo de la Laguna, which drains into Alameda Creek and into the San Francisco Bay immediately west of Newark, California, approximately 18.5 miles downstream.

Two (2) study areas are located in subdivision-related stormwater management features: Site 56 and Site 57A/B/C. One (1) study area is located on Arroyo Las Positas: Site 58. Two (2) study areas are located on Arroyo Mocho: Site 62 and Site 66. One (1) study area is located on Altamont Creek: Site 68.

Site 56 is located at an unnamed stormwater basin system located in the The Bluffs housing development near Frick Lake. The unnamed stormwater basins were created to capture stormwater flow from The Bluffs development which completed around 2000. The drainage network at The Bluffs neighborhood receives overflow from Frick Lake and adjacent grasslands through two storm drains that travel under Laughlin Road and connect with the stormwater basins. The stormwater basins are engineered basins that meander through the neighborhood. At the unnamed basin which is part of the SMP Bear Creek Basins network where Site 56 is located, the flow direction appears to be from southeast to northwest with flows collected in an overflow drain. From there the flows are conveyed through the storm drain system where they connect to an unnamed tributary of Altamont Creek. The Bluffs development and the engineered basins connect flows from Frick Lake to an unnamed tributary of Altamont Creek through the stormdrain system so as not to stop the natural hydrology of the floodplain. The unnamed basin is therefore delineated as Other Waters because it mimics stream features. The unnamed basins are hydrologically connected to Arroyo Las Positas via unnamed tributaries that flow into Altamont Creek which in turn debouches into Arroyo Las Positas.

Site 57 A/B/C study area consists of 3 subsites that are located at Saddleback housing development near the Springtown Alkali Sink, and are referred to as the "Saddleback stromwater features". Sites 57 A and B were created to capture stormwater flow from the Saddleback development and were installed in 1998/1999. Site 57A is fed upstream by a concrete V-ditch that conveys stormwater from a small portion of the hills north and east of the development into the grassed swale that is Site 57A. The grass swale continues until it is culverted into a storm drain that travels under Martingale Lane. The storm drain outfalls on the other side of Martingale Lane into a grassed swale where Site 57B begins. Site 57B is fed by stormwater captured stormwater from within the development. These flows, combined with the input from 57A, are ultimately conveyed to the Saddleback created wetland basin (at the corner of Ames Street and Dalton Avenue). Within the created wetland basin flows have the potential to outflow through the stormdrain system which travels under the corner of Ames Street and Dalton Avenue which contributes overland flow to the Springtown Alakli Sink. Site 57C is a roadside ditch that has no surface flow besides direct precipitation runoff. The roadside ditch connects through a culvert to the same stormdrain system as Site 57A/B at the corner of Ames Street and Dalton Avenue. There is no surface connection between the adjacent created wetland and Site 57C. The Saddleback features are hydrologically connected to Arroyo Las Positas through the Springtown Alakli Sink through Altamont Creek which in turn debouches into Arroyo Las Positas.

Site 58 is located on Arroyo Las Positas at the Heather Lane bridge culvert. The Arroyo Las Positas flows into the Arroyo Mocho near the Chain of Lakes which flows into the Arroyo de la Laguna, which drains into Alameda Creek and into the San Francisco Bay immediately west of Newark, California, approximately 18.5 miles downstream.

Site 62 is located on the Arroyo Mocho floodplain in the vicinity of Robertson Park Dog Park. It is a culvert outfall into a ~210 foot discontinous channel within the floodplain. The upstream source of water that feeds into the outfall is the stormdrain network from development south and east of Robertson Park. Arroyo Mocho flows into the Arroyo de la Laguna, which drains into Alameda Creek and into the San Francisco Bay immediately west of Newark, California, approximately 18.5 miles downstream.

Site 68 is on Altamont Creek at the Laughlin Road Bridge Culvert. Altamont Creek flows into Arroyo Las Positas in northeast Livermore. The Arroyo Las Positas flows into the Arroyo Mocho near the Chain of Lakes which flows into the Arroyo de la Laguna, which drains into Alameda Creek and into the San Francisco Bay immediately west of Newark, California, approximately 18.5 miles downstream.

The natural hydrology of the entire ARDA has been altered by controlled flows; installation of culverts, stormwater inlets/outfalls, and bridges under roads and adjacent development; associated hardscape (e.g., paved trails, arterial roads); residential and commercial development; and sedimentation from past erosion episodes. The primary hydrologic influence throughout the ARDA is precipitation, freshwater and urban runoff, and Zone 7 water releases and groundwater recharge activities in Arroyo Mocho.

1.8 ARDA Vegetation

The ARDA is in the San Joaquin Valley Subregion of the California Floristic Province (Baldwin et al. 2012). The vegetation cover types observed in the ARDA can be generally described as developed, ruderal, emergent freshwater wetland, and riparian. Plant species' scientific names used in this report are based on the taxonomy in the second edition of the Jepson Manual (Baldwin et al. 2012) and online updates. A list of all plant species noted at any of the locations is provided in **Table 1-4 — Vegetation Recorded in the Aquatic Resources Delineation Area**. Because locations were evaluated as Other Waters using the Arid West Ephemeral and Intermittent Streams OHWM Datasheet, not all vegetation observed was identified or recorded.

<u>Site 56, Hillstone Court Outfall at The Bluffs Neighborhood</u> is a storm outfall that occurs within the northern half of the unnamed stormwater basin between Bluffs Court, Lake Drive, and Hillstone Drive. The drainage inlet for the outfall is located at the end of Hillstone Court. A ~12-inch culvert outfalls into the unnamed stormwater basin but is completely clogged. At this location the basin supports a small grove of cottonwood trees (*Populus fremontii*) with their trunks rooted in the basin floor. Herbaceous vegetation is minimal but includes tall sedge (*Cyperus eragrosta*) and dock (*Rumex* sp.). The low-flow channel is identified by an absence of vegetation and flow patterns among the decaying leaf debris. The OHWM is identified by a change in elevation, a transition from FACW vegetation to UPL or NL species, and an increase in vegetative cover by the UPL species.

<u>Sites 57 A/B/C</u> are located in the Saddleback housing development near Springtown Alkali Sink and are associated with stormwater management features managed by the City.

> <u>Site 57A, Saddleback Grassed Swale and Outfall - Raymond Road to Martingale Lane</u> begins at the end of a concrete V-ditch at the northwest corner of the development and extends for ~390 feet south, parallel between Ames Street and the development wall, before being culverted beneath Martingale Lane where it joins Site 57B. The end of the V-ditch is adjacent to a culvert outfall to the west. The culvert outfall is separated from the V-ditch by a concrete headwall that is part of the outfall structure with a rock rip rap apron. While there is probably some surface water-mingling during peak storm flows, these two features are otherwise separate from each other, with separate inflows and separate outflows. The grassed swale at Site 57A is delineated as Other Waters because of its linear channelized structure and its intermittent riparian canopy of willows (*Salix* sp.) and mulefat (*Baccharis salicifolia*); the delineation includes the other outfall structure that is blocked by cattails. Within the grassed swale beneath the canopy cover the channel is unvegetated, while open

areas of the channel are lightly to heavily vegetated with an array of FACW, FAC, FACU, and UPL plants. OBL species is limited to cattails (*Typha* sp.). FACW species include willowherb (*Epilobium ciliatum*), gumplant (*Grindelia camporum*), and dock (*Rumex* sp.). FAC and other less hydrophytic vegetation includes perennial pepperweed (*Lepidium latifolium*), Italian ryegrass (*Festuca perennis*), wild oats (*Avena barbata*), spring vetch (*Vicia sativa*), and barley (*Hordeum marinum*).

Site 57B Saddleback Grassed Swale- Martingale Lane to Saddleback Basin begins at a culvert outfall south of Martingale Lane. It receives flows from 57A as well as additional storm and irrigation water from the neighborhood at a drainage inlet on the north curb of Martingale Lane, which continues beneath Martingale Lane and discharges at an outfall south of the road. From there it extends for ~375 feet south, parallel between Ames Street and the development wall, before being diverted around the Saddleback wetland and into the storm drain system, under Dalton Road, and out to the Springtown Alkali Sink. Site 57B is delineated as Other Waters because of its linear channelized structure and its intermittent riparian canopy of willows (*Salix* sp.). The character of 57B changes from that upstream in 57A, with standing water at the culvert mouth followed by a patch of cattails and tules (*Scirpus* sp.). An open water channel approximately 1 foot wide conveys flow for approximately 175 feet to the first of a fairly consistent overstory stretch of willow trees. Beneath the first willow tree that water is pooled to a depth of approximately 6 inches for the extent of the canopy. Otherwise, species are as described above for Site 57A.

Site 57C Saddleback V-Ditch along Ames Street is located at the bottom of Ames Street where it begins to curve and become Dalton Ave. This feature is separate from the Saddleback basin; there is no surface connectivity between the two, but seepage and/or groundwater may provide most of the water in the feature. Site 57C is a vegetated roadside ditch with a culvert on each end. The north culvert receives roadside drainage and is connected to a pipe that carries storm flow due west under Ames Street where it discharges into the Springtown Alkali Sink environs. The north culvert was formerly connected to the roadside ditch and carried flow to the south culvert that connects to the stormdrain system that travels under Dalton Avenue and discharges into private property in the Springtown Alkali Sink. Both culverts are clogged with sediment and no longer functioning to carry storm flows. In addition to algal mats observed in the lowest points along the ditch, FAC and less hydrophytic vegetation grows including California burclover (*Medicago polymorpha*), spring vetch, wild oats, barley (*Bromus* sp.), dock (*Rumex* sp.), and Harding grass (*Phalaris aquatica*).

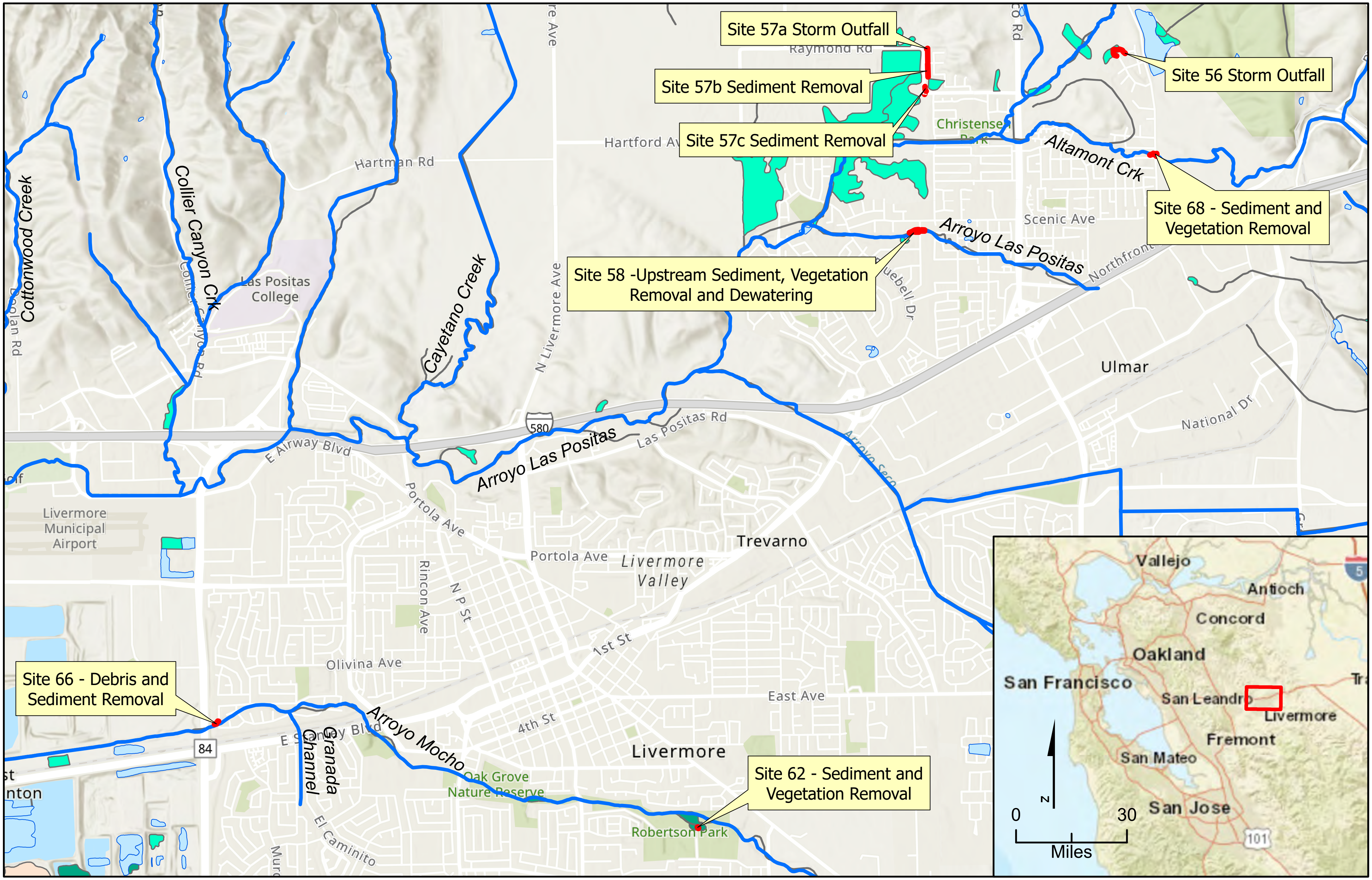
Site 58, Arroyo Las Positas at Heather Lane is located on Arroyo Las Positas. Arroyo Las Positas through the Springtown residential development is an altered, manmade extension of the stream channel that traverses through the North Livermore area prior to confluencing with Altamont Creek. Site 58 is a trapezoidal channel with concrete aprons upstream and downstream of the bridge crossing. Small coast live oaks (*Quercus agrifolia*) and olive (*Olea europaea*) overhang the creek upstream, while *Eucalyptus*, ash (*Fraxinus* sp.), and willow trees overhand the channel downstream. The upstream channel is mostly open water, with areas of last year's emergent tules and cattails. The downstream channel is open water for half of the channel (the north half) for a distance of approximately 150 feet. The rest of the channel is choked with cattails and tules (*Schoenoplectus acutus* var. *occidentalis*). Upland bank vegetation includes bull mallow (*Malva nicaensis*), toyon (*Heteromeles arbutifolia*), cheeseweed (*Malva parviflora*), and annual grasses.

<u>Sites 62 and 66</u> are located on Arroyo Mocho. Arroyo Mocho through most of the Livermore Valley is a constrained creek bordered by development on both banks. Arroyo Mocho has wide leeway in the vicinity of Robertson Park Dog Park, where the floodplain is upwards of 500 feet. Approximately 3 miles downstream, the Arroyo Mocho separates into the Arroyo Mocho Low Flow Channel and the Arroyo Mocho Stanley Reach. The low flow channel portion where Site 66 occurs is constrained to a channel approximately 50 feet wide.

> <u>Site 62, Outfall at Robertson Dog Park on Arroyo Mocho</u> is acessible from the northwest corner of the Robertson Park Dog Park gravel parking area. At the outfall, which is almost completely buried, the channel is bowl-shaped and approximately 8 feet across the bed, 10 feet across the active floodplain, and 12 feet across at top-of-bank. After ~10 feet downstream of the outfall the channel settles into its uniform width of 4 feet across the bed, 6 feet across the active floodplain, and 8 feet across the top-of-bank. In-stream vegetation is negligible, but a clump of last year's cattails grows at the mouth of the culvert and some old cocklebur (*Xanthium* sp.) shortly downstream. Bank vegetation is mostly Himalayan blackberry (*Rubus armeniacus*) and mulefat. Upland vegetation consists of a wide variety of weedy bromes and oats, cheeseweed, black mustard (*Brassica nigra*) and other ruderal vegetation. Floodplain trees include native willows and non-native pepper trees (*Schinus molle*) and eucalyptus.
>
> <u>Site 66, Rockrose Outfall Arroyo Mocho Low Flow Channel</u> at the terminus of the Arroyo Mocho Low Flow Channel. At this location, the channel is culverted for ~130 feet under Rockrose Street via a concrete culvert that is more than 5 feet tall, more than 5 feet wide. It outfalls into the channel for ~70 feet before it is culverted again for ~60 feet under an access road. This downstream culvert is also large, and has a metal debris grate over the inflow. It outfalls into Arroyo Mocho Stanley Reach adjacent to Isabel Ave. The channel forms a bowl approximately 60 feet wide and 100 feet long, surrounded by pedestrian trails on the west, north, and south, and by Rockrose Street on the east. The mature overstory is non-native eucalyptus, but young restoration plantings (from 2017 work at this site) of coast live oak, toyon, manzanita, and blueblossom (*Ceanothus* sp.) are present. There is no in-stream vegetation and the channel, which is marked by flow patterns in downed wood and leafy debris, is ~5.5 feet wide. While the channel bottom offers a wide area for flows to pond, there is no evidence that the ordinary flows extend beyond a floodplain ~7.5 feet wide.

<u>Site 68, Laughlin Road Bridge Culvert on Altamont Creek</u> is located where the creek exits undeveloped grazing lands and enters the modified channel where residential housing development begin on Livermore's eastern boundary. Here Altamont Creek is a low, concrete box culvert bridge located at a gradual bend in the creek, with concrete wingwalls and apron at each end. In both directions, the creek is provided with an ample lateral

migration corridor. One small cottonwood tree provides overstory on the east side and one willow (*Salix* sp) is present on the upstream concrete apron. The low-flow channel is approximately 2.5 feet wide with water as deep as 1.5 feet in some locations. The width of the active floodplain varies along the channel, as narrow as ~20 feet and as wide as 40 feet at the downstream wingwall. Instream vegetation is limited to algae. Active floodplain vegetation includes cottonwood, tules, rushes (*Juncus* sp.), saltgrass (*Distichlis spicata*), and unidentified grasses.



2022 SMP ARD Sites
NHD Dataset for Alameda County
Wetlands (NWI)
Freshwater Emergent Wetland
Freshwater Forested/Shrub Wetland
Freshwater Pond
Lake
Riverine

N

0 1 2 Miles

Figure 1-3 2022 SMP Hydrology

City of Livermore - Stream Maintenance Program

February 2022

SBI

Table 1-4. Vegetation Recorded in the Aquatic Resources Delineation Area (ARDA)

Genus	***Species***	**Common Name**	**Wetland Indicator Status[a]**
Aesculus	*californica*	California buckeye	NL
Artemisia	*douglasiana*	mugwort	FAC
Avena	*barbata*	wild oat	NL
Baccharis	*pilularis*	coyote brush	NL
Baccharis	*salicifolia*	mulefat	FAC
Brassica	*nigra*	black mustard	NL
Bromus	*diandrus*	ripgut brome	NL
Bromus	*hordeaceus*	soft chess	FACU
Carduus	*pycnocephalus*	Italian thistle	UPL
Carex	*sp.*	sedge	FACW-OBL
Cirsium	*vulgare*	bull thistle	NL
Cortaderia	*sp.*	pampas grass	FACU
Cottoneaster	*sp.*	cottoneaster	NL
Cyperus	*eragrostis*	flattop sedge	FACW
Digitaria	*sanguinalis*	crabgrass	FACU
Distichlis	*spicata*	saltgrass	FAC
Dittrichia	*graveolens*	stinkwort	NL
Elymus	*sp.*	native ryegrass	~FACU
Epilobium	*ciliatum*	willowherb	FACW
Erigeron	*canadensis*	horseweed	UPL
Erodium	*cicutarium*	red-stemmed filaree	NL
Eschscholzia	*california*	California poppy	NL
Eucalyptus	*camaldulensis*	red gum	NL
Eucalyptus	*globulus*	blue gum	NL
Festuca	*myuros*	rattail sixweek's grass	FACU
Festuca	*perennis*	perennial rye grass	FAC
Frangula	*californica*	California coffeeberry	NL
Fraxinus	*latifolia*	Oregon ash	FACW

Genus	*Species*	Common Name	Wetland Indicator Status[a]
Galium	*aparine*	cleavers	FACU
Genista	*monspessulana*	French broom	NL
Geranium	*dissectum*	wild geranium	NL
Geranium	*molle*	crane's bill	NL
Grindelia	*camporum*	gumplant	FACW
Hedera	*helix*	English ivy	FACU
Helenium	*puberulum*	sneezeweed	FACW
Helminthotheca	*echioides*	bristly oxtongue	FAC
Heteromeles	*arbutifiolia*	toyon	NL
Holcus	*lanatus*	velvet grass	FAC
Hordeum	*brachyantherum*	meadow barley	FACW
Hordeum	*marinum*	seaside barley	FAC
Hordeum	*murinum*	foxtail barley	FACU
Juglans	*hindsii*	walnut	NL
Lactuca	*serriola*	prickly sowthistle	FACU
Lepidium	*latifolium*	perennial pepperweed	FAC
Lotus	*corniculatus*	bird's foot trefoil	FAC
Malva	*nicaensis*	bull mallow	NL
Malva	*parviflora*	cheeseweed	NL
Marrubium	*vulgare*	horehound	FACU
Medicago	*polymorpha*	medic, burclover	FACU
Olea	*europa*	olive	NL
Phoenix	*canariensis*	Canary Island palm	NL
Pittosporum	*sp.*	boxwood	NL
Plantago	*major*	common plantain	FAC
Platanus	*racemosa*	California sycamore	FAC
Polypogon	*monspeliensis*	rabbitsfoot grass	FACW
Populus	*fremontii*	Fremont cottonwood	NL
Privet	*Ligustrum*	sp.	NL

Genus	*Species*	Common Name	Wetland Indicator Status[a]
Prunus	*sp.*	ornamental	NL
Quercus	*agrifolia*	coast live oak	NL
Quercus	*lobata*	valley oak	FACU
Raphanus	sp.	wild radish	NL
Rosa	*californica*	California rose	FAC
Rubus	*armeniacus*	Himalayan blackberry	FAC
Rumex	*californicus*	California dock	FACW
Rumex	*crispus*	curly dock	FAC
Rumex	*obtusifolius*	broadleaf dock	FAC
Rumex	*pulcher*	fiddle dock	FAC
Salix	*lasiolepis*	arroyo willow	FACW
Salsola	*tragus*	tumbleweed	FACU
Schinus	*molle*	pepper tree	NL
Schoenoplectus	*acutus* var. *occidentalis*	tule	OBL
Scirpus	*sp.*	bulrush	OBL
Silybum	*marianum*	milk thistle	NL
Sonchus	*asper*	spiny sowthistle	FAC
Stipa	*milliacea*	Smilo grass	NL
Typha	*sp.*	cattail	OBL
Ulmus	*minor*	English elm	NL
Umbellularia	*californica*	California bay laurel	FAC
Verbascum	*thapsus*	woolly mullein	FACU
Vicia	*villosa* ssp. *villosa*	hairy vetch	NL
Washingtonia	*robusta*	Mexican fan palm	FACU
Xanthium	*spinosum*	spiny cocklebur	FACU

Genus	*Species*	Common Name	Wetland Indicator Status[a]

Sources: Environmental Laboratory 1987; U.S. Army Corps of Engineers 2012; Baldwin et al. 2012; Lichvar, et al., 2014; 2016; Federal Register 2020.

[a] Indicator Status Definitions:

OBL	=	Obligate, almost always occurs in wetlands (>99% probability of occurrence)
FACW	=	Facultative wetland, usually occurs in wetlands (66%–99% probability)
FAC	=	Facultative, equally likely to occur in wetlands or nonwetlands (34%–66% probability)
FACU	=	Facultative upland, usually occurs in nonwetlands but occasionally in wetlands (1%–33% probability)
UPL	=	Obligate upland, almost never occurs in wetlands (<1% probability)
NL	=	No indicator (insufficient information to assign an indicator status)

1.9 Delineation Methods

Field preparation included a desktop review of current and historical satellite imagery available on Google Earth, a query of the National Wetland Inventory (NWI) database (USFWS 2022), a query of the NRCS Web Soil Survey (USDA 2022), and familiarization with updated materials published by the Corps including updated National Wetland Plant Lists (Lichvar et al., 2014; 2016; 2018; Federal Register 2020). Satellite imagery of the study area was reviewed for the period August 1993 to June 2021 to understand past hydrology, explore historical wetland features, and identify areas of repeated ponding. Standard texts were consulted during the course of the delineation (Hickman, 1993; Munz and Keck, 1973; Sawyer, et. al., 2009).

Sites were delineated as shown in Table 1-5 by SBI biologists N. Dvorak and L. Koenig. During these field visits data was gathered to describe the soil, vegetation, and hydrological character of the ARDA and make field measurements and observations in support of the delineation.

Table 1-5. Delineation Dates and Delineators

Site	Date	Delineators
Site 56 Hillstone Court Outfall at Bear Creek Basins	February 23, 2022	N. Dvorak & L. Koenig
Site 57 A Saddleback Grassland Swale- Raymond Road to Martingale Lane **Site 57 B Saddleback Grassland Swale-Martingale Lane to Saddleback Basin** **Site 57 C Saddleback V-ditch along Ames Street**	February 23, 2022	
Site 58 Heather Lane Bridge Culvert on Arroyo Las Positas	February 23, 2022	
Site 62 Outfall at Robertson Dog Park on Arroyo Mocho	February 23, 2022	
Site 66 Rockrose Outfall Arroyo Mocho Low Flow Channel	February 23, 2022	
Site 68 Laughlin Road Bridge Culvert on Altamont Creek	February 23, 2022	

Methods described in the Corps' 2008 *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States* were followed to gather cross-sectional stream data in support of identifying OHWMs and tops-of-bank dimensions. Global Positioning System (GPS) coordinates were obtained in the field using a hand-held GPS with accuracy ranging from 9 to 14 feet, and locations were also marked on printed aerials as determined visually in the field by the delineator.

Upon returning to the office, mapping data was geo-referenced relative to GPS coordinates, aerials marked up in the field, and ArcMap basemap imagery of the study area to create the most feasible and accurate map representation of ground conditions. Stream length and area calculations for aquatic resources were computed using ArcGIS software, either by calculating geometry within Attribute tables or by using the Measure tool.

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Lichvar, R.W., D.L. Banks, W.N. Kirchner, and N.C. Melvin. 2014. *The National Wetland Plant List v 3.2*: 2014 wetland ratings. Available online at **http://wetland_plants.usace.army.mil/**. Accessed July and September 2017.

Lichvar, Robert W. and Shawn M. McColley. 2008. *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States, A Delineation Manual*. Prepared for U.S. Army Corps of Engineers Wetland Regulatory Assistance Program. August 2008. Available online at https://www.spk.usace.army.mil/Portals/12/documents/regulatory/pdf/Ordinary_High_Watermark_Manual_Aug_2008.pdf.

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2. Site 56 Hillstone Court Outfall at Bear Creek Basins

2.1 Delineation Map

This section includes a map of delineated aquatic resources ("Aquatic Resources Delineation Map") at the unnamed Bear Creek Basin at Laughlin Road ARDA.

To avoid cluttering the Aquatic Resources Delineation Maps, the requested reference block identifying the individual(s) who conducted the delineation, date(s) of the maps, and date(s) of any revisions is provided here as follows:

Map Reference Block for ARD Site 56 Hillstone Court Outfall at Bear Creek Basins

Delineation date:	February 23, 2022
Delineators:	Natasha Dvorak/ Swaim Biological, Inc. Leslie Koenig/ Swaim Biological, Inc.
GIS & Map Preparers:	Chris Swaim/ Swaim Biological, Inc. Natasha Dvorak/ Swaim Biological, Inc.
Map Imagery Data:	ESRI ArcGIS Basemap World Imagery Local Imagery date: 1993-2020
Date Maps Prepared:	Field delineation results were mapped in GIS in February 2022.
	Reports maps were prepared in February 2022.

Drainage Inlet
Culvert Outfall
Underground Drainage
LFC - 29 Feet Wide
OHWM - 37 Feet Wide
TOB - 64 Feet Wide
Low Terrace
Active Floodplain

Figure 2-1 Site 56 - Hillstone Court Outfall at Bear Creek Basins

City of Livermore - Stream Maintenance Program

February 2022

N

0 50 100 Feet

SBI Swaim Biological Inc

2.2 Aquatic Resources

Table 2-1. Aquatic Resources Site 56 Hillstone Court Outfall at Bear Creek Basins

Aquatic Resource Name	Aquatic Resources Classification				Aquatic Resource Size* (acre) Required for all resources	Aquatic Resource Size (linear feet) Required for only stream channels
	Cowardin	Location (lat/long) UTM 10S				
Hillstone Court Outfall at Bear Creek Basins	R6	Upstream	613374	4176618	**0.07**	**205**
		Downstream	613354	4176636		

R6: Cowardin wetland classification code meaning Riverine Ephemeral (Cowardin et al., 1979).
* Active Floodplain/area between Ordinary High Waters

Other Waters

The Site 56 ARDA is a ~1,785 square foot area in the an unnamed stormwater basin that is part of the Bear Creek Basins in The Bluffs neighborhood, encompassing a culvert outfall (the work area) and the basin downstream to a subsurface collection drain.

As described in the Summary, Site 56 was evaluated as an Other Waters as it has hydrological connectivity to Arroyo Las Positas via unnamed tributary connections to Altamont Creek. Arroyo Las Positas connects to Arroyo Mocho engineered channel near the Chain of Lakes, and then connects into Arroyo de la Laguna thence Alameda Creek thence San Francisco Bay and ultimately the Pacific Ocean. Both Alameda Creek in its lower 5.6-mile reach and San Francisco Bay are Navigable Waterways (Corps 1971).

Delineators completed the Arid West Ephemeral and Intermittent Streams Datasheet for this location. Data were collected for 1 cross-section documenting a simple culvert outfall into the west basin, which is an engineered linear stormwater conveyance channel. The culvert is buried in sediment. It is ~12" in diameter and has a small cottonwood tree growing at its opening. A small grove of cottonwoods is rooted in the basin floor within an area of sparse hydrophytic vegetation, heavy leaf litter, and debris flow patterns. At higher elevations up the sides of the channel, the herbaceous vegetation becomes denser and transitions to upland species; canopy species transition from cottonwood to oaks. There was not flow at the time of the delineation. A break in bank slope, a change in vegetation species, and a change in total vegetation cover identified the Ordinary High Water Mark (OHWM) boundary.

2.3 Soil Survey and Hydric Soil Information

The NRCS Web Soil Survey (USDA, 2022) was consulted to determine the soil types occurring within the ARDA. The soil types *Linne clay loam, 3 to 15 percent slopes, San Ysidro loam, 0 to 2 percent slopes, MRLA 14,* and *Solano find sandy loam* occur at this location. Figure 2- Soils in the Delineation Area provides a map of soil types overlaid on ARDA imagery. The NRCS Web Soil Survey is provided in **Appendix B.**

2.4 Vegetation

Vegetation is previously described in the Summary and includes cottonwood, tall sedge, unknown sedge, and broadleaf dock in the active floodplain.

2.5 Data Sheets

Arid West Ephemeral and Intermittent Streams OHWM Datasheets for the ARDA at Site 56 consists of data for 1 cross-section (A-A').

2.6 Representative Photographs

Following the Datasheets is an 11x17 pictorial map and photo guide for Site 56.

Data Sheets for Site 56 Hillstone Court Outfall at Bear Creek Basins

Photodocumentation Site 56- Hillstone Court at Bear Creek Basins

Outfall with cottonwood at outlet

Court and berm separating basin and outfall

3. Site 57 A/B/C Saddleback Features

3.1 Delineation Map

This section includes a map of delineated aquatic resources ("Aquatic Resources Delineation Map") at:

- Site 57A, Saddleback Grassed Swale and Outfall - Raymond Road to Martingale Lane
- Site 57B, Saddleback Grassed Swale- Martingale Lane to Saddleback Basin
- Site 57C, Saddleback V-ditch along Ames Street

To avoid cluttering the Aquatic Resources Delineation Maps, the requested reference block identifying the individual(s) who conducted the delineation, date(s) of the maps, and date(s) of any revisions is provided here as follows:

Map Reference Block for ARD Site 57 A/B/C Saddleback Features

Delineation date:	February 23, 2022
Delineators:	Natasha Dvorak/ Swaim Biological, Inc. Leslie Koenig/ Swaim Biological, Inc.
GIS & Map Preparers:	Chris Swaim/ Swaim Biological, Inc. Natasha Dvorak/ Swaim Biological, Inc.
Map Imagery Data:	ESRI ArcGIS Basemap World Imagery Local Imagery date: 1993-2020
Date Maps Prepared:	Field delineation results were mapped in GIS in February 2022.
	Reports maps were prepared in February 2022.

Outfall Feature

Concrete V-ditch

LFC - 1 Foot, 8 Inches Wide

OHWM - 5 Feet, 4 inches Wide

TOB - 10 Feet Wide

Active Floodplain Low

Terrace

Wetland Feature (Not Delineated)

Cattails at outfall apron

Figure 3-1 Site 57A - Saddleback Grassed Swale Raymond Road to Martingale Lane

City of Livermore - Stream Maintenance Program

February 2022

N

0 50 100 Feet

SBI Swaim Biological Inc

LFC - 2 Feet, 6 Inches Wide

OHWM - 6 Feet Wide

TOB - 10 Feet Wide

Underground Drainage

Active Floodplain

Low Terrace

N

0 50 100 Feet

Figure 3-2 Site 57B - Martingale Lane to Saddleback Basin

City of Livermore - Stream Maintenance Program

February 2022

SBI Swaim Biological Inc

Culvert Outfall

Drainage Inlet

LFC - 1 Foot, 6 Inches Wide

Underground Drainage

N

0 50 100 Feet

Figure 3-3 Site 57C - Saddleback V-Ditch along Ames Street

City of Livermore - Stream Maintenance Program

February 2022

SBI Swaim Biological Inc

3.2 Aquatic Resources

Table 3-1. Aquatic Resources Site 57 A/B/C Saddleback Features

Aquatic Resource Name	Aquatic Resources Classification				Aquatic Resource Size* (acre	Aquatic Resource Size (linear feet)
	Cowardin	Location (lat/long) UTM 10S				
57A Saddleback Grassed Swale and Outfall- Raymond Road to Martingale Lane	R6	Upstream	611646	4176676	0.06	42
		Downstream	611648	4176556		
57B Saddleback Grassed Swale - Martingale Lane to Saddleback Basin	R6	Upstream	611647	4176539	0.05	367
		Downstream	611652	4176426		
57C Saddleback V-ditch along Ames Street	R6	Upstream	611624	4176316	0.01	120
		Downstream	611624 611634	4176341 4176301		

R6: Cowardin wetland classification code meaning Riverine Ephemeral (Cowardin et al., 1979).
* Active Floodplain/area between Ordinary High Waters

Other Waters

The ARDA is a ~1-acre area encompassing three subfeatures: 57A, 57B, and 57C.

Site 57A begins at the end of a concrete V-ditch at the northwest corner of the development (near Raymond Road) and extends for ~390 feet south, parallel between Ames Street and the subdivision wall, before being culverted beneath Martingale Lane. It supports an intermittent riparian canopy of willows and mulefat, while the ephemeral channel ranges from vegetated to unvegetated with a range of FACW to FACU vegetation. The low-flow channel averages 1.8 feet wide (20 inches) within an active floodplain that measures approximately 5.5 feet wide. The top of bank averages 10 feet total width.

Site 57B begins underground at a drainage inlet on the north curb of Martingale Lane. This drainage inlet combines flows from hills east of The Saddleback development, flows from within the residential neighborhood, and flows from 57A and conveys them under Martingale Lane to a culvert outfall just south of the road. From there, the surface waters extend for ~375 feet south, parallel between Ames Street and the subdivision wall, before entering the fenced Saddleback basin area where it is diverted around the Saddleback wetland and into the city's stormwater system and out into Springtown Alkali Sink environs. Pooled water was observed in the mouth of this culvert and a 2.5-foot wetted channel extended for ~170 feet. The active floodplain extended on either side for a total width of 6 feet. Top-of-bank totalled 10 feet in width.

Site 57C begins on Ames Street between the Saddleback wetland berm and the sidewalk and extends south approximately 220 feet, just rounding the bend onto Dalton Ave. There is no surface connection between this roadside ditch and the Saddleback wetland, though seepage from the mitigation berm and/or a high groundwater table are thought to provide the surface waters in 57C. This feature is silted in, with a high point in the middle. From the high point, water flows north to a culvert or south to a culvert, both of which are also silted at the mouth. Feature 57C measures 1.5 feet wide across its low flow channel which appears to be coincident with its active floodplain. Top of bank is just inches wider than the active floodplain.

As described in the Summary, Site 57 A/B/C were evaluated as Other Waters and are presumed to have hydrological connectivity to Arroyo Las Positas via unnamed tributary connections through Springtown Alkali Sink environs. Arroyo Las Positas is tributary to Arroyo Mocho near the Chain of Lakes, and then connects to Arroyo de la Laguna thence Alameda Creek thence San Francisco Bay and ultimately the Pacific Ocean. Both Alameda Creek in its lower 5.6-mile reach and San Francisco Bay are Navigable Waterways (Corps 1971).

Delineators completed the Arid West Ephemeral and Intermittent Streams Datasheet for this location. Data were collected for a cross-section (A-A') at each feature.

3.3 Soil Survey and Hydric Soil Information

The NRCS Web Soil Survey (USDA, 2021) was consulted to determine the soil types occurring within the ARDA. The soil type *Gaviota rocky sandy loam, 5 to 40 percent slopes, eroded* occurs at Site 57A. *Solano find sandy loam* occurs at Sites 57A. 57B, and 57C. Figure 2- Soils in the Delineation Area provides a map of soil types overlaid on ARDA imagery. The NRCS Web Soil Survey is provided in **Appendix B.**

3.4 Vegetation

Vegetation is previously described in the Summary and includes willow, cottonwood, mulefat, wild rye, dock, cattails, tule, tall sedge, Italian ryegrass, and willowherb in the channel.

3.5 Data Sheets

There are 3 *Arid West Ephemeral and Intermittent Streams OHWM Datasheets* for the ARDA consisting of 1 cross-section (A-A') at each sub-feature 57A, 57B, and 57C.

3.6 Representative Photographs

Following the Datasheets is an 11x17 pictorial map and photo guide for Sites 57A/B/C.

Data Sheets for Site 57 A/B/C Saddleback Features

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: COL SMA 2022
Project Number: Saddleback A
Stream: 57A
Investigator(s): N. Dwrah

Date: 2/23/22 **Time:** 1130
Town: Livermore **State:** CA
Photo begin file#: **Photo end file#:**

Y [x] / N [ ] Do normal circumstances exist on the site?

Y [x] / N [ ] Is the site significantly disturbed?

Location Details: 57A

Projection: **Datum:** UTM
Coordinates: U/S: 611646, 4176676 D/S: 611648, 4176554

Potential anthropogenic influences on the channel system:
Residential development conveyance system for stormwater direct precip around the development.

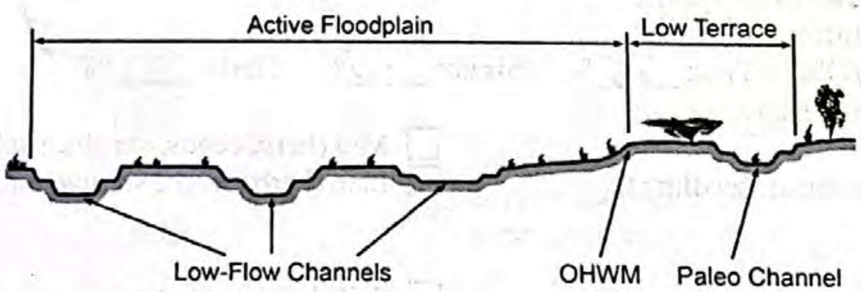
Brief site description:
V-ditch 2.5' TOB + ~18" channel bed; beyond V-ditch there is no known channel except under tree canopy. Vegetated ditch

Checklist of resources (if available):

- [x] Aerial photography
  Dates: 1993 – 2021
- [x] Topographic maps
- [ ] Geologic maps
- [ ] Vegetation maps
- [x] Soils maps
- [ ] Rainfall/precipitation maps
- [ ] Existing delineation(s) for site
- [x] Global positioning system (GPS)
- [ ] Other studies

- [ ] Stream gage data
  Gage number:
  Period of record:
  - [ ] History of recent effective discharges
  - [ ] Results of flood frequency analysis
  - [ ] Most recent shift-adjusted rating
  - [ ] Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units

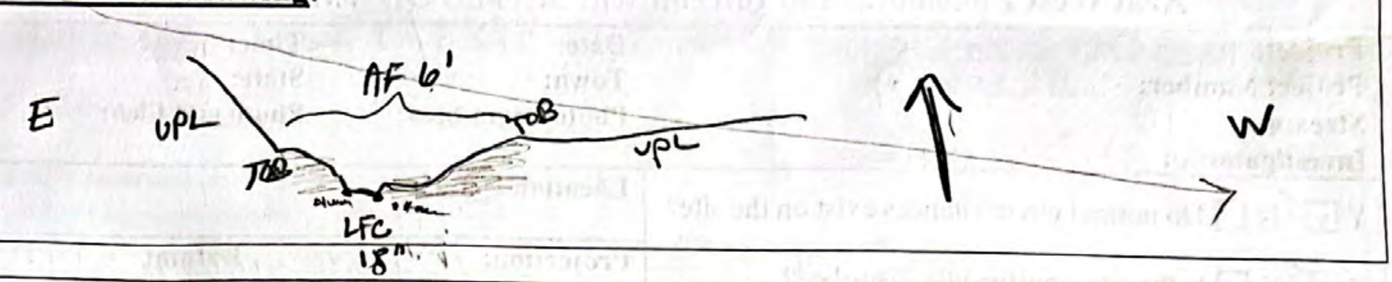


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - [x] Mapping on aerial photograph
   - [x] Digitized on computer
   - [x] GPS 18"
   - [ ] Other:

Project ID: 57A **Cross section ID:** A-A' **Date:** 2/23/22 **Time:**

Cross section drawing:



OHWM

GPS point: 37.7296, -121.7330 ± 13'

Indicators:

- [ ] Change in average sediment texture
- [x] Change in vegetation species
- [~] Change in vegetation cover
- [x] Break in bank slope
- [ ] Other:
- [ ] Other:

Comments: In channel veg supports mulefat, cottonwood, willow.

Floodplain unit: [ ] Low-Flow Channel [x] Active Floodplain [ ] Low Terrace

GPS point: same as above

Characteristics of the floodplain unit:

Average sediment texture: silt

Total veg cover: 150 % Tree: 35 % Shrub: 35 % Herb: 80 %

vs aerial vs aerial

Community successional stage:

- [ ] NA
- [x] Early (herbaceous & seedlings)
- [ ] Mid (herbaceous, shrubs, saplings)
- [ ] Late (herbaceous, shrubs, mature trees)

Indicators:

- [ ] Mudcracks
- [ ] Ripples
- [x] Drift and/or debris
- [ ] Presence of bed and bank
- [x] Benches
- [ ] Soil development
- [x] Surface relief
- [ ] Other:
- [ ] Other:
- [ ] Other:

Comments: Upl. veg more stressed than in adjacent uplands

Project ID: 57A **Cross section ID:** A-A' **Date:** 2/23/22 **Time:**

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☑ ~~Low~~ Terrace

GPS point: same as above

Characteristics of the floodplain unit:

Average sediment texture: —

Total veg cover: 90 % Tree: 0 % Shrub: 0 % Herb: 90 %

Community successional stage:

- ☐ NA
- ☑ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☑ Surface relief
- ☐ Other: ______
- ☐ Other: ______
- ☐ Other: ______

Comments:

upland vegetation, no trees, higher elevation.

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: ______

Characteristics of the floodplain unit:

Average sediment texture: ______

Total veg cover: ____ % Tree: ____ % Shrub: ____ % Herb: ____ %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: ______
- ☐ Other: ______
- ☐ Other: ______

Comments:

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: COL SMP 2022 **Project Number:** Saddleback B **Stream:** 57B **Investigator(s):** N. Durel	**Date:** 2/23/2022 **Time:** **Town:** Livermore **State:** CA **Photo begin file#:** **Photo end file#:**
Y ☑ / N ☐ Do normal circumstances exist on the site? Y ☑ / N ☐ Is the site significantly disturbed?	**Location Details:** 57B **Projection:** **Datum:** **Coordinates:** u/s 37.7294, -121.7330 ± 11'

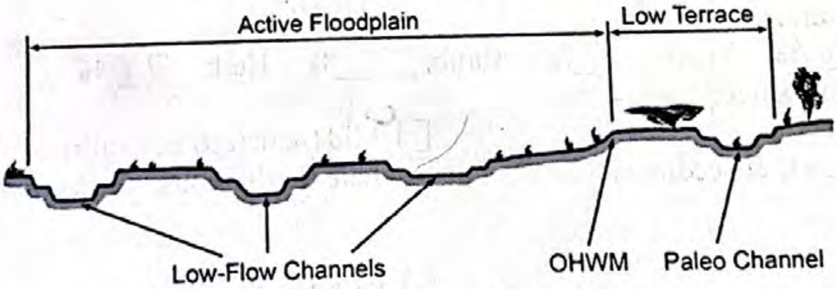
Potential anthropogenic influences on the channel system:
Residential runoff - irrigation + stormwater

Brief site description:
earthen conveyance channel

Checklist of resources (if available):

- ☑ Aerial photography
  Dates: 1993 - 2021
- ☑ Topographic maps
- ☐ Geologic maps
- ☐ Vegetation maps
- ☑ Soils maps
- ☐ Rainfall/precipitation maps
- ☐ Existing delineation(s) for site
- ☑ Global positioning system (GPS)
- ☐ Other studies
- ☐ Stream gage data
  Gage number:
  Period of record:
  - ☐ History of recent effective discharges
  - ☐ Results of flood frequency analysis
  - ☐ Most recent shift-adjusted rating
  - ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units

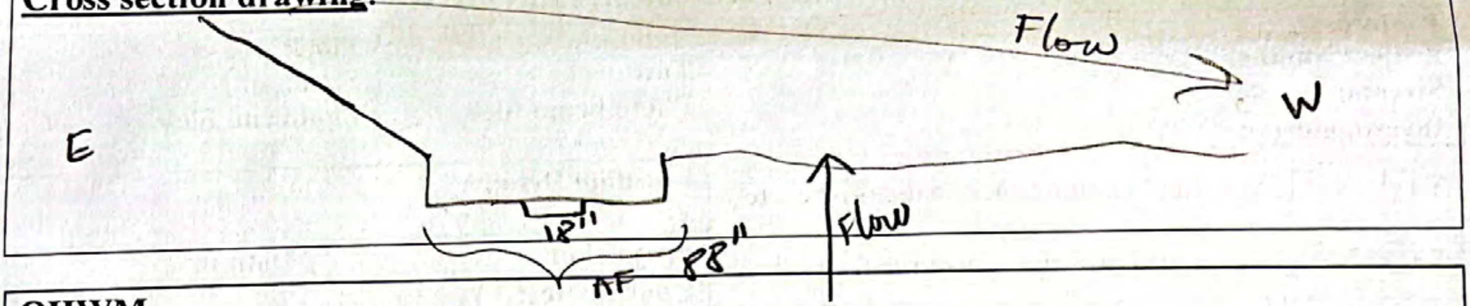


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - ☑ Mapping on aerial photograph
   - ☑ Digitized on computer
   - ☑ GPS
   - ☐ Other:

Project ID: 57B **Cross section ID:** A-A' **Date:** 2/23/22 **Time:**

Cross section drawing:



OHWM

GPS point: @ culvert

Indicators:

- [ ] Change in average sediment texture
- [x] Change in vegetation species
- [x] Change in vegetation cover
- [x] Break in bank slope
- [x] Other: ~~[illegible]~~
- [ ] Other:

Comments:

Floodplain unit: [x] Low-Flow Channel [ ] Active Floodplain [ ] Low Terrace

GPS point: @ culvert

Characteristics of the floodplain unit:

Average sediment texture: silt

Total veg cover: 0 % Tree: 0 % Shrub: 0 % Herb: 0 %

Community successional stage:

- [x] NA
- [ ] Early (herbaceous & seedlings)
- [ ] Mid (herbaceous, shrubs, saplings)
- [ ] Late (herbaceous, shrubs, mature trees)

Indicators:

- [ ] Mudcracks
- [ ] Ripples
- [ ] Drift and/or debris
- [x] Presence of bed and bank
- [ ] Benches
- [ ] Soil development
- [ ] Surface relief
- [x] Other: open water at culvert
- [ ] Other: opening & in
- [ ] Other: ~1-ft. channel

Comments:

Project ID: 57B **Cross section ID:** A – A' **Date:** 2/23/22 **Time:**

Floodplain unit: ☐ Low-Flow Channel ☑ Active Floodplain ☐ Low Terrace

GPS point: @ culvert

Characteristics of the floodplain unit:

Average sediment texture: silt

Total veg cover: ____ % Tree: 0 % Shrub: 0 % Herb: 95 %

Community successional stage:

☐ NA
☑ Early (herbaceous & seedlings)
☐ Mid (herbaceous, shrubs, saplings)
☐ Late (herbaceous, shrubs, mature trees)

Indicators:

☐ Mudcracks
☐ Ripples
☑ Drift and/or debris
☑ Presence of bed and bank
☐ Benches
☐ Soil development
☐ Surface relief
☑ Other: emergent veg.
☐ Other: ____
☐ Other: ____

Comments:

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☑ Low Terrace

GPS point: @ culvert

Characteristics of the floodplain unit:

Average sediment texture: unk.

Total veg cover: 95 % Tree: 0 % Shrub: 0 % Herb: 95 %

Community successional stage:

☐ NA
☑ Early (herbaceous & seedlings)
☐ Mid (herbaceous, shrubs, saplings)
☐ Late (herbaceous, shrubs, mature trees)

Indicators:

☐ Mudcracks
☐ Ripples
☐ Drift and/or debris
☐ Presence of bed and bank
☐ Benches
☐ Soil development
☑ Surface relief
☑ Other: upland veg
☐ Other: ____
☐ Other: ____

Comments:

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: COL SMP 2022
Project Number: Site 57
Stream: Saddleback C
Investigator(s): N. Dvorak

Date: 2/23/22
Town: Livermore
Photo begin file#:

Time:
State: CA
Photo end file#:

Y ☑ / N ☐ Do normal circumstances exist on the site?

Y ☑ / N ☐ Is the site significantly disturbed?

Location Details: Roadside Ditch Ames/Dalton
Projection: 611627, 4176341 **Datum:** UTM 10S
Coordinates: 611631, 4176301

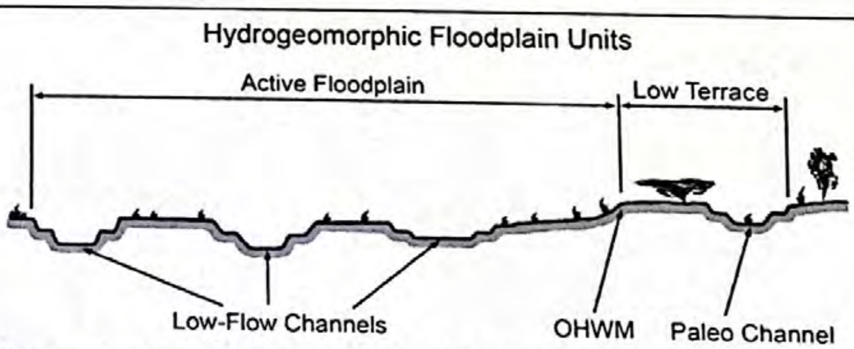
Potential anthropogenic influences on the channel system:
Engineered conveyance associated with Saddleback Development

Brief site description:
~150' ditch w/a high point in the middle draining to a culvert at each end

Checklist of resources (if available):

- ☑ Aerial photography
  Dates: 1993 – 2021
- ☑ Topographic maps
- ☐ Geologic maps
- ☐ Vegetation maps
- ☑ Soils maps
- ☐ Rainfall/precipitation maps
- ☐ Existing delineation(s) for site
- ☑ Global positioning system (GPS)
- ☐ Other studies

- ☐ Stream gage data
  Gage number:
  Period of record:
  - ☐ History of recent effective discharges
  - ☐ Results of flood frequency analysis
  - ☐ Most recent shift-adjusted rating
  - ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

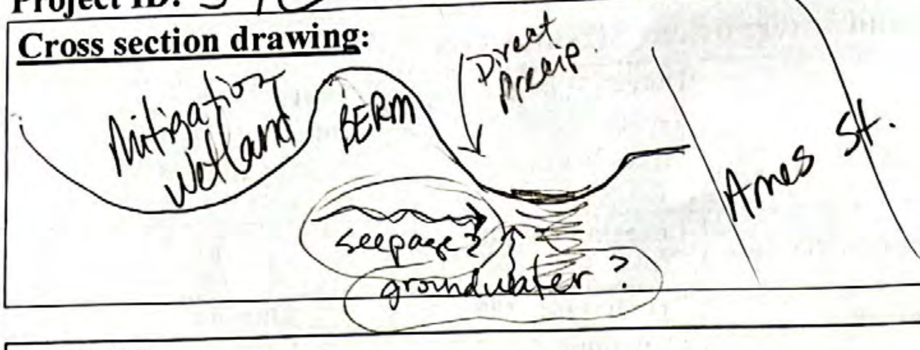


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - ☑ Mapping on aerial photograph
   - ☑ Digitized on computer
   - ☑ GPS
   - ☐ Other:

Project ID: 57C **Cross section ID:** A – A' **Date:** 2/23/22 **Time:**

Cross section drawing:



OHWM

GPS point: 611624, 4176316 UTM

Indicators:

- ☐ Change in average sediment texture
- ☐ Change in vegetation species
- ☒ Change in vegetation cover
- ☒ Break in bank slope
- ☒ Other: algal matting
- ☐ Other: ______

Comments:

Narrow ~ 1-foot wide roadside ditch.

Floodplain unit: ☐ Low-Flow Channel ☒ Active Floodplain ☐ Low Terrace

GPS point: 611624, 4176316

Characteristics of the floodplain unit:

Average sediment texture: algal matting

Total veg cover: 0 % Tree: 0 % Shrub: 0 % Herb: 0 %

Community successional stage:

- ☒ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☒ Surface relief
- ☒ Other: algal matting
- ☐ Other: ______
- ☐ Other: ______

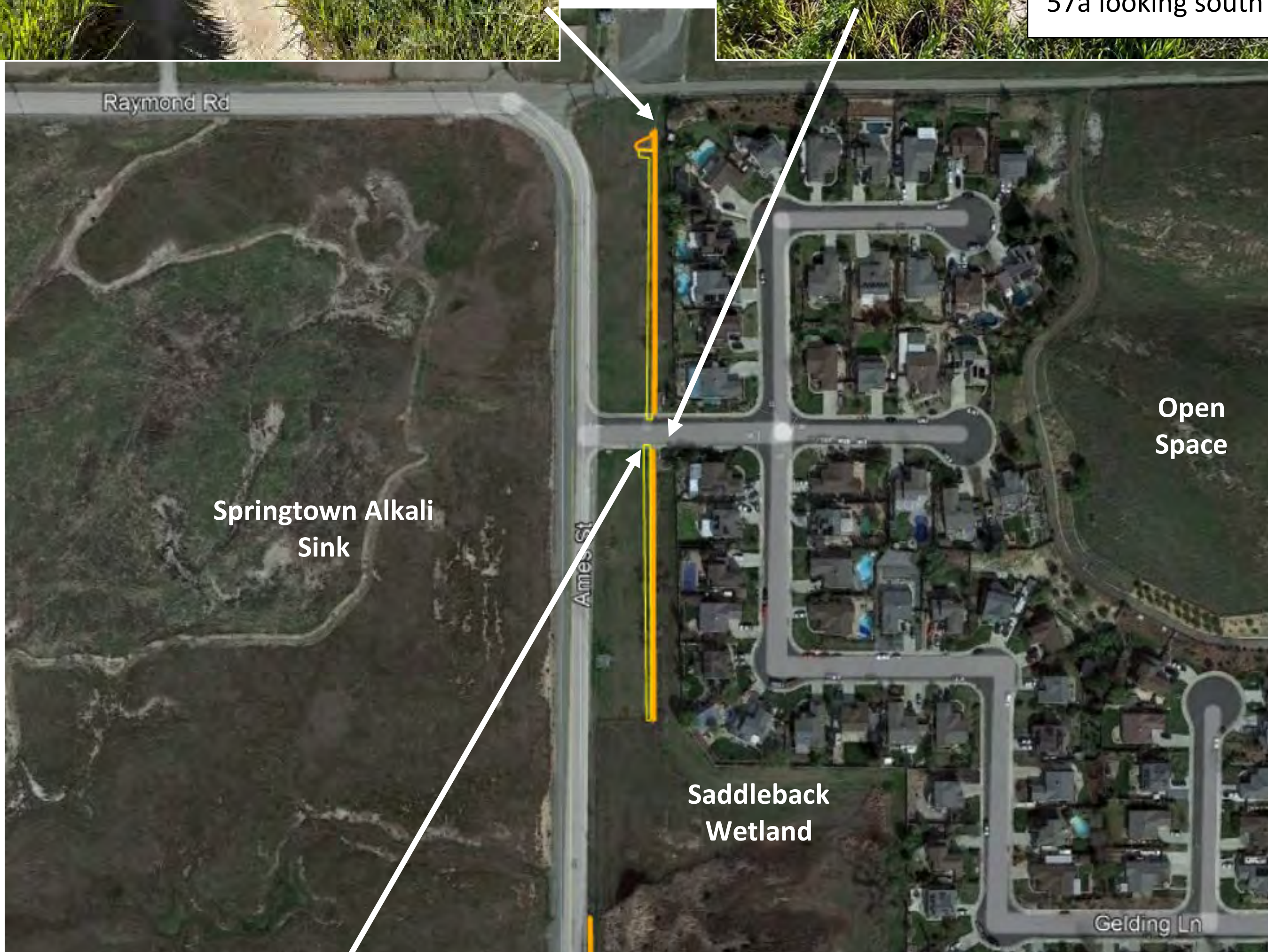
Comments:

Feature is tiny + subtle relative to these Floodplain units, so limited this data sheet to OHWM + Active Floodplain.

Photodocumentation Site 57A/B/C Saddleback Features

57a looking south

57a looking south



57b looking south

57c looking south at culvert inlet

4. Site 58 Heather Lane Bridge Culvert on Arroyo Las Positas

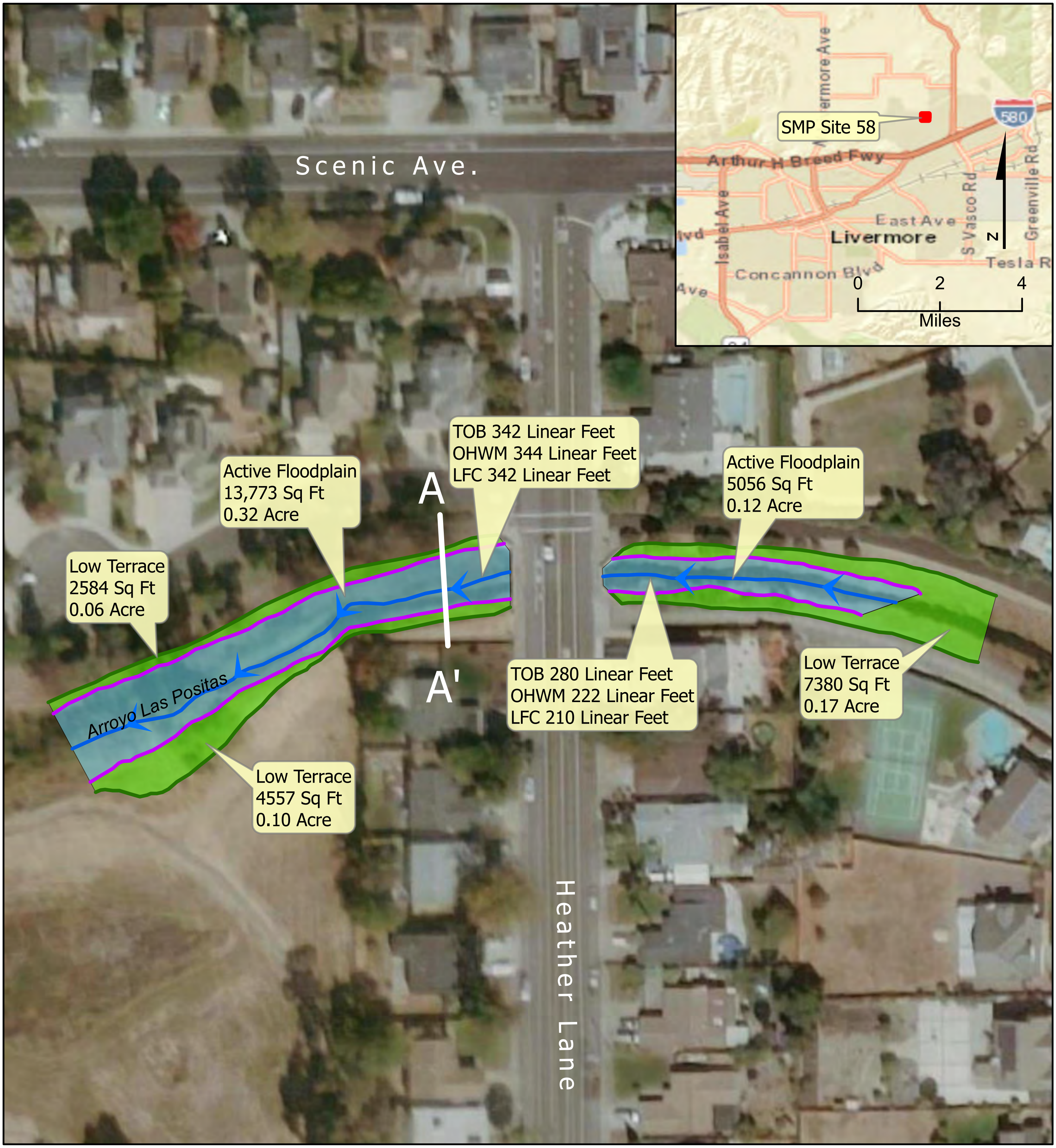
4.1 Delineation Map

This section includes a map of delineated aquatic resources ("Aquatic Resources Delineation Map") at the Heather Lane Bridge Culvert on Arroyo Las Positas ARDA.

To avoid cluttering the Aquatic Resources Delineation Maps, the reference block identifying individual(s) who conducted the delineation, date(s) of the maps, and date(s) of any revisions is provided here as follows:

Map Reference Block for ARDA Site 58 Sediment and Vegetation Outfall Management at Arroyo Las Positas and Heather Lane

Delineation date:	February 23, 2022
Delineators:	Natasha Dvorak/ Swaim Biological, Inc. Leslie Koenig/ Swaim Biological, Inc.
GIS & Map Preparers:	Chris Swaim/ Swaim Biological, Inc. Natasha Dvorak/ Swaim Biological, Inc.
Map Imagery Data:	ESRI ArcGIS Basemap World Imagery Local Imagery date: 1993-2020
Date Maps Prepared:	Field delineation results were mapped in GIS in February 2022.
	Reports maps were prepared in February 2022.



LFC - 19 Feet Wide
OHWM - 37 Feet Wide
TOB - 50 Feet Wide
Active Floodplain
Low Terrace

N

0 100 200 Feet

Figure 4-1 Site 58 - Heather Lane Bridge Culvert on Arroyo Las Positas

City of Livermore - Stream Maintenance Program

February 2022

SBI
Swaim Biological Inc

4.2 Aquatic Resources

Table 4-1. Aquatic Resources Site 58 Heather Lane Bridge Culvert on Arroyo Las Positas

Aquatic Resource Name	Aquatic Resources Classification				Aquatic Resource Size* (acre) Required for all resources	Aquatic Resource Size (linear feet) Required for only stream channels
	Cowardin	Location (lat/long) UTM 10S				
Arroyo Las Positas	R5AB3	Upstream	611621	4175095	0.44	566
		Downstream	611487	4175070		

R5AB3: Cowardin wetland classification code meaning Riverine Unknown Perennial Aquatic Bed Rooted Vascular (Cowardin et al., 1979).
* Active Floodplain/area between Ordinary High Waters

Other Waters

The ARDA for Site 58 is a 0.4-acre area encompassing Arroyo Las Positas upstream and downstream of the Heather Lane Bridge Culvert. Arroyo Las Positas through the Springtown neighborhood is an engineered trapezoidal channel of uniform width and bank slope. The defined structure of the channel restricts its active floodplain to a vertical rise in the water level rather than a horizontal spreading across a floodplain. About 1/3 up the banks the vegetation abruptly changes to upland herbaceous species, mostly annual grasses. Below that is the active floodplain, measuring a fairly consistent ~75 feet wide; except for areas where prior years'stream maintenance activities has cleared the channel, it is choked with cattails and tules. The low-flow channel varies in width through the study area but averages 15 feet, and probably varies seasonally. Flowing open water was present during the delineation.

As described in the Summary, Site 58 was evaluated as an Other Waters and is presumed to have hydrological connectivity to Arroyo Las Positas via unnamed tributary connections to Altamont Creek. Arroyo Las Positas connects to Arroyo Mocho engineered channel near the Chain of Lakes, and then connects into the Arroyo de la Laguna thence Alameda Creek thence San Francisco Bay and ultimately the Pacific Ocean. Both Alameda Creek in its lower 5.6-mile reach and San Francisco Bay are Navigable Waterways (Corps 1971).

Delineators completed the Arid West Ephemeral and Intermittent Streams Datasheet for this location. Data were collected for 1 cross-section, documenting a simple trapezoidal channel.

4.3 Soil Survey and Hydric Soil Information

The NRCS Web Soil Survey (USDA, 2021) was consulted to determine the soil types occurring within the study area. Mapped soils within the study area are *San Ysidro loam, 0 to 2 percent slopes, MRLA 14* and *Solano find sandy loam* as described in Section 1. Figure 1-2 Soils in the Delineation Area provides a map of soil types overlaid on study area imagery. The NRCS Web Soil Survey is provided in **Appendix B.**

4.4 Vegetation

Vegetation is previously described in the Summary and includes cattails, tules, and tall sedge in the wetted channel.

4.5 Data Sheets

There is 1 *Arid West Ephemeral and Intermittent Streams OHWM Datasheet* for Site 58 consisting of data for 1 cross-section (A-A').

4.6 Representative Photographs

Following the Datasheets is an 11x17 pictorial map and photo guide.

Data Sheets for Site 58 Heather Lane Bridge Culvert on Arroyo Las Positas

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: COL SMP 2022 **Project Number:** 58 **Stream:** Arroyo Las Positas **Investigator(s):** N. Dvorak	**Date:** 2/23/22 **Time:** **Town:** Livermore **State:** CA **Photo begin file#:** **Photo end file#:**
Y ☑ / N ☐ Do normal circumstances exist on the site?	**Location Details:** Heather Lane Bridge
Y ☑ / N ☐ Is the site significantly disturbed?	**Projection:** 611621, 4175095 **Datum:** UTM **Coordinates:** 611487, 4175070

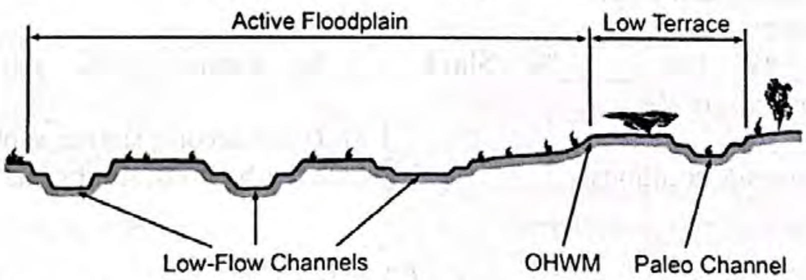
Potential anthropogenic influences on the channel system:
Trapezoidal channel w/ large flows and no lateral movement floodplain.

Brief site description:
Trapezoidal channel

Checklist of resources (if available):

- ☑ Aerial photography
  Dates: 1993 - 2021
- ☑ Topographic maps
- ☐ Geologic maps
- ☐ Vegetation maps
- ☑ Soils maps
- ☐ Rainfall/precipitation maps
- ☑ Existing delineation(s) for site
- ☑ Global positioning system (GPS)
- ☐ Other studies
- ☐ Stream gage data
  Gage number:
  Period of record:
  - ☐ History of recent effective discharges
  - ☐ Results of flood frequency analysis
  - ☐ Most recent shift-adjusted rating
  - ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units

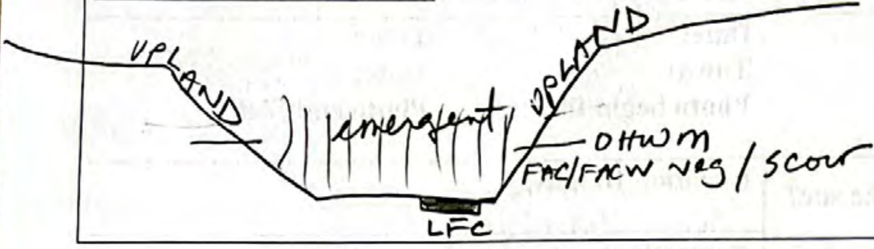


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - ☑ Mapping on aerial photograph
   - ☑ Digitized on computer
   - ☑ GPS
   - ☐ Other:

Project ID: 58 **Cross section ID:** A – A' **Date:** 2/23/22 **Time:**

Cross section drawing:



OHWM UTM 10S

GPS point: 611564, 4175093

Indicators:

- [ ] Change in average sediment texture
- [x] Change in vegetation species
- [x] Change in vegetation cover
- [ ] Break in bank slope
- [x] Other: scour
- [ ] Other: ______

Comments: About 1/3 up the bank the vegetation transitions from tall sedge + dock to upland grasses.

Floodplain unit: [x] Low-Flow Channel [ ] Active Floodplain [ ] Low Terrace

GPS point: 611562, 4175090

Characteristics of the floodplain unit:

Average sediment texture: mud

Total veg cover: ____ % Tree: 0 % Shrub: 0 % Herb: 100 % (except for prior cleared area)

Community successional stage:

- [ ] ~~NA~~
- [x] Early (herbaceous & seedlings)
- [ ] Mid (herbaceous, shrubs, saplings)
- [ ] Late (herbaceous, shrubs, mature trees)

Indicators:

- [ ] Mudcracks
- [ ] Ripples
- [ ] Drift and/or debris
- [ ] Presence of bed and bank
- [ ] Benches
- [ ] Soil development
- [ ] Surface relief
- [x] Other: open water through
- [x] Other: Dense cattails, tules
- [ ] Other: ______

Comments:

Project ID: 58 **Cross section ID:** A-A' **Date:** 2/23/22 **Time:**

Floodplain unit: [ ] Low-Flow Channel [x] Active Floodplain [ ] Low Terrace

GPS point: 611564, 4175093

Characteristics of the floodplain unit:
Average sediment texture: engineered fill
Total veg cover: 100 % Tree: 0 % Shrub: 0 % Herb: 100 % (overall character)
Community successional stage:
- [ ] NA
- [x] Early (herbaceous & seedlings)
- [ ] Mid (herbaceous, shrubs, saplings)
- [ ] Late (herbaceous, shrubs, mature trees)

Indicators:
- [ ] Mudcracks
- [ ] Ripples
- [ ] Drift and/or debris
- [ ] Presence of bed and bank
- [ ] Benches
- [ ] Soil development
- [x] Surface relief
- [x] Other: dense tules + cattails
- [ ] Other:
- [ ] Other:

Comments:
transition from dense tule & cattail to a narrow fringe of willowherb, sedge, dock then to uplands.

Floodplain unit: [ ] Low-Flow Channel [ ] Active Floodplain [x] Low Terrace / uplands

GPS point: 611564, 4175093

Characteristics of the floodplain unit:
Average sediment texture: engineered fill
Total veg cover: 50 % Tree: 0 % Shrub: 0 % Herb: 50 %
Community successional stage:
- [ ] NA
- [x] Early (herbaceous & seedlings)
- [ ] Mid (herbaceous, shrubs, saplings)
- [ ] Late (herbaceous, shrubs, mature trees)

Indicators:
- [ ] Mudcracks
- [ ] Ripples
- [ ] Drift and/or debris
- [x] Presence of bed and bank
- [ ] Benches
- [ ] Soil development
- [ ] Surface relief
- [x] Other: veg transition
- [ ] Other:
- [ ] Other:

Comments: Trapezoidal channel w/ the Low terrace beginning ~ 2/3 down the side banks, where hydrophytic veg drops out + upland veg takes over. The time of year & + maintenance on the banks resulted in less % cover in the uplands during delineation.

Photo Documentation Site 58 – Heather Lane Bridge Culvert on Arroyo Las Positas

5. Site 62 Outfall at Robertson Dog Park on Arroyo Mocho

5.1 Delineation Map

This section includes a map of delineated aquatic resources ("Aquatic Resources Delineation Map") in the Site 62 Outfall at Robertson Dog Park on Arroyo Mocho ARDA.

To avoid cluttering the Aquatic Resources Delineation Maps, the requested reference block identifying the individual(s) who conducted the delineation, date(s) of the maps, and date(s) of any revisions is provided here as follows:

Map Reference Block for Site 62 Sediment and Vegetation Management at Robertson Dog Park

Delineation date:	February 23, 2022
Delineators:	Natasha Dvorak/ Swaim Biological, Inc. Leslie Koenig/ Swaim Biological, Inc.
GIS & Map Preparers:	Chris Swaim/ Swaim Biological, Inc. Natasha Dvorak/ Swaim Biological, Inc.
Map Imagery Data:	ESRI ArcGIS Basemap World Imagery Local Imagery date: 1993-2020
Date Maps Prepared:	Field delineation results were mapped in GIS in February 2022.
	Reports maps were prepared in February 2022.

Culvert Outfall
LFC - 4 Feet Wide
Underground Drainage
OHWM - 6 Feet Wide
TOB - 8 Feet Wide
Active Floodplain
Low Terrace

N

0 25 50 Feet

Figure 5-1 Site 62 - Outfall at Robertson Dog Park on Arroyo Mocho

City of Livermore - Stream Maintenance Program

February 2022

SBI Swaim Biological Inc

5.2 Aquatic Resources

Table 5-1. Aquatic Resources Site 62 Outfall at Robertson Dog Park on Arroyo Mocho

Aquatic Resource Name	Aquatic Resources Classification				Aquatic Resource Size* (acre) Required for all resources	Aquatic Resource Size (linear feet) Required for only stream channels
	Cowardin	Location (lat/long) UTM 10S				
unnamed tributary in Arroyo Mocho floodplain	R4SB3	Upstream	609646	4169894	**0.03**	**210**
		Downstream	609588	4169906		

R4SB3: Cowardin wetland classification code meaning Intermittent Riverine Streambed Cobble-Gravel (Cowardin et al., 1979).
* Active Floodplain/area between Ordinary High Waters

Other Waters

The ARDA at Site 62 is a 0.1-acre culvert outfall and channel in the Arroyo Mocho floodplain. The origin of flow within the culvert is from stormwater from residential development south and east of Robertson Park Road. The culvert is mostly buried in sediment. There was a small pool of ponded water at the mouth of the buried culvert, but the channel was otherwise dry during the delineation. At the outfall the channel is bowl-shaped and approximately 8 feet across the bed, 10 feet across the active floodplain, and 12 feet across at top-of-bank. After ~10 feet downstream of the outfall the channel settles into its uniform width of 4 feet across the bed, 6 feet across the active floodplain, and 8 feet across the top-of-bank. The channel deadends about 200 feet west of the outfall, in the Arroyo Mocho floodplain. In-stream vegetation is negligible, but a clump of last year's cattails grows at the mouth of the culvert and last year's spiny cocklebur (*Xanthium* sp.) downstream. Active floodplain vegetation is mostly Himalayan blackberry (*Rubus armeniacus*) and mulefat.

Arroyo Mocho is a Relatively Permanent Waters with a nexus to San Francisco Bay: Arroyo Mocho drains into Arroyo de la Laguna thence Alameda Creek thence San Francisco Bay and ultimately the Pacific Ocean. Both Alameda Creek in its lower 5.6-mile reach and San Francisco Bay are Navigable Waterways (Corps 1971).

Delineators completed the Arid West Ephemeral and Intermittent Streams Datasheet for this location. Data were collected for 1 cross-section at the outfall location. Total vegetative cover was 25% consisting of a herbaceous layer of dried cattails and cocklebur. The Ordinary High

Water Mark (OHWM) was determined by the growth of Himalayan blackberry and mulefat saplings sandwiched between scour marks in the lower channel and upland vegetation at the top of bank. The transition from wetland to upland occurs quickly due to an abrupt change in elevation from channel bed to top of bank.

5.3 Soil Survey and Hydric Soil Information

The NRCS Web Soil Survey (USDA, 2017) was consulted to determine the soil types occurring within the study area. The soil type *Riverwash* occurs at this location. Figure 2- Soils in the Delineation Area provides a map of soil types overlaid on study area imagery. The NRCS Web Soil Survey is provided in **Appendix B.**

5.4 Vegetation

Vegetation is previously described in the Summary and includes cattail, spiny cocklebur, Himalayan blackberry, and mulefat in the channel.

5.5 Data Sheets

There is 1 *Arid West Ephemeral and Intermittent Streams OHWM Datasheet* for Site 62, consisting of data for 1 culvert tributary cross-section (A-A').

5.6 Representative Photographs

Following the Datasheets is an 11x17 pictorial map and photo guide.

Data Sheets for Site 62 Outfall at Robertson Dog Park on Arroyo Mocho

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: COL SMP 2022
Project Number: 62 Robertson Outfall
Stream: unnamed trib to Arroyo Mocho
Investigator(s): N DVORAK

Date: 2/23/22 **Time:**
Town: Livermore **State:** CA
Photo begin file#: **Photo end file#:**

Y ☑ / N ☐ Do normal circumstances exist on the site?

Y ☑ / N ☐ Is the site significantly disturbed?

Location Details: Site 62

Projection: 609646, 4169897 **Datum:** UTM
Coordinates: 609588, 4169906

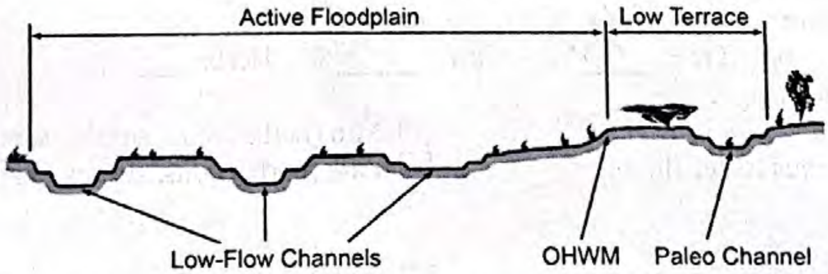
Potential anthropogenic influences on the channel system:
Adjacent development; debris piles all over the area

Brief site description:
culvert outfall into a channel that peters out, all within the Arroyo Mocho floodplain

Checklist of resources (if available):

- ☑ Aerial photography
  Dates: 1993 - 2021
- ☑ Topographic maps
- ☐ Geologic maps
- ☐ Vegetation maps
- ☑ Soils maps
- ☐ Rainfall/precipitation maps
- ☐ Existing delineation(s) for site
- ☑ Global positioning system (GPS)
- ☐ Other studies
- ☐ Stream gage data
  Gage number:
  Period of record:
  - ☐ History of recent effective discharges
  - ☐ Results of flood frequency analysis
  - ☐ Most recent shift-adjusted rating
  - ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units



Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   ☑ Mapping on aerial photograph ☑ GPS
   ☑ Digitized on computer ☐ Other:

Project ID: 62 **Cross section ID:** A - A' **Date:** 2/23/22 **Time:**

Cross section drawing: @ outfall

OHWM

GPS point: 609676, 416897

Indicators:

- [ ] Change in average sediment texture
- [x] Change in vegetation species
- [x] Change in vegetation cover
- [x] Break in bank slope
- [ ] Other: ______
- [ ] Other: ______

Comments:
Little instream veg transitions to dense blackberry & mulefat saplings. downstream Channel banks are steep & abruptly transition to upland.

Floodplain unit: ☐ Low-Flow Channel ☑ Active Floodplain ☐ Low Terrace

GPS point: same

Characteristics of the floodplain unit:
Average sediment texture: Granules & pebbles
Total veg cover: ___ % Tree: 0 % Shrub: 20 % Herb: 25 %
Community successional stage:

- [ ] NA
- [x] Early (herbaceous & seedlings)
- [x] Mid (herbaceous, shrubs, saplings)
- [ ] Late (herbaceous, shrubs, mature trees)

Indicators:

- [ ] Mudcracks
- [ ] Ripples
- [ ] Drift and/or debris
- [x] Presence of bed and bank
- [ ] Benches
- [ ] Soil development
- [x] Surface relief
- [x] Other: steep banks
- [x] Other: scour
- [ ] Other: ______

Comments: Abrupt transition to upland veg. Downstream this break is shown by blackberry & mulefat but at the outfall is shown by scour.

Scanned with CamScanner

Project ID: 62 **Cross section ID:** A-A' **Date:** 2/23/22 **Time:**

Floodplain unit: ☑ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: same

Characteristics of the floodplain unit:

Average sediment texture: Granule/pebble

Total veg cover: ___ % Tree: ___ % Shrub: ___ % Herb: 25 %

Community successional stage:

- ☐ NA
- ☑ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☑ Drift and/or debris
- ☑ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☑ Other: water @ culvert mouth
- ☐ Other:
- ☐ Other:

Comments: Dried patch of cattails at culvert mouth. Scour marks & debris flow patterns.

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☑ Low Terrace

GPS point: same

Characteristics of the floodplain unit:

Average sediment texture: coarse sand

Total veg cover: 110 % Tree: 10 % Shrub: 10 % Herb: 90 %

Community successional stage:

- ☐ NA
- ☑ Early (herbaceous & seedlings)
- ☑ Mid (herbaceous, shrubs, saplings)
- ☑ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☑ Soil development
- ☑ Surface relief
- ☐ Other:
- ☐ Other:
- ☐ Other:

Comments: There is an abrupt elevation change from channel bed to top-of-bank. Veg. at top of bank is dense upland herbaceous forbs & grasses, & assorted trees (peppertree, cottonwood, Eucalyptus), some mulefat & cotoneaster shrubs

Photodocumentation Site 62 Outfall at Robertson Dog Park on Arroyo Mocho

V-ditch

Clogged outfall

6. Site 66 Rockrose Outfall on Arroyo Mocho Low Flow Channel

6.1 Delineation Map

This section includes an overview map and detail maps of all delineated aquatic resources ("Aquatic Resources Delineation Map") at the Site 66 Rockrose Outfall on Arroyo Mocho Low Flow Channel ARDA.

To avoid cluttering the Aquatic Resources Delineation Maps, the requested reference block identifying the individual(s) who conducted the delineation, date(s) of the maps, and date(s) of any revisions is provided here as follows:

Map Reference Block for Site 66 Rockrose Outfall on Arroyo Mocho Low Flow Channel

Delineation date:	February 23, 2022
Delineators:	Natasha Dvorak/ Swaim Biological, Inc. Leslie Koenig/ Swaim Biological, Inc.
GIS & Map Preparers:	Chris Swaim/ Swaim Biological, Inc. Natasha Dvorak/ Swaim Biological, Inc.
Map Imagery Data:	ESRI ArcGIS Basemap World Imagery Local Imagery date: 1993-2020
Date Maps Prepared:	Field delineation results were mapped in GIS in February 2022.
	Reports maps were prepared in February 2022.

LFC - 5 Feet, 6 Inches Wide
OHWM - 7 Feet, 6 Inches Wide
TOB - 122 Feet Wide
66 Underground Drainage
Active Floodplain
Low Terrace

N

0 50 100 Feet

Figure 6-1 Site 66 - Rockrose Outfall
Arroyo Mocho Low Flow Channel
City of Livermore - Stream Maintenance Program

February 2022

SBI Swaim Biological Inc

6.2 Aquatic Resources

Table 6-1. Aquatic Resources Site 66 Rockrose Outfall on Arroyo Mocho Low Flow Channel

Aquatic Resource Name	Aquatic Resources Classification				Aquatic Resource Size* (acre) Required for all resources	Aquatic Resource Size (linear feet) Required for only stream channels
	Cowardin	Location (lat/long) UTM 10S				
Arroyo Mocho Low Flow Channel	R4SB6	Upstream	605457	4170798	**0.02**	**82**
		Downstream	605433	4170791		

R4SB6: Cowardin wetland classification code meaning Riverine Intermittent Streambed Organic (Cowardin et al., 1979).

* Active Floodplain/area between Ordinary High Waters

Other Waters

The ARDA is a 0.25-acre area encompassing an open stretch of Arroyo Mocho Low Flow Channel between two lengthy culverts. An iron grate across the downstream culvert acts as an effective debris catchment. The channel bottom measures ~60 feet wide X ~100 feet long and is surrounded by pedestrian trails on the west, north, and south, and by Rockrose Street on the east. The mature overstory is non-native eucalyptus, but young restoration plantings of coast live oak, toyon, manzanita, and blueblossom (*Ceanothus* sp.) were observed. There is no in-stream vegetation and the channel, which is marked by flow patterns in downed wood and leafy debris, is ~5.5 feet wide. While the basin floor offers a wide area for flows to pond, there is no evidence that the ordinary flows extend beyond a floodplain ~7.5 feet wide.

As described in the Summary, Arroyo Mocho Low Flow Channel is tributary to Arroyo Mocho, which is a Relatively Permanent Waters with a nexus to San Francisco Bay: Arroyo Mocho is tributary to Arroyo de la Laguna thence Alameda Creek thence San Francisco Bay and ultimately the Pacific Ocean. Both Alameda Creek in its lower 5.6-mile reach and San Francisco Bay are Navigable Waterways (Corps 1971).

Delineators completed the Arid West Ephemeral and Intermittent Streams Datasheet for this location. Data were collected for 1 cross-section. The Ordinary High Water Mark (OHWM) was determined by water staining on the culvert chutes and debris flow patterns. The outfall was dry at the time of the delineation.

6.3 Soil Survey and Hydric Soil Information

The NRCS Web Soil Survey (USDA, 2017) was consulted to determine the soil types occurring within the ARDA. The soil type *Yolo loam, calcareous substratum, 0 to 6 percent slopes, MRLA 14* occurs at this location. Figure 2- Soils in the Delineation Area provides a map of soil types overlaid on ARDA imagery. The NRCS Web Soil Survey is provided in **Appendix B.**

6.4 Vegetation

Vegetation is previously described in the Summary. There is no vegetation in the channel or the active floodplain, possible due to the thick accumulation of eucalyptus leaves and branches; eucalypts release chemicals to prohibit vegetative growth beneath their canopy. Upland vegetation includes annual grasses, eucalyptus, coast live oak, toyon, manzanita, and blueblossom.

6.5 Data Sheets

There is 1 *Arid West Ephemeral and Intermittent Streams OHWM Datasheets* for Site 66 consisting of data for 1 cross-section (A-A').

6.6 Representative Photographs

Following the Datasheets is an 11x17 pictorial map and photo guide.

Data Sheets for Site 66 Rockrose Outfall on Arroyo Mocho Low Flow Channel

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: COL SMP 22
Date: 2/23/22 **Time:**
Project Number: Site 66
Town: Livermore **State:** CA
Stream: Arroyo Mocho Low Flow Channel
Photo begin file#: **Photo end file#:**
Investigator(s): N. Dvorak

Y ☑ / N ☐ Do normal circumstances exist on the site?

Y ☑ / N ☐ Is the site significantly disturbed?

Location Details: Rockrose outfall
Projection: 605457, 4170988 **Datum:** UTM 10S
Coordinates: 605733, 4170791

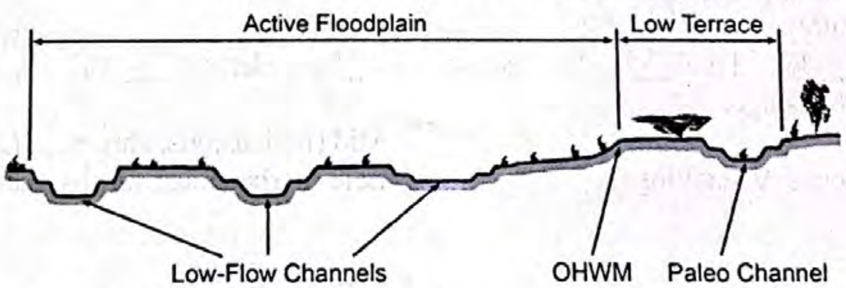
Potential anthropogenic influences on the channel system:
Engineered open basin between 2 long culverted stream reaches w/forced bends in creek over a short distance

Brief site description:
Bowl-shaped open basin apparently designed to catch debris & clean it out before conveying flow back into Arroyo Mocho.

Checklist of resources (if available):

- ☑ Aerial photography
  Dates: 1993–2021
- ☑ Topographic maps
- ☐ Geologic maps
- ☐ Vegetation maps
- ☑ Soils maps
- ☐ Rainfall/precipitation maps
- ☑ Existing delineation(s) for site
- ☑ Global positioning system (GPS)
- ☐ Other studies
- ☐ Stream gage data
  Gage number:
  Period of record:
  - ☐ History of recent effective discharges
  - ☐ Results of flood frequency analysis
  - ☐ Most recent shift-adjusted rating
  - ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units

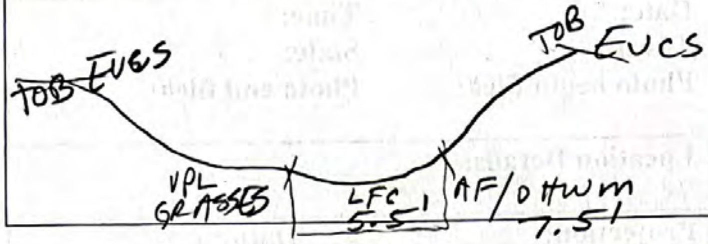


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - ☑ Mapping on aerial photograph
   - ☑ Digitized on computer
   - ☑ GPS
   - ☐ Other:

Project ID: Site 66 **Cross section ID:** A – A' **Date:** 2/23/22 **Time:**

Cross section drawing:



OHWM UTM 10S

GPS point: 605452, 4170793

Indicators:

- [x] Change in average sediment texture
- [x] Change in vegetation species
- [x] Change in vegetation cover
- [ ] Break in bank slope
- [x] Other: Leafy debris
- [x] Other: cobble

Comments:

Floodplain unit: ☐ Low-Flow Channel ☑ Active Floodplain ☐ Low Terrace

GPS point: 605452, 4170793

Characteristics of the floodplain unit:

Average sediment texture: sand to rock

Total veg cover: 80 % Tree: 80 % Shrub: 0 % Herb: 0 %

Community successional stage:

- [ ] NA
- [ ] Early (herbaceous & seedlings)
- [ ] Mid (herbaceous, shrubs, saplings)
- [x] Late (herbaceous, shrubs, mature trees)

Indicators:

- [ ] Mudcracks
- [ ] Ripples
- [x] Drift and/or debris
- [ ] Presence of bed and bank
- [ ] Benches
- [ ] Soil development
- [ ] Surface relief
- [ ] Other:
- [ ] Other:
- [ ] Other:

Comments: clear flow pattern from storm debris – leafs, sticks, + rocks/cobble. Beyond the edge of this debris are upland grasses. Overstory trees are eucalyptus.

Project ID: Site 66 **Cross section ID:** A–A' **Date:** 2/23/22 **Time:**

Floodplain unit: [x] Low-Flow Channel [ ] Active Floodplain [ ] Low Terrace

GPS point: 605452, 4170793

Characteristics of the floodplain unit:
Average sediment texture: organic
Total veg cover: 80 % Tree: 80 % Shrub: 0 % Herb: 0 %
Community successional stage:
- [ ] NA
- [ ] Early (herbaceous & seedlings)
- [ ] Mid (herbaceous, shrubs, saplings)
- [x] Late (herbaceous, shrubs, mature trees)

Indicators:
- [ ] Mudcracks
- [ ] Ripples
- [x] Drift and/or debris
- [ ] Presence of bed and bank
- [ ] Benches
- [ ] Soil development
- [ ] Surface relief
- [ ] Other: ______
- [ ] Other: ______
- [ ] Other: ______

Comments:
clear flow pattern of storm debris & no vegetation.

Floodplain unit: [ ] Low-Flow Channel [ ] Active Floodplain [x] Low Terrace

GPS point: 605450, 4170789

Characteristics of the floodplain unit:
Average sediment texture: silt & sand
Total veg cover: 160 % Tree: 80 % Shrub: 0 % Herb: 80 %
Community successional stage:
- [ ] NA
- [x] Early (herbaceous & seedlings)
- [ ] Mid (herbaceous, shrubs, saplings)
- [x] Late (herbaceous, shrubs, mature trees)

Indicators:
- [ ] Mudcracks
- [ ] Ripples
- [ ] Drift and/or debris
- [ ] Presence of bed and bank
- [ ] Benches
- [ ] Soil development
- [ ] Surface relief
- [ ] Other: ______
- [ ] Other: ______
- [ ] Other: ______

Comments:
upland vegetation

Photodocumentation Site 66- Rockrose Outfall on Arroyo Mocho Low Flow Channel

Culvert that connects to Stanley Reach	Culvert under Rockrose

7. Site 68 Laughlin Road Bridge Culvert on Altamont Creek

7.1 Delineation Map

This section includes an overview map and detail maps of all delineated aquatic resources ("Aquatic Resources Delineation Map") in the Site 68 Laughlin Road Bridge Culvert on Altamont Creek ARDA.

To avoid cluttering the Aquatic Resources Delineation Maps, the requested reference block identifying the individual(s) who conducted the delineation, date(s) of the maps, and date(s) of any revisions is provided here as follows:

Map Reference Block for ARD Site 68 Lauglin Road Bridge Culvert on Altamont Creek

Delineation date:	February 23, 2022
Delineators:	Natasha Dvorak/ Swaim Biological, Inc. Leslie Koenig/ Swaim Biological, Inc.
GIS & Map Preparers:	Chris Swaim/ Swaim Biological, Inc. Natasha Dvorak/ Swaim Biological, Inc.
Map Imagery Data:	ESRI ArcGIS Basemap World Imagery Local Imagery date: 1993-2020
Date Maps Prepared:	Field delineation results were mapped in GIS in February 2022.
	Reports maps were prepared in February 2022.

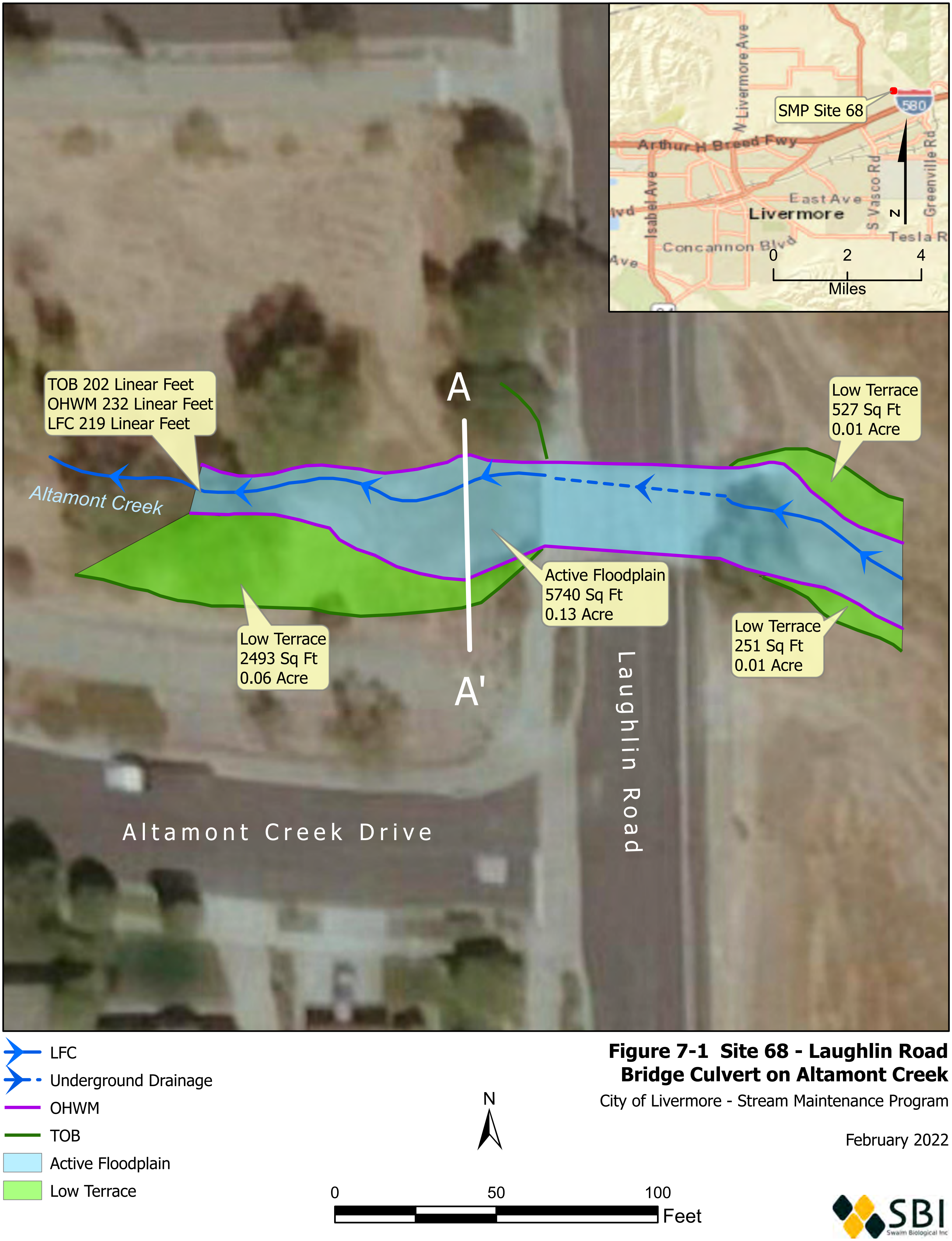


Figure 7-1 Site 68 - Laughlin Road Bridge Culvert on Altamont Creek

City of Livermore - Stream Maintenance Program

February 2022

SBI
Swaim Biological Inc

7.2 Aquatic Resources

Table 7-1. Aquatic Resources Site 68 Laughlin Road Bridge Culvert on Altamont Creek

Aquatic Resource Name	**Aquatic Resources Classification**				**Aquatic Resource Size* (acre) Required for all resources**	**Aquatic Resource Size (linear feet) Required for only stream channels**
	Cowardin	**Location (lat/long) UTM 10S**				
Altamont Creek	R4SB5	Upstream	613643	4175753	**0.13**	**232**
		Downstream	613583	4175756		

R4SB5: Cowardin wetland classification code meaning Riverine Intermittent Streambed Mud (Cowardin et al., 1979).
* Active Floodplain/area between Ordinary High Waters

Other Waters

The ARDA at Site 68 is ~0.4-acre study area on Altamont Creek at the Laughlin Road Bridge Culvert, extending upstream and downstream of the bridge. Flowing water was present during the delineation, with algae in the low-flow channel. The low-flow channel averaged 2.5 feet wide. Outside of the wetted channel, the active floodplain varied from 20 to 40 feet in width, widest at the downstream wingwall. Floodplain vegetation included cottonwood, tule, rushes, saltgrass, and unidentified grasses (early growth). The transect location was at the downstream wingwall, and stream morphology at this location supported two benches on each side. The first bench formed the lateral boundary of the active floodplain. Vegetation on the second higher-elevation benches transitioned from a mixture of upland-wetland species nearer the active floodplain to purely upland species. The upper benches are so wide and flat that it is possible that any wetland vegetation in this area is fed by groundwater or even direct precipitation. The lateral limits of urban development allow for a fairly generous lateral stream migration, especially downstream of the bridge on the north bank. There is no evidence that Altamont Creek has ventured far into this ~300-foot-wide corridor.

Altamont Creek is a Relatively Permanent Waters with a nexus to San Francisco Bay: Altamont Creek is tributary to Arroyo las Positas thence Arroyo Mocho thence Arroyo de la Laguna thence Alameda Creek thence San Francisco Bay and ultimately the Pacific Ocean. Both Alameda Creek in its lower 5.6-mile reach and San Francisco Bay are Navigable Waterways (Corps 1971).

Delineators completed the Arid West Ephemeral and Intermittent Streams Datasheet for this location. Data were collected along one transect (A-A'). Presence of bed and bank, benches, and a change in vegetative species were used to identify the OHWM.

7.3 Soil Survey and Hydric Soil Information

The NRCS Web Soil Survey (USDA, 2021) was consulted to determine the soil types occurring within the study area. The soil type *San Ysidro loam, 0 to 2 percent slopes, MRLA 14* occurs at this location. Figure 2- Soils in the Delineation Area provides a map of soil types overlaid on study area imagery. The NRCS Web Soil Survey is provided in **Appendix B.**

7.4 Vegetation

Vegetation is previously described in the Summary and includes willow, cattail, tule, rushes, and tall sedge in the Active Floodplain.

7.5 Data Sheets

Arid West Ephemeral and Intermittent Streams OHWM Datasheets for the ARDA at Site 68 consists of data for 1 cross-sections (A-A').

7.6 Representative Photographs

Following the Datasheets is an 11x17 pictorial map and photo guide.

Data Sheets for Site 68 Laughlin Road Bridge Culvert on Altamont Creek

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: COL SMP 2022 **Project Number:** 68 **Stream:** Altamont Creek **Investigator(s):** N. Dvorak	**Date:** 2/23/22 **Time:** **Town:** Livermore **State:** CA **Photo begin file#:** **Photo end file#:**
Y ☑ / N ☐ Do normal circumstances exist on the site? Y ☐ / N ☑ Is the site significantly disturbed?	**Location Details:** Altamont Creek under Laughlin **Projection:** 613643, 4175753 **Datum:** UTM **Coordinates:** 613583, 4175754

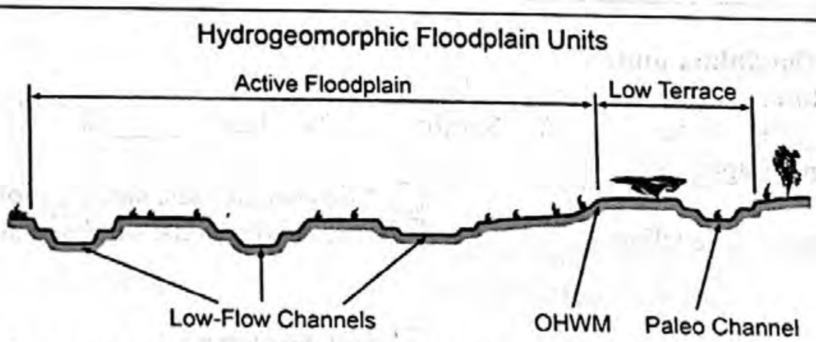
Potential anthropogenic influences on the channel system:
Bridge culvert at a bend in the creek.

Brief site description:
Wetted channel with a generous lateral floodplain on both banks u/s & d/s from bridge culvert.

Checklist of resources (if available):

- ☑ Aerial photography
  Dates: 1993-2021
- ☑ Topographic maps
- ☐ Geologic maps
- ☐ Vegetation maps
- ☑ Soils maps
- ☐ Rainfall/precipitation maps
- ☐ Existing delineation(s) for site
- ☑ Global positioning system (GPS)
- ☐ Other studies

- ☐ Stream gage data
  Gage number:
  Period of record:
  - ☐ History of recent effective discharges
  - ☐ Results of flood frequency analysis
  - ☐ Most recent shift-adjusted rating
  - ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

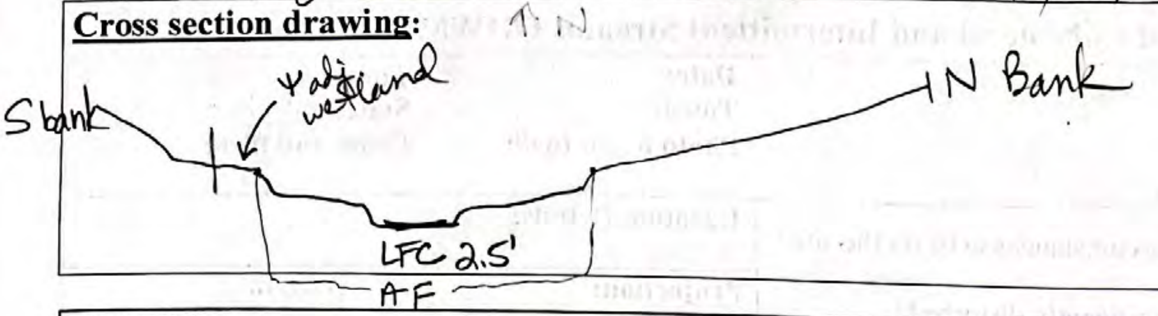


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - ☑ Mapping on aerial photograph
   - ☑ Digitized on computer
   - ☑ GPS
   - ☐ Other:

Project ID: 68 **Cross section ID:** A-A' **Date:** 2/23/22 **Time:**

Cross section drawing:



OHWM

GPS point: 613607, 4175753 UTM 10S

Indicators:

- [ ] Change in average sediment texture
- [x] Change in vegetation species
- [x] Change in vegetation cover
- [x] Break in bank slope
- [ ] Other: ____
- [ ] Other: ____

Comments: At the A-A' location there is an extra bench on each side of the LFC. These support meadow barley, unk. sedge, saltgrass, Juncus. The higher benches are mostly upland but are flat & may support seasonal wetlan separate from direct stream hydrology.

Floodplain unit: [x] Low-Flow Channel [ ] Active Floodplain [ ] Low Terrace

GPS point: 613607, 4175753

Characteristics of the floodplain unit:

Average sediment texture: Mud, fine silt

Total veg cover: 30 % Tree: 0 % Shrub: 0 % Herb: 30 %

Community successional stage:

- [ ] NA
- [x] Early (herbaceous & seedlings)
- [ ] Mid (herbaceous, shrubs, saplings)
- [ ] Late (herbaceous, shrubs, mature trees)

Indicators:

- [ ] Mudcracks
- [ ] Ripples
- [ ] Drift and/or debris
- [x] Presence of bed and bank
- [ ] Benches
- [ ] Soil development
- [ ] Surface relief
- [x] Other: Algae
- [ ] Other: ____
- [ ] Other: ____

Comments: Flowing water. Up to 18" deep in some locations. In-stream algae. No other emergents/floating aquatics.

Scanned with CamScanner

Project ID: 68 **Cross section ID:** A-A' **Date:** 2/23/22 **Time:**

Floodplain unit: ☐ Low-Flow Channel ☑ Active Floodplain ☐ Low Terrace

GPS point: 613607, 4175753 utm

Characteristics of the floodplain unit:
Average sediment texture: unk.
Total veg cover: 90 % Tree: 0 % Shrub: 0 % Herb: 90 %
Community successional stage:
- ☐ NA
- ☑ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:
- ☐ Mudcracks
- ☐ Ripples
- ☑ Drift and/or debris
- ☐ Presence of bed and bank
- ☑ Benches
- ☐ Soil development
- ☑ Surface relief
- ☐ Other: ______
- ☐ Other: ______
- ☐ Other: ______

Comments:
supports hydrophytic species.

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☑ Low Terrace

GPS point: 613607, 4175753

Characteristics of the floodplain unit:
Average sediment texture: unk.
Total veg cover: 115 % Tree: 25 % Shrub: 0 % Herb: 90 %
Community successional stage:
- ☐ NA
- ☑ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☑ Late (herbaceous, shrubs, mature trees)

Indicators:
- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☑ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☑ Surface relief
- ☑ Other: Veg. transition to upland species.
- ☐ Other: ______
- ☐ Other: ______

Comments:

Photodocumentation Site 68 Laughlin Road Bridge Culvert on Altamont Creek

Altamont Creek Downstream

Culvert and apron downstream

Culvert, apron, debris and willow upstream

Biological Assessment

2022 City of Livermore Stream Maintenance Projects

Prepared for:

City of Livermore
Community Development Department
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Livermore, CA 94550
Contact: Edward Reyes
(925) 960-4527

Prepared by:

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SBI
Swaim Biological Inc.

March 2022

Contents

Tables

Attachments

Acronyms and Abbreviations

ALP	Arroyo Las Positas
AM	Arroyo Mocho
AMM	Avoidance and Minimization Measure
BO	Biological Opinion
BS	Basin
CDFW	California Department of Fish and Wildlife
CESA	California Endangered Species act
CFR	Code of Federal Regulations
City	City of Livermore
CNDDB	California Natural Diversity Database
CRLF	California red-legged frog
CTS	California tiger salamander
EACCS	East Alameda County Conservation Strategy
ESA	Endangered Species Act of 1973, as amended
FEMA	Federal Emergency Management Agency
LF	Linear Feet
PBBB	Palmate-bracted bird's break
SF	Square feet
SMP	Stream Maintenance Program
SDO	Storm Drain Outfall
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service

Chapter 1
Introduction

This Biological Assessment has been prepared for the City of Livermore's (City) proposed 2022Stream Maintenance Projects (project). The 2022 annual project list that are within federal species habitat consists of a total of 11 projects at 10 site locations where site-specific investigation has determined that maintenance activities are necessary to restore stormwater conveyance capacity, to reduce flood and fire hazards, and improve habitat value. The proposed projects will involve a combination of sediment and vegetation management activities.

Project activities are described in the Livermore Stream Maintenance Program (SMP), which was developed by the City to improve and define the management and maintenance of engineered and modified flood control channels and basins, and non-modified natural creeks within the City's SMP Area.

The project is located within the Livermore city limits in eastern Alameda County, California (see Figure 1, Attachment A), and would result in work in jurisdictional waters of the United States, as defined by the U.S. Army Corps of Engineers (USACE) under Section 404 of the Clean Water Act (CWA) (33 United States Code [USC] 1259). The City received a Section 404 Regional General Permit from USACE in order to implement the program (1012-19006S).

This Biological Assessment has been prepared in compliance with legal requirements set forth under the ESA to support USACE's consultation with USFWS and meets the following objectives:

- Provide USFWS information about the biological resources in the proposed project area.

Determine whether the proposed project would adversely affect species that are federally-listed as endangered or threatened or proposed for such listing.

- Determine whether the proposed project would adversely modify designated or proposed critical habitat.
- Describe conservation measures for the proposed project that would avoid or minimize project-related effects on these species and their habitats.

The City is requesting coverage for implementation of the project under the East Alameda County Conservation Strategy (EACCS; ICF International 2010) for effects on federally-listed species and is requesting USFWS append the project to the EACCS Programmatic Biological Opinion (EACCS BO; 08ESMF00-2012-F-0092-1). The EACCS BO evaluated the effects of the EACCS to the following species: the federally endangered longhorn fairy shrimp (*Branchinecta longiantenna*) and its critical habitat, the threatened vernal pool fairy shrimp (*Branchinecta lynchi*) and its critical habitat, the endangered callippe silverspot butterfly (*Speyeria callippe callippe*), the threatened California red-legged frog (*Rana draytonii*) and its critical habitat, the threatened Central California Distinct Population Segment of the California tiger salamander (Central California tiger salamander - *Ambystoma californiense*) and its critical habitat, the threatened Alameda whipsnake (*Masticophis lateralis euryxanthus*) and its critical habitat, the endangered San Joaquin kit fox (*Vulpes macrotis mutica*), and the endangered palmate-bracted bird's-beak (*Chloropyron [=Cordylanthus] palmatum*).

This Biological Assessment documents the effects the 2022 projects may have on the following federally-listed species that are potentially present in the project action area (see definition below) and covered under the EACCS BO: California red-legged frog (*Rana draytonii*), Central California tiger salamander (*Ambystoma californiense*), longhorn fairy shrimp (*Branchinecta longiantenna*), vernal pool fairy shrimp (*Branchinecta lynchi*), Callippe silverspot butterfly (*Speyeria callippe callippe*), Alameda whipsnake (*Masticophis lateralis euryxanthus*), San Joaquin kit fox (*Vulpes macrotis mutica*), and palmate-bracted bird's-beak (*Chloropyron* [=*Cordylanthus*] *palmatus*).

The City has agreed that the project be appended to the EACCS BO instead of pursuing an independent programmatic BO for the Livermore SMP, due to the desire to maintain consistency with the EACCS across the tri-valley area. This approach is supported by guidance provided by USFWS (Olah pers. comm.).

This Biological Assessment also concludes that the project would not affect the following federally-listed species because they are not likely to occur in the action area: bay checkerspot butterfly (*Euphydryas editha bayensis*), vernal pool tadpole shrimp (*Lepidurus packardi*), California least tern (*Sternula browni*), salt marsh harvest mouse (*Reithrodontomys raviventris*), valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), giant garter snake (*Thamnophis gigas*), large-flowered fiddleneck (*Amsinckia grandiflora*), and Contra Costa goldfields (*Lasthenia conjungens*).

This project will use the conservation measures as outlined in the EACCS BO. Additional Avoidance and Minimization Measures (AMMs) in this Biological Assessment are taken from the Livermore SMP and are feasible measures that would further avoid or minimize effects on the federal species and their habitats.

Action Area

The *action area* of a proposed action is defined as all areas that may be affected directly or indirectly by the action, not just the immediate area involved in the action (50 Code of Federal Regulations [CFR] 402.02). For the purposes of the effects analysis, the action area includes the proposed project footprint, parking, equipment storage, stockpile, access, and borrow site locations and any additional effects that may occur downstream or off-site as a result of the proposed actions for each Nationwide or other permit that is included within the EACCS BO action area.

Details of the project site locations are provided in Table 1 below and shown on Figure 1 in Attachment A. The limit of maintenance activity (i.e., the area within which maintenance activities would occur) at each location is shown in site maps in Attachment A.

SMP Projects YM-2 and YM-3 do not occur within suitable habitats for federally listed species. SMP Projects 59, 65, 67, YM-4 and YM-5 occur within suitable habitats for federally listed species, however, they are limited to hand labor that will not result in disturbance to habitats. These project sites are not discussed further in this BA.

Table 1. Project Site Location Information

SMP Site	Location	Latitude	Longitude	Stream Reach ID[1]	Waterbody	Tributary to	Adjacent Land Use	Ownership
56	Sediment and Vegetation Outfall Management at Hillstone Court	37.727581	-121.711243	ACT-3b-2	Altamont Creek Tributary	Altamont Creek	Residential Development, Preserve, Open Space	City
57a	Saddleback Sediment and Vegetation Outfall Management and Debris from Raymond Road to Martingale Lane	37.728881	-121.712807	SDB	Saddleback Basin	Altamont Creek	Residential Development, Preserve	City
57b	Saddleback Sediment and Vegetation Outfall Management - Martingale Lane to Saddleback Basin	37.727247	-121.713784	SDB	Saddleback Basin	Altamont Creek	Residential Development, Preserve	City
57c	Saddleback Sediment, Vegetation and Debris Removal - Dalton Avenue and Ames Street	37.695043	-121.848615	SDB	Roadside ditch	Altamont Creek	Residential Development, Preserve	City
58	Heather Lane Culvert Sediment, Debris and Vegetation Management along Arroyo Las Positas	37.716259	-121.734066	ALP-12c, ALP-13ab	Arroyo Las Positas	Arroyo Mocho	Residential Development, Golf Course	City
60	Bluebell Drive Culvert Sediment, Vegetation and	37.67139	-121.76494	ALP-12ab	Arroyo Las Positas	Arroyo Mocho	Residential, Golf Course	City

SMP Site	Location	Latitude	Longitude	Stream Reach ID[1]	Waterbody	Tributary to	Adjacent Land Use	Ownership
	Debris Management along Arroyo Las Positas							
61	Springtown Open Space Sediment and Vegetation Outfall Management along Unnamed Tributary to Arroyo Las Positas	37.715642	-121.745342	ALP-10a	Arroyo Las Positas Unnamed Tributary	Arroyo Las Positas	Residential Development	City
62	Robertson Park Sediment and Vegetation Outfall Management at Arroyo Mocho Floodplain	37.669659	-121.756746	AM-8b	Arroyo Mocho	Arroyo de la Laguna	Residential Development, Park	LARPD
63	West of Robertson Park Vegetation and Debris Management at Outfall and Arroyo Road Bridge along Arroyo Mocho	37.67151	-121.763047	AM-7a	Arroyo Mocho	Arroyo de la Laguna	Residential Development, Park	LARPD
64	Stanley Blvd Bridge and the Old Railroad Bridge Sediment, Vegetation, and Debris Management along Arroyo Mocho	37.678124	-121.789208	AM-4a	Arroyo Mocho	Arroyo de la Laguna	Residential, Commercial Development	City , Railroad
66	Rockrose Street Culvert and Outfall Debris and Sediment	37.6782784	-121.804302	AM-1bc	Arroyo Mocho	Arroyo de la Laguna	Residential	City

SMP Site	Location	Latitude	Longitude	Stream Reach ID[1]	Waterbody	Tributary to	Adjacent Land Use	Ownership
	Management in Arroyo Mocho Low Flow Channel							
68	Laughlin Bridge Culvert Sediment and Vegetation Management along Altamont Creek	37.7218367	-121.710514	AC-6ab, 7d	Altamont Creek	Arroyo las Positas	Residential	City, Zone 7
YM-1[2]	Holmes Street Bridge Annual Sediment Management	37.693969	-121.847168	AM-5a, AM-6c	Arroyo Mocho	Arroyo de la Laguna	Residential Development, Park	City

Species Eliminated from the Consultation

The following federally-listed species were evaluated for their potential to occur within the action area but were found to have no potential to occur in the action area based on the absence of suitable habitat within the action area:

- Bay checkerspot butterfly – threatened. No serpentine soils are present within the action area, and the action area is outside of the known range for the species.
- Vernal pool tadpole shrimp – endangered. The action area is outside of the known range for the species.
- California least tern – endangered. There is no suitable nesting habitat (salt panne or sandy beaches) or foraging habitat (open marine water) for California least tern within the action area.
- Salt marsh harvest mouse – endangered. Salt marsh harvest mouse is found in saline and brackish marsh habitats. Such habitat types do not occur within the action area.
- Valley elderberry longhorn beetle – threatened. The action area is outside of the known range for the species.
- Giant garter snake – threatened. The action area is outside of the known range for the species.
- Contra Costa goldfields – endangered. The action area is outside of the known range for the species; all known occurrences of this species within Alameda County are west of the Diablo Mountains.
- Large-flowered fiddleneck – endangered. This species is known in the Livermore Valley from three occurrences; one was planted, the second dates back to an observation made in 1889, and the third dates back to another observation from 1889. Aside from the planted individual, this species has not been observed within the Livermore Valley since 1889 and is considered extirpated from the area. Large-flowered fiddleneck is known to occur at Lawrence Livermore National Lab Site 300, according to an observation made in 1992, and on an adjacent property owned by the Contra Costa Water District. Because this species is considered extirpated from the Livermore Valley, the species does not occur within the action area and would not be affected by the project. As such, this species is not analyzed further.

It is therefore determined that the proposed action would have no effect on the above-listed species. No further evaluation is needed, and there is no need for consultation regarding these species (50 CFR 402.12).

Chapter 2
Proposed Action

Proposed Project Types

The following is a list of the individual activities that comprise the project (Table 1 provides details regarding the location of each project) and discussed in detail below.

A total of 19 project activities are proposed at 10 site locations. Of the total 19 project activities, 11 projects will result in the potential for impacts to federally listed species and are therefore further described and evaluated further. Sites 59, 65, 67, 5 YM-2, YM-3, YM-4 and YM-5 are not discussed in this Biological Assessment – their project descriptions are included in the SMP Annual Notification Report.

The extent of each project location evaluated in this assessment is included in Attachment A. Representative photos of each of the project sites are provided in Attachment B. Full descriptions of each project activity are below.

Site 56 –Sediment and Vegetation Outfall Management at Hillstone Court

Proposed work at Site 56 will consist of sediment removal and vegetation management from a storm drain culvert outlet area that is a component of The Bluffs neighborhood stormwater basin system which is identified in the SMP manual as part of the Bear Creek Basins system. Vegetation has grown in the riprap apron which is capturing sediment and blocking flow. The work will occur at the outlet of the 12-inch concrete pipe that conveys storm flows from Hillstone Court.

The proposed work will encompass one day of work and will include temporary impacts to excavate a 12-foot by 12-foot area (144 SF / 5 CY) around the pipe outfall, removing the previously installed riprap, removing vegetation (including 4 cottonwoods, less than 4" DBH) and excavating to a depth of approximately 12-inches to restore the freeboard around the outfall. Removed riprap will be replaced in kind and grades restored to original contours to allow flow to reach the basin without backing up the outfall.

The work will be conducted with an excavator and loader that will access the basin from the north using existing access roads (for access and staging see Figures in Appendix A). Dewatering is not anticipated to be necessary as work is being conducted at an ephemeral stormwater basin that typically only receives flows on a seasonal basis.

Site 57a – Saddleback Sediment and Vegetation Outfall Management and Debris from Raymond Road to Martingale Lane

Proposed work at Site 57a will consist of sediment and vegetation removal from a storm drain outfall and a 390 LF earthen stormwater swale (Swale A) that starts near the corner of Raymond Road and Ames Street. These structures were installed in 1998/1999 and associated with the adjacent Saddleback residential development. Together, the storm outfall and earthen swale collects stormwater from the nearby PG&E facilty, the Dalton Reservoir and access road, and overland surface flow from the hillsides above the Saddleback development. The swale has been filled in with sediment over time and is no longer capturing stormwater but is instead overflowing in the grassy area that ends up flowing onto the adjacent Ames Street. The storm outfall has a rock rip rap apron that is completely filled in with sediment and cattails. The resulting overflow is contributing to surface water accumulation on the roadway causing public safety hazards and concerns.

The proposed work will encompass one day of work and includes temporary impacts to excavate the earthen swale for 390 LF to as built designs (4 feet wide by 0.5 feet deep) including removal of 1560 SF / 30 CY of sediment and removal of five willows (Salix sp.) and one mugwort (Artemisia douglasiana) that are growing within the bottom of the swale. The remaining trees on site will be selectively limbed up and woody debris removed. The storm drain outfall rip rap apron will be cleared and approximately 260 SF / 9 CY of sediment and vegetation (cattails) removed to clear the rip rap outfall to allow for capture of storm flow.

The site will be accessed from Martingale Lane and equipment work access will occur in a 12 foot area parallel to the grassed swale. Equipment will be staged on the street (for access and staging see Figures in Appendix A). Work will be conducted with a mini rubber tracked excavator, a dump truck and a loader. Sediment, vegetation and debris will be hauled to the Vasco dump or the waste water treatment plant for later disposalas there is not an appropriate location to stage materials or leave chipped vegetation on site, dewatering is not anticipated to be necessary.

Site 57b - Saddleback Sediment and Vegetation Outfall Management - Martingale Lane to Saddleback Basin

Proposed work at Site 57b will consist of sediment and vegetation removal from a 380 LF earthen stormwater swale that connects to Swale A which connects to a culvert/storm drain north of Martingale Lane and travels under the street, outfalling into a grassed swale to the south (Swale B). Swale B is obstructed with cattails for approximately 150 LF and filled with sediment, willows and coyote brush for the remaining extent.

The proposed work will encompass one day of work and will include temporary impacts to excavate Swale B for 380 LF to as built conditions (4 feet wide by 0.5 feet deep) including removal of 1520 SF / 28 CY of sediment/vegetation and removal of one coyote brush (Baccharis pilularis) that is growing within the bottom of the swale. The remaining trees on site will be limbed up and downed woody debris that is within the swale will be removed.

The site will be accessed from Martingale Lane and equipment work access will occur in a 12 foot area parallel to the grassed swale. Equipment will be staged on the street (for access and staging see Figures in Appendix A). Work will be conducted with a mini rubber tracked excavator, a dump truck and a loader. Sediment, vegetation and debris will be hauled to the Vasco dump or the waste water treatment plant for later disposal as there is not an appropriate location to stage materials or leave chipped vegetation on site, dewatering is not anticipated to be necessary.

Site 57c – Saddleback Sediment, Vegetation and Debris Removal - Dalton Avenue and Ames Street

Proposed work at Site 57c will consist of sediment removal from an approximately 150 LF roadside v-ditch that collects stormwater flow from Ames Street. The v-ditch connects to a culvert/storm drain on the corner of Dalton Ave. and Ames St. and then outfalls south of the road. The v-ditch is filled in with sediment and grasses affecting capacity and the designed road pattern. The ditch no longer conveys flow from the road to the storm drain, resulting in seepage and standing water on the road. The outfall southwest of the Dalton/Ames corner is also filled with trash, vegetation (tumbleweeds and perennial pepperweed) and debris.

The proposed work will encompass one day of work and will include temporary impacts to excavate the 150 LF v-ditch 3 feet wide and 1 foot deep and will include removal of 450 SF / 17 CY of sediment. There is an approximately 3 foot by 5 foot rip rap apron at the culvert inlet that will be removed and replaced in kind. Vegetation, trash and debris removal from the southern storm drain outfall will be conducted by hand and/or vaccum truck, dewatering is not anticipated to be necessary.

Work to restore the v-ditch will be conducted with a mini rubber tracked excavator, a dump truck and a loader. Equipment will stage on the road/sidewalk with traffic control (for access and staging see Figures in Appendix A). Sediment, vegetation, trash and debris will be hauled off as there is not an appropriate location to stage materials on site.

Site 58 – Heather Lane Culvert Sediment, Debris and Vegetation Management along Arroyo Las Positas

Proposed work at Site 58 consists of managing debris, vegetation, and sediment at the box culvert structure upstream and downstream of the Heather Lane culvert along Arroyo Las Positas. Work was done at this site in 2017, 2019, and 2021 but debris, vegetation, and sediment annually accumulate. Work was completed in 2019 to establish a low flow channel on the south side of the Arroyo Las Positas through this reach and vegetation, trash and debris management has been conducted within the limits of the concrete aprons of the cuvlert. Despite ongoing maintenance efforts immediately surrounding the culvert, localized flooding continues to occur at this location during storm events resulting in damage to adjacent residential properties. Cattail and tule reestablish annually and impact storm flow conveyance at this location due to a combination of factors and the culvert area also catches considerable amounts of debris and trash from upstream non-point sources. The City is actively evaluating a long term solution evaluating the potential to replace the structure at Heather Lane or establishing by-pass flows. In the interim, the City is proposing extending vegetation and sediment management to address the challenges immediately upstream and downstream of the box culvert.

The proposed work is anticipated to take five (5) to seven (7) days and includes temporary impacts associated with sediment, vegetation and debris removal in four locations. The stream is perennial in this stretch and the site will be dewatered to conduct project activities (see dewatering plan below). At the culvert, a concrete apron with wingwalls lines the channel bed and banks for 20-feet upstream and downstream. Inset paver stones line the channel bottom where the concrete aprons end/begin.

(1) Upstream: Clear debris and sediment 100 LF upstream of the culvert to the paver stones in the channel bottom. Temporary impacts will occur in 2,800 SF / 208 CY.

(2) In culverts: Clear sediment within the two box culverts, approximately 60 LF / 800 SF / 60 CY, under the bridge to the concrete bottom. Work will be completed with small hand-push compact track loader to push the sediment into a place that it can be removed with the excavator staged on the top of the bank.

(3) Immediately Downstream: Remove sediment and vegetation approximately 50 by 150 feet (4,000 SF / 296 CY) to the paver stones in the channel bottom.

(4) Downstream Low Flow Channel: Remove sediment and vegetation to the channel bottom to establish a low flow channel on the north side of the stream approximately 10 by 140 feet (1,400 SF / 104 CY) to connect the outfall at Quince Court. The low flow channel will be established to follow the natural contours of the streambank to ensure the ability for the low flow channel to naturally meander within the reach. The outfall at Quince Court was connected across the channel to the southern low flow channel in 2019. This work will ensure the outfall which often backs up is cleared and will create additional connectivity to allow for positive flow to continue downstream during storm events and prevent back up of stormwater into Quince Court and Heather Lane during storm events.

Debris and sediment removal will be performed from the top of bank with an excavator, loader, dump truck and vacuum truck which will be staged outside of the channel. The work area will be accessed from Heather Lane and the adjacent pedestrian trails/access roads. Equipment will be staged outside of the stream with the exception of equipment used to install and maintain a dewatering system and to remove sediment within the culvert (for access and staging see Figures in Appendix A).

Depending on saturation and moisture rates, sediment and vegetation spoils will be staged to dry in the central region of the golf course to the west. This area has been used in previous years as a sediment/vegetation drying site (see figures Appendix A).

A clear water diversion consisting of a gravel bag berm wrapped in visqueen plastic will be installed upstream of Heather Lane bridge prior to work. Flows will be temporarily diverted through a pipe downstream of the project area to maintain flow. The site will be dewatered and surveyed by qualified biologists who will inventory and relocate all aquatic life that is observed during dewatering. Diversion activities will be conducted in accordance with California Stormwater Quality Association (CASQA) NS-5: Clear Water Diversion and SMP BMP BR-4, Impact Avoidance and Minimization During Dewatering.

The details and mapping presented in this Notification are preliminary and a full design set is being generated by the City.

Site 60 – Bluebell Drive Culvert Sediment, Vegetation and Debris Management along Arroyo Las Positas

Proposed work at Site 60 consists of managing debris, vegetation, and sediment at the box culvert structure of the Bluebell Drive culvert along Arroyo Las Positas. Work was done at this site in 2017, 2019, and 2021 however the entirety of the culvert has never been succesfully cleared. Work in 2019 and 2021 cleared sediment from two of the five box culverts and the southern concrete apron.

Sediment remains in three of the five boxes and on portions of the upstream concrete aprons. This work is focused on removing sediment and vegetation to maintain the connectivity of the low-flow channel and keep the stream functioning and to reduce flooding. Cattail, tule, and Nasturtium species reestablish annually in the channel and impact storm flow conveyance at this location. The culvert area also catches debris and trash from upstream non-point sources.

The proposed work will encompass one day of work and includes temporary impacts associated with sediment, vegetation and debris removal. The stream is perennial in this stretch and the site will be dewatered to conduct project activities (see dewatering plan below). At the culvert, a concrete apron with wingwalls lines the channel bed and banks 20-feet on both sides of the bridge where the channel is 75-feet wide (top-of-bank to top-of-bank).

Debris, sediment and vegetation removal will be conducted in-stream for 130 LF with an excavator, small hand-push compact track loader (under culvert), dump truck and vacuum truck within 3,400 SF / 250 CY. The work area will be accessed from Bluebell Drive and the adjacent pedestrian trails (for access and staging see Figures in Appendix A).

Depending on saturation and moisture rates, sediment and vegetation spoils will be staged to dry in the central region of the golf course to the west. This area has been used in previous years as a sediment/vegetation drying site (see figures Appendix A). A clear-water diversion consisting of a gravel bag berm wrapped in visqueen plastic will be installed prior to work. Flows will be temporarily diverted to the southern side of the stream to maintain flow. The site will be dewatered and surveyed by qualified biologists who will inventory and relocate all aquatic life that is observed during dewatering. Diversion activities will be conducted in accordance with California Stormwater Quality Association (CASQA) NS-5: Clear Water Diversion and SMP BMP BR-4, Impact Avoidance and Minimization During Dewatering.

Site 61 – Springtown Open Space Sediment and Vegetation Outfall Management along Unnamed Tributary to Arroyo Las Positas

Proposed work at Site 61 will occur along a small drainage ditch near Golf Drive in the Springtown Open Space(former Springtown Golf Course). The drainage ditch connects to an unnamed tributary that discharges into the old Springtown golf course diversion pond and eventually connects to the Arroyo Las Positas. This ditch captures stormwater from the open space areas and neighborhood. Work was completed at this location as well as the downstream portions of Golf Creek Drive in 2020.

The proposed work will encompass one day of work and will include the removal of dense sections of cattail and sediment at the outfall as well as removal of cattails downstream for 70 LF totalling 880 SF to a depth of 24” (64 CY).

Work will be performed with an excavator and dump truck. Equipment and material staging will occur along the adjacent graveled access road/trail. Depending on saturation and moisture rates, sediment and vegetation spoils will be staged to dry in the central region of the golf course to the north. This area has been used in previous years as a sediment/vegetation drying site (for access and staging see figures in Appendix A).

This drainage ditch is intermittent from occassional urban runoff. Flows are nonexistent or much lower in the summer. However, if flowing water is present a clearwater diversion technique will be utilized, options include a filter fabric isolation barrier, or an impervious gravel bag berm will be installed along with downstream sediment control BMPs. Diversion activities will be conducted in accordance with California Stormwater Quality Association (CASQA) NS-5: Clear Water Diversion and SMP BMP BR-4, Impact Avoidance and Minimization During Dewatering.

Site 62 – Robertson Park Sediment and Vegetation Outfall Management at Arroyo Mocho Floodplain

Proposed work at Site 62 will consist of sediment and vegetation removal in the vicinity of an 18-inch storm drain outfall in the Arroyo Mocho floodplain. The outfall conveys storm drain flows into a drainage ditch that connects to the Arroyo Mocho. Work was conducted in 2017 to clear the outfall and v-ditch that connects to the Arroyo Mocho. Since then, sediment and vegetation (cattails) have accumluated around the outfall and restricted the flow from the outfall into the v-ditch.

The proposed work will be completed in one day and involve excavating sediment and removing vegetation from an approximately 5-foot by 5-foot area (24 SF, 1.5 CY) at the storm drain outfall to a depth of approximately 24 inches to restore flows from the outfall to the v-ditch.

The site will be accessed from the adjacent gravelled and disturbed parking lot and equipiment where equipment will be staged (for access and staging see Figures in Appendix A). Work will be conducted with an excavator from the disturbed habitat to the east of the outfall.

Site 63 – West of Robertson Park Vegetation and Debris Management at Outfall and Arroyo Road Bridge along Arroyo Mocho

This work at Site 63 was proposed in 2021 but was not implemented. The work consists of vegetation and debris management at a storm drain outfall that connects to the Arroyo Mocho downstream of Robertson Park. The outfall is positioned along the south mid-bank and is being affected by overgrowth of invasive Himalayan blackberry and associated downed woody debris. Work will occur in an approximately 3700 SF area where equipment will be operated to remove Himalayan blackberry and other downed woody debris to access and clean the outfall.

The proposed work will encompass one day of work and consists of removal of Himalayan blackberry thickets in order to remove the blockage of the outfall and will involve excavating sediment from an approximately 5-foot by 5-foot area (24 SF, 1.5 CY) at the storm drain outfall to a depth of approximately 24 inches. To reduce blackberry regrowth, herbicide will be applied directly to cut stumps per the SMP BMPs outlined in Chapter 7 of the SMP manual. Blackberry will be offhauled and properly disposed of, removed downed woody debris will be chipped on site and used for mulch along the trails. Downstream of the Arroyo Road bridge there are 6 dead and/or dying cottonwood trees that will be removed. They are on the banks of the stream, below the top of bank but outside of the active flow channel. The trees need to be removed to address public safety hazards as the trees have the potential to fall on the bridges and trails and could provide flood hazards if they fall within the active flow channel.

This work entails only invasive plant management and will enhance riparian habitat and local ecological function; therefore, the work is considered self-mitigating. Himalyan blackberry work will be conducted with mini excavator, loader, dump truck chainsaws, and hand tools. Tree removal will be conducted with hand tools and chainsaws to remove the trees. Trees will be chipped on site and placed in upland landscape areas adjacent to the trail. The work area will be accessed from the adjacent pedestrian trails (for access and staging see Figures in Appendix A).

Site 64 – Stanley Blvd Bridge and Old Railroad Bridge Sediment, Vegetation, and Debris Management along Arroyo Mocho

Proposed work at Site 64 will consist of sediment, vegetation, and debris removal from a concrete bridge apron between the Stanley Blvd. Bridge and the decommissioned railroad bridge. Work was completed at this site in 2017, 2019 and 2021; however, sediment, vegetation and debris accumulate annually at the site. The site needs to be routinely maintained due to complications with public safety around use of the site by homeless individuals when significant vegetation and debris are present. Scour pools are present on the downstream concrete apron where the apron connects to the natural channel bed. In 2021, quarter ton rip rap was installed in the western most scour pool and backfilled with gravel. This repair was successful in reducing additional scour and therefore additional rip rap is proposed to be installed to extend the scour pool repairs.

The proposed work will encompass one day of work and consists of removing sediment, debris and vegetation less than 4” DBH that establishes on the concrete apron. Approximately 50 CY of vegetation and debris will be removed. In addition to the concrete apron maintenance, 25 CY of native course gravel fill from upstream projects or staged material from previous projects and additional 25 CY of quarter ton rip rap will be placed within the remaining scour pools that have formed at the toe of the concrete apron from the Old Railroad Bridge. In total the work along the apron and within the channel bed is estimated to account for 9,000 SF/ 100 LF (maximum) of temporary impacts and as-built conditions will be documented in the annual report.

Work will be conducted with a backhoe from the channel bed. The work area will be accessed from the eastern pedestrian trail (for access and staging see Figures in Appendix A). Vegetation will be chipped onsite and spread for upper terrace erosion control along the trail boundary, trash and debris will be off hauled and properly disposed. Dewatering is not expected to be necessary for work at this site. The Arroyo Mocho is naturally ephemeral and as of this report, Zone 7 does not plan to release aqueduct flows for groundwater recharge.

Site 66 –Rockrose Street Culvert and Outfall Debris and Sediment Management in Arroyo Mocho Low Flow Channel

Proposed work at Site 66 will consist of one day of work clearing downed woody debris, trash and sediment from the Arroyo Mocho low flow channel west of Rockrose Street in a residential neighborhood. Within this reach, a 42-inch concrete culvert travels under Rockrose Street. Two 12-inch concrete storm drains outfalls also connect at this location. These three structures convey flows into an approximately 80-foot by 20-foot settling area, which connects to another 42-inch concrete culvert approximately 50 feet downstream. This culvert connects the low flow channel to the Arroyo Mocho Zone 7 flood control channel (also known as the Stanley Reach) where it outfalls under a maintenance road/trail approximately 50 feet to the west.

The channel between the two 42-inch culverts is obstructed by downed woody debris, trash, leaf litter and sediment buildup within the channel that have the potential to obstruct flow as the debris and sediment mobilize during storm events. To prevent clogging of the western most culvert, sediment and debris removal will be conducted.

The work encompasses one day of work and extends approximately 100 feet downstream (west) from Rockrose Street. The proposed work consists of excavating an approximately 10-foot by 20-foot area (200 SF) at the outlet of the eastern 42-inch culvert to a depth of approximately 24 inches (15 CY); the two 12-inch storm outfalls will also be cleared. Further downstream at the western 42-inch culvert, an approximately 10-foot by 7-foot area (70 SF) at the inlet will also be excavated to a depth of 24 inches (5 CY). These two areas are assumed to be temporarily impacted. Instream impacts will occur associated with equipment movement between the two excavation locations. All excavation work will be conducted with an excavator and/or loader that will access the stream from the adjacent pedestrian trail. Equipment will stage outside of the creek on the trail and Rockrose Street (for access and staging see Figures in Appendix A). The adjacent riparian restoration area will be flagged and avoided. While water is not expected to be present at the time of work, the Zone 7 Water Agency has the ability to control flows through Site 8 and the timing of flows may be coordinated in advance of work, if necessary.

Site 68 – Laughlin Bridge Culvert Sediment and Vegetation Management along Altamont Creek

Proposed work at Site 68 consists of managing sediment at the box culvert structure of the Laughlin Drive Bridge along Altamont Creek. At the culvert, a concrete apron with wingwalls lines the channel bed and banks 20-feet upstream and 25-feet downstream of the bridge where the channel is 40-50-feet wide (top-of-bank to top-of-bank). Sediment build up has occurred within the box culvert with enough sediment present that a willow tree has established on the upstream concrete apron. This work is focused on removing the willow and sediment to keep the stream functioning and reduce flooding. Sediment has established however emergent vegetation is not present.

The proposed work will be completed in one day and includes temporary impacts associated with sediment and willow removal. The stream is seasonal in this stretch and it is assumed work can be conducted in the fall during dry conditions without the need to dewater. Sediment removal will be conducted with an excavator, small hand-push compact track loader (under culvert), dump truck and vacuum truck. Approximately 2,400 SF / 178 CY of sediment will be removed along 100 LF of the stream (maximum estimated temporary disturbance). The work area will be accessed from the adjacent pedestrian trail on the downstream portion and from adjacent private land on the upstream portions (for access and staging see Figures in Appendix A).

Excavated or vacuumed materials will be off-hauled and disposed of properly. The willow tree will be chipped on site with mulch being placed in appropriate upland areas along the pedestrian trail.

SMP Yearly Maintenance Site 1 (YM-1) – Holmes Street Bridge Annual Sediment Management along Arroyo Mocho

Proposed work at Site YM-1 will consist of sediment removal from the channel of the Arroyo Mocho, in an area extending 150 feet upstream and 170 feet downstream of the Holmes Street bridge, as well as the area of the channel beneath the bridge. Work within the proposed 2022 project site footprint has already occurred three times during the 2017, 2018, and 2020 SMP work cycles (see Table # 3). Annual sedimentation issues require sediment removal at this site to be performed on an annual basis which is why it is now included as a Yearly Maintenance Project.

This bridge is a concrete structure supported by piers. Continued sediment buildup around this bridge has restricted the storm flow conveyance in the channel and flood capacity of the stream. The design and location of the bridge structure has created conditions that causes excessive and chronic sediment deposition issues. The City recognizes the need for a long-term solution to sedimentation issues in this area and has commissioned a geomorphic study of possible comprehensive solutions. In the meantime, routine work is needed to maintain this site. The proposed work consists of excavating and grading gravel and debris from a 355 linear foot area under and surrounding the bridge (23,748 SF total) to a depth of 1 to 4-feet. Grading and channel restoration will be performed in an area extending approximately 150 feet upstream and 170 feet downstream and beneath the bridge (totaling 355 LF), to tie-in to the existing unmaintained stream section grades.

The 2022 work will occur within the same boundaries of the 2020 footprint, which accounted for the third temporary impact requiring state waters/riparian mitigation (SMP 8.2.1 Footnote 1). Final impacts will be calculated based on post-construction as-built disturbance dimensions.

Work will be conducted with a bulldozer and a compact track loader (under bridge) to push substrate to an area of the streambed that is accessible to an excavator operating from the top-of-bank. Equipment will not be operated or tracked across any surface water. The upland gravel areas adjacent to the access roads will be utilized for equipment and material staging. Sediment will be eventually transported to off-site staging locations or immediately repurposed at other sites, including SMP Sites 50 and 51A via dump trucks operating from the eastern or western paved trails. Any woody debris in the channel that is removed will be relocated in beneficial upland locations for habitat, or, if necessary, disposed as green waste at a landfill. Depending on saturation levels, the sediment removed from the channel will be temporarily stockpiled to dry in an upland area that is greater than 100-feet away from the streambank with sediment control BMPs. In total, approximately 700 CY of sediment will be excavated, this estimate is based on quantities removed in 2020.

Upstream and downstream areas of the reach are characterized predominantly by barren gravel and cobble with mixed annual grasses and wetland herbaceous species with no vegetation growth beneath the bridge. Once the work is complete, the channel will be graded so that the transition between excavated area and existing channel is smooth and continuous. Final impacts will be documented in the SMP Annual Report.

Water is not expected to be present at the time of work as the Zone 7 Water Agency controls flows along Arroyo Mocho and at this point they have no plans to release aqueduct flows in the summer. If dewatering is necessary, a cofferdam, pump, and re-routing pipeline will be used together to dewater the section of creek. Cofferdams will be constructed of gravel bags and plastic sheeting or, if necessary, an inflatable rubber cofferdam will be used. Pumping rates will be set to match inflows to the cofferdam with the downstream release of the diverted flows. The diverted flows will be released back into the creek as close as possible to the downstream end of the project area. Silt bags will be used at the end of the diversion pipe to reduce any sediment discharge downstream and to dissipate flow velocity and prevent scour at the discharge site. Dewatering activities will be conducted in accordance with BMP BR-4, Impact Avoidance and Minimization During Dewatering, to ensure impacts on water quality and special-status species are avoided or minimized to the maximum extent practicable.

Action Area Summary

Table 2 below summarizes the acreage of disturbance effects by site and project type. These impact areas are depicted in Attachment A, *Figures and Action Area Impact Maps.*

Table 2. Acreage of Direct Disturbance by Project Type

Site ID	Project Type		Total (Acres)
	Sediment/ Vegetation Removal (Acres)	Staging / Access[1] (Acres)	
Site 56	0.003	0.018	0.021
Site 57	0.087	0.129	0.216
Site 58	0.207	0.137	0.344
Site 60	0.078	0.000	0.078
Site 61	0.020	0.000	0.020
Site 62	0.001	0.000	0.001
Site 63	0.085	0.000	0.085
Site 64	0.207	0.000	0.207
Site 66	0.006	0.012	0.018
Site 68	0.055	0.042	0.097
Sub total	0.481	0.284	0.764
Site YM-1	0.545	0.367	0.912
Total all sites	1.026	0.651	1.677

[1] Staging and access is calculated only if it is a disturbance to potential CTS/CRLF breeding, non-breeding aquatic or upland dispersal habitat. All other staging and access will occur on previously highly disturbed areas, paved areas or existing access roads and it is not included in total disturbance acreage.

Wetlands and Non-Wetland Waters Mitigation for Proposed 2022 Projects

For information and details regarding Wetland and Non-Wetland Waters Mitigation for Proposed 2022 Projects, such as planting palettes and mitigation locations, please reference the “2022 Stream Maintenance Program Annual Notification Package” March 2022, Prepared by Swaim Biological, Inc..

Site-specific mitigation planting plans will be provided 30 days prior to plantings, and additional details will be available in the Annual Summary Report.

Timing of Work

Sediment and vegetation management can be classified as either actions that cause ground disturbance or actions that do not. All ground-disturbing maintenance activities that occur in the creek/channel or basin (e.g., sediment removal) will take place during the low-flow period (e.g., between May 1 and October 31). Ground-disturbing activities will be conducted only during periods of dry weather. Exposed soils in upland creek or channel areas will be stabilized through hydroseeding or with use of erosion-control fabric/blankets and will not include woven-grid matrix materials. Significant rainfall is defined as 0.5 inch of rain in a 24-hour period. Non-ground-disturbing work on the upper banks of creeks or channels (e.g., vegetation removal) may be conducted year-round. Non-ground-disturbing work may be conducted in the creek or channel zone beyond the primary maintenance work window of May 1 to October 31 if the creek or channel is dry (and with notification of and approval by the regulatory agencies).

Construction will take place between 7 a.m. and 8 p.m. within 30 minutes after sunrise and 30 minutes before sunset and will not occur in residential areas on Saturdays, Sundays, or City-observed state holidays, except during emergencies or with advance notification of surrounding residents (weekend or holiday work would be limited to between 9 a.m. and 3 p.m.). Therefore, project implementation is expected to be completed by the end of the summer/fall dry season.

Equipment and Personnel

Implementation of the project requires the use of the following equipment and personnel to carry out the corresponding project type, as shown in Table 3.

Table 3. Equipment Use and Frequency by Project Type (Estimate)

Project Type	Equipment/Fuel	Number of Pieces of Equipment per Day	Number of Personnel per Day
Sediment Removal	Loader/Diesel	1	3-5
	Backhoe/Diesel	1	
	Excavator/Diesel	1	
	Dump/haul truck/Diesel	1	
Vegetation Management	Crane boom truck/Diesel	1	3-5
	Loader/Diesel	1	
	Backhoe/Diesel	1	
	Dump/haul truck/Diesel	1	
Erosion Repair	Compactor/Diesel	1	3-5
	Loader/Diesel	1	
	Excavator/Diesel	1	

The project activities will generate spoils that will be repurposed onsite or hauled off-site. At Site 64, clean gravel from Site YM-1 may be moved downstream to fill in stream scour holes. The farthest distance that a haul truck would need to travel per trip is approximately 5 miles. Table 4, below, indicates the maximum number of daily trips and round trips per year that will be necessary, broken out by project type.

Table 4. Haul Truck Trip Frequency by Project Type

Project Type	Roundtrips per Year	Maximum Daily Trips
Sediment Removal	5	10
Vegetation Management	5	10

Sediment Management

Based on the volume of material removed and the sampling thresholds outlined in the SMP manual, and as specified by the Regional Water Quality Control Board (RWQCB) and CDFW, sediment sampling, analysis, and reporting is required for any sediment removal project in excess of 50 cubic yards that has not previously been sampled and tested. As per this specification, sediment sampling is required at Sites 61 and 68. The other projects exceeding 50 CY of sediment have been sampled in the past 5 years. Previous SMP Sediment Sampling reports are available upon request.

Material Disposal

Excavated sediment will be placed at specified locations or will be properly disposed as identified in the site descriptions.

Specifically, clean gravel and cobble removed from Arroyo Mocho at Holmes Street (Site YM-1) will be repurposed to backfill the scour depressions along Arroyo Mocho at Site 64 (Stanley Bridge). Sediment reuse activities will incorporate BMPs such as burrow avoidance, compaction, and hydro-seed application (upper bank). If excavated sediment, gravel, or substrate cannot feasibly be repurposed it will be taken via dump truck to either an upland area of the old Springtown golf course for Sites 58, 60 and 61, the interior upland area of Medeiros Parkway for Site YM-1, the upland gravel roadway at Stanley Blvd near Site 64the Robertson Park Rodeo Grounds parking area, Zone 7 staging areas, or the City of Livermore's Water Resources Department yard (101 Jack London Blvd) for staging and later alternative repurposing. Trash and non-beneficial debris will be taken to Altamont or Vasco Landfill. Debris generated as part of vegetation management projects may be relocated in upland areas for habitat enhancement or chipped and/or lopped and used as erosion control on upland sites or taken to landfills for green-waste composting.

Conservation Measures

The City is requesting that the 2022 SMP Projects be appended to the EACCS BO; therefore, the project will be consistent with the EACCS and EACCS BO AMMs. There are additional AMMs from the SMP which are included below and will also be required for implementation of the projects. Taken together, the EACCS and SMP AMMs provide a comprehensive and integrated approach to avoiding and minimizing impacts resulting from project implementation. The Conservation Measures from the EACCS BO and SMP are included in Attachment B.

In some cases, the general EACCS AMMs overlap with SMP AMMs. The overlap does not result in inconsistencies in how each AMM would be applied and as such, both are maintained and will be applied as appropriate. The EACCS AMMs specific to species avoidance will be used instead of species AMMs in the SMP. Table 5 provides a summary of all of the AMMs and identifies at which sites they will be applied.

Table 5. Conservation Measures Applied by Site

BMP	Name	56	57	58	60	61	62	63	64	66	68	YM-1
	EACCS Avoidance and Minimization Measures											
General												
GEN-01	Environmental Sensitivity Training	X	X	X	X	X	X	X	X	X	X	X
GEN-02	Environmental Tailboard Trainings	X	X	X	X	X	X	X	X	X	X	X
GEN-03	Contractor Compliance	X	X	X	X	X	X	X	X	X	X	X
GEN-04	Prohibited Activities	X	X	X	X	X	X	X	X	X	X	X
GEN-05	Staging	X	X	X	X	X	X	X	X	X	X	X
GEN-06	Off-road Travel	X	X	X	X	X	X	X	X	X	X	X
GEN-07	Speed Limits	X	X	X	X	X	X	X	X	X	X	X
GEN-08	Vehicle Refueling	X	X	X	X	X	X	X	X	X	X	X
GEN-09	Vehicle Washing	X	X	X	X	X	X	X	X	X	X	X
GEN-10	Invasive Plants	X	X	X	X	X	X	X	X	X	X	X
GEN-11	Wildlife Entrapment	X	X	X	X	X	X	X	X	X	X	X
GEN-12	Erosion Control Measures	X	X	X	X	X	X	X	X	X	X	X
GEN-13	Material Stockpiling				X	X	X	X	X	X		X
GEN-14	Minimal Grading	X	X	X	X	X	X				X	
GEN-15	Project Construction Boundaries	X	X	X	X	X	X	X	X	X	X	X
GEN-16	Wet Weather Work-stop	X	X	X	X	X	X	X	X	X	X	X
GEN-17	Open Trenches											
Species-Specific												

BMP	Name	56	57	58	60	61	62	63	64	66	68	YM-1
AMPH-1	California red-legged frog	X	X	X	X	X	X	X	X	X	X	X
AMPH-2	California red-legged frog California tiger salamander	X	X								X	
Livermore SMP Avoidance and Minimization Measures												
General Impact Avoidance and Minimization												
GEN-1	Maintenance Work Window	X	X	X	X	X	X	X	X	X	X	X
GEN-2	Staging and Stockpiling of Materials	X	X	X	X	X	X	X	X	X	X	X
GEN-3	Creek and Channel Access	X	X	X	X	X	X	X	X	X	X	X
BR-1	Area of Disturbance	X	X	X	X	X	X	X	X	X	X	X
BR-2	Pre-Maintenance Educational Training	X	X	X	X	X	X	X	X	X	X	X
BR-4	Impact Avoidance and Minimization During Dewatering	X	X	X	X	X	X	X	X	X	X	X
BR-6	On-Call Biologist	X	X	X	X	X	X	X	X	X	X	X
BR-8	Nesting Migratory Bird and Raptor Pre-maintenance Surveys	X	X	X	X	X	X	X	X	X	X	X
Hazardous Materials Safety												
HAZ-1	Spill Prevention and Response Plan	X	X	X	X	X	X	X	X	X	X	X

BMP	Name	56	57	58	60	61	62	63	64	66	68	YM-1
HAZ-2	Equipment and Vehicle Maintenance	X	X	X	X	X	X	X	X	X	X	X
HAZ-3	Equipment and Vehicle Cleaning	X	X	X	X	X	X	X	X	X	X	X
HAZ-4	Refueling	X	X	X	X	X	X	X	X	X	X	X
HAZ-5	On-Site Hazardous Materials Management	X	X	X	X	X	X	X	X	X	X	X
Vegetation Management												
VEG-1	Removal of Existing Vegetation	X	X	X	X	X	X	X	X	X	X	X
VEG-2	Invasive Plant Species Control Measures	X	X	X	X	X	X	X	X	X	X	X
VEG-5	Planting and Revegetation After Soil Disturbance	X	X	X	X	X	X	X	X	X	X	X
Water Quality and Creek/Channel Protection												
WQ-4	Dechlorination Procedures for Discharges into Creeks and Channels			X	X	X					X	X

Additional Conservation Measures

1. A USFWS approved biologist will survey mitigation planting sites in advance of planting to confirm that no California red-legged frogs are present and that the planting of trees and wetland plants do not degrade potential breeding habitat. If there is ground disturbing activities associated with mitigation plantings (e.g., irrigation), a biologist will monitor the mitigation sites during such activities.

Chapter 3
Environmental Baseline

Action Area and Site Specific Environmental Baseline

The environmental baseline for the EACCS boundary is incorporated here by reference. All project sites are located in and around the City of Livermore in Alameda County. This region is characterized by rolling hills interspersed with low-lying valleys with elevations up to 1,400 feet above sea level. The residential and urban areas within the valleys are surrounded by grazed non-native annual grassland interspersed with seasonal drainages, intermittent creeks, and seasonal pools or ponds. The action area is located within the EACCS's Conservation Zone 2 (Sites 62, 63, 64, 66, YM-1), and Conservation Zone 4 (Sites 56, 57, 58, 60, 61 and 68).

Land Cover Types

The eight (8) sites support eight land cover types including upland access over mixed land cover types including ruderal, annual grassland and previously disturbed and developed areas. Staging and access areas are identified in the individual project descriptions and in the figures provided in Appendix A. Land cover types identified in this biological assessment are based on the vegetation community mapping completed for the EACCS. The greater surrounding area also supports valley sink scrub, alkali wetland, urban-suburban, and rural residential land cover types; these habitats will not be affected. Land cover types as described in EACCS that potentially provide habitat for listed species within the action area include the following:

- California annual grassland – Foraging and movement habitat for Central California tiger salamander and California red-legged frog;
- Mixed riparian forest and woodland – Foraging and movement habitat for California red-legged frog and Central California tiger salamander;
- Mixed willow riparian scrub – Foraging, movement, and breeding habitat for California red-legged frog;
- Riverine stream – Foraging, movement, and breeding habitat for California red-legged frog;
- Perennial freshwater marsh – Foraging and movement for Central California tiger salamander and California red-legged frog; marginal breeding habitat for California red-legged frog, Central California tiger salamander. Marginal habitat for longhorn fairy shrimp and vernal pool fairy shrimp.
- Urban/suburban area – Marginal foraging and movement habitat for Central California tiger salamander and California red-legged frog;
- Ruderal - Foraging and movement habitat for California red-legged frog and Central California tiger salamander;

- Golf course or urban park – Marginal foraging and movement habitat for Central California tiger salamander and California red-legged frog. Ponds on golf courses may provide marginal breeding habitat if non-native predators are not present.

Project Impacts on Jurisdictional Areas

The 2022 stream maintenance projects will result in impacts to waters of the US and State as summarized in Table 2. Several of the 2022 stream maintenance projects will result in impacts on waters of the U.S. and State. The SMP project sites generally fall into one of three categories: other waters at the unnamed basins in The Bluffs neighborhood stormwater basin system which is identified in the SMP manual as part of the Bear Creek Basins system, other waters and in-channel wetlands within Arroyo Las Positas, and other waters and mixed riparian woodland resources within the Arroyo Mocho. These features are described in further detail in the “Aquatic Resources Delineation Report for the Livermore 2022 SMP”, prepared by Swaim Biological, Inc. Representative photographs are provided in Attachment B.

Land Ownership

The City of Livermore currently owns and maintains reaches of covered creeks and channels for flood control and storm drain management purposes, as well as for fire hazard reduction. Livermore Area Recreation and Park District (LARPD) and Zone 7 Water Agency (Zone 7) owns and maintains other portions of these creeks and channels as well as other creeks in the region. Zone 7 regularly performs routine channel maintenance, including activities similar to those proposed in the project. The ongoing City of Livermore and Zone 7 stream maintenance activities and other development projects in the Livermore area may contribute to increased hydraulic capacity in Eastern Alameda County; however, state and federal regulations on construction activities and stormwater management serve to limit such increases and associated adverse effects on water quality. Thus, there is already a history of disturbance to the area’s sites proposed for project activities.

Regional Environmental Baseline

Development projects currently in varying stages of development within the Livermore area include commercial, industrial, office, mixed-use, hotel, and residential developments and as a result there has likely been a loss of federally-listed species and their habitat within the City of Livermore and Alameda County. Development, associated infrastructure, and the resulting habitat fragmentation in the action area are widespread and considered the primary or one of the primary threats to most of the listed species in the area action. The existing disturbed character of much of the landscape within the action area in combination with the limited amount of undeveloped habitat in the area surrounding the project sites, reduces the likelihood that federally-listed species would occur in most of the action area where they have not been documented in the past.

Species Status and Critical Habitat in the Action Area

In December 2022 through March 2022, Swaim Biological, Incorporated biologists Leslie Koenig and Natasha Dvorak, conducted reconnaissance level field surveys to evaluate habitat conditions within the

2022 SMP Project locations. Additionally, a desktop evaluation was conducted reviewing the following resources for technical information related to species occurrences within the Action Area:

- USFWS website, Sacramento district: Official lists of federal candidate, proposed, threatened, and endangered plant and animal species having the potential to occur in the review area was generated from the Information for Consultation and Planning (IPaC) online project planning tool (US Fish and Wildlife Service 2022).
- California Natural Diversity Database search within 5 miles of the project locations (California Department of Fish and Wildlife 2022)
- EACCS (ICF International 2010) and City of Livermore Stream Maintenance Program Focal Species lists

California Red-Legged Frog

Status

Refer to page 28 of the *EACCS BO* (U.S. Fish and Wildlife Service 2012a) for information on status of the species within the EACCS boundary. Refer to page 32 of the EACCS Biological Opinion for information on that status of its Critical Habitat.

The action area is located within the EACCS's Conservation Zone 2 (Sites 62, 63, 64, 66, YM-1), and Conservation Zone 4 (Sites 56, 57, 58, 60, 61 and 68). The EACCS identifies the protection of designated critical habitat for the California red-legged frog in Conservation Zone 4. Protection of California red-legged frog habitat and implementation of restoration opportunities along the Arroyo Mocho (location of Sites 62, 63, 64, 66, YM-1) to support the California red-legged frog are conservation priorities in Zone 2.

Critical Habitat

Critical habitat has been designated for California red-legged frog, but there are no units overlapping with the proposed maintenance sites. Designated critical habitat for the California red-legged frog (Mount Diablo unit, subunit CCS-2B) is present in the northern portion of the study area near Site 56 and 68. California red-legged frog subunit CCS-2B is located immediately north and east of The Bluffs neighborhood, near these project sites but does not overlap with any of the sites.

Potential to Occur in the Action Area

There are 113 CNDDB occurrences of California red-legged frog within five miles of all project sites (CDFW 2022). Within the action area, the California red-legged frog could be present at all sites included in this assessment although based on the last five years of work within the Arroyo Mocho the likelihood of encountering a frog is reduced as discussed below. Potential breeding habitat is located within the two of the Bear Creek Basins and north, west and east of The Bluffs neighborhood (Site 56), within the Saddleback Basin (Site 57 A, B, C), within Altamont Creek (Site 68) and within the Arroyo Las Positas at the former golf course in Springtown (Site 58, 60, 61), where open water habitat is present. Non-breeding aquatic habitat and upland dispersal habitat is present at the other sites along the Arroyo Mocho (Site 62, 63, 64, 66, YM-1) as discussed below.

Site 56 and 68, Bear Creek Basins in The Bluffs Neighborhood and Laughlin Road

There are 21 CNDDB occurrences within two miles of Sites 56 and 68. The nearest record (Occurrence number 81) is located in Altamont Creek near Laughlin Road, 0.4 miles south of Site 56 and adjacent to Site 68 where four adult red-legged frogs were observed in November 1981. Potential breeding habitat is located approximately northeast in Frick Lake and within suitable ponds in Bear Creek Basin-2. Numerous stock ponds occur within the extensive tracts of open grassland habitat that surround the project sites. The nearest recorded breeding pond occurs 1.4 miles northeast of Site 56, within a stock pond on East Bay Regional Park District owned lands in Brushy Peak Regional Preserve (Occurrence number 377). Few records of red-legged frogs occur in the immediate vicinity of Site 56; however, dispersing juveniles and adults have been recorded northwest of the site in Altamont Creek tributaries and near Dalton Ave.

Within Site 56, open grassland habitat associated with the storm drain outfalls and stormwater basin provide suitable dispersal habitat. These areas do not retain water of sufficient depth or length of time to support breeding by this species, and no burrows were observed in or near the work areas. Non-native grasslands associated with these basins provide potential upland dispersal habitat for the California red-legged frog. Staging and access for Site 56 will occur within the stormwater basin which does provide potentially suitable upland dispersal habitat. Access for Site 56 will occur via the existing access road, that travels behind the houses to access the stormwater basins. Staging and ground disturbance at the outfall will occur within suitable upland habitat for the California red-legged frog.

Site 57, Saddleback Basin

There are 20 CNDDB occurrences within two miles of Site 57. The closest observation (Occurrence Number 970) is from an adult that was observed along an exclusion fence at the Dalton Reservoir Replacement Project immediately to the north of Site 57 in 2019 (CNDDB 2022). Potential breeding habitat is located in the Saddleback wetland, at the Springtown Alkali Sink and at stockponds located to the north. Impacts within the grassed swales at Site 57, areas with cattails and tules provide marginally suitable non-breeding aquatic habitat, with potential foraging and refugia habitat. Impacts during sediment and vegetation activities including overland access in adjacent grasslands have the potential to impact upland dispersal habitat for the California red-legged frog.

Site 58, 60 and 61, Arroyo Las Positas

There are 11 CNDDB occurrences within two miles of Site 58, 60 and 61. There is a recent observation immediately downstream of Site 60 at the confluence of Altamont Creek and Arroyo Las Positas where a great egret was observed predating on a California red-legged frog in 2021 (Field Survey Form END21F0001). The nearest CNDDB record within the current database is located approximately 0.6 mile northeast of Site 58, where three egg masses and a dead adult frog were observed along a narrow, meandering channel with cattails and sedimented bottom that is disconnected from Altamont Creek (Occurrence number 1427). Potential breeding habitat is located approximately 0.6 mile west of Site 58, where open water habitat is present at the inlet to the former golf course diversion pond and within open water habitat within the Arroyo Las Positas at both sites and pools upstream and downstream. Records in and near the Livermore urban boundaries document habitats that are marginalized by urban development and the presence of non-native predators including bullfrogs, crayfish, mosquitofish and non-native minnow species.

Within Site 58, 60 and 61, areas with cattails and tules provide marginally suitable non-breeding aquatic habitat, with potential foraging and refugia habitat. There are open water patches that could potentially support breeding, however, there are known predators within this location based on previous work at this site. Adult, juvenile and tadpole bullfrogs and non-native fish (carp, goldfish) have been captured and euthanized at Site 58. Native fish (California hitch) have also been captured and relocated during previous work at Sites 58 and 60. Staging and access areas for these sites will occur on the paved surfaces of Heather Lane, Bluebell Drive and the adjacent trail. Access on existing graveled roads will occur for access to the drying site and Site 61. Suitable habitat for the California red-legged frog is present within the stream channel. Non-native grasslands associated with the former golf course provide potential upland dispersal habitat for the California red-legged frog with rodent burrows present.

Arroyo Mocho: Sites 62, 63, 64, 66, and YM-1

There are two CNDDB occurrences within two miles of Sites 64, 66 and YM-1. Both records are located north of I-580, one along Cayetano Creek (Occurrence number 229), and the other in grasslands east of North Livermore Road (Occurrence number 297). These records are separated from the work areas by considerable development and I-580. The nearest record south of I-580 is from 1999 and is located along the Arroyo Las Positas within the Las Positas Golf Course (Occurrence number 227) which is not hydrologically connected and separated by development. On-site habitat within the channel provides marginal, non-breeding, open water habitat when flow is present. The flow within the Arroyo Mocho at these sites is controlled by Zone 7 Water releases from the South Bay Aqueduct. Potential open water habitat is typically not present throughout the breeding season. When water is present, it is subject to flashy flows and lacks sufficient depth or duration to support California red-legged frog breeding.

California red-legged frogs are known to occur upstream in agricultural and rangeland areas and downstream of the urbanized stretch of the Arroyo Mocho where these projects occur. There are no known suitable breeding sites within dispersal distance of these projects. During work within the Arroyo Mocho over the last five years under the SMP addressing projects along this stream in Robertson Park, Medeiros Parkway, Holmes Street Bridge and Stanley Bridge, no California red-legged frogs have been observed and no suitable breeding habitat has been observed. The riverine stream habitat present at all four sites along the Arroyo Mocho could serve as non-breeding aquatic habitat when water is present and refugia/dispersal habitat when water is not. However, the lack of suitable breeding habitat within dispersal distance, lack of observations within the stream during project activities the potential for direct encounter of the species during the time periods that work will occur (in the dry during August to October) is low.

Access to these sites will occur along paved recreation or maintenance trails. These trails are considered developed and do not provide suitable habitat for the California red-legged frog. Staging and access that occurs overland within the ruderal and grassland habitats in the riparian corridor, may provide upland dispersal habitat for the California red-legged frog, however, direct impacts to the species at these locations will be avoided through the implementation of avoidance and minimization measures identified in the EACCS BO and the SMP.

Summary of California Red-Legged Frog Potential to Occur

Based on the documented presence of California red-legged frogs in the area, the habitat within and adjacent to the action area, and the biology and ecology of the California red-legged frog, this Biological Assessment presumes that California red-legged frogs are likely to be present in the action area at Sites 56, 57, 58, 60, 61 and 68.

At Sites56 and 68 near the Bear Creek Basins, Site 57 at Saddleback Basin and Site 58, 60, and 61 within the Arroyo Las Positas and unnamed tributaries in the Springtown area, impacts at these project sites will occur within breeding, non-breeding aquatic, and upland dispersal habitat. The proposed effect determination for the work activities at Sites 56, 57, 58, 60, 61 and 68 for California red-legged frog is *May Affect, Likely to Adversely Affect (LAA)*.

At Sites 62, 63, 64, 66, and YM-1 along the urbanized center of the Arroyo Mocho, impacts at project sites will occur within potentially suitable habitat, however, the potential for the species to occur during work periods is low based on the proposed project activities and work period restrictions. The proposed effect determination for the work activities at Sites 62, 63, 64, 66, and YM-1 for California red-legged frog is *May Affect, Not Likely to Adversely Affect (NLAA)* with implementation of avoidance and minimization measures. This is supported by previous determination under the FEMA Programmatic BO consultation for work at Holmes Street Bridge along the Arroyo Mocho in 2020 and the 2021 SMP BO Appendage determination that also resulted in a NLAA determination.

Acreages of impacts by habitat type located at each site is displayed in Table 6.

Table 6. California red-legged frog Habitat Types within Project Sites

Site ID	Habitat Type (Acres)			Total (Acres)
	Breeding	Non-breeding aquatic	Upland Dispersal	
Site 56	--	--	0.021	0.021
Site 57	--	--	0.216	0.216
Site 58	--	--	0.133	0.133
Site 60	--	0.173	--	0.173
Site 61	--	0.020	--	0.020
Site 62	0.000	--	0.001	0.001
Site 63	0.000	0.000	0.085	0.085
Site 64				
Site 66				
Site 68				
Sub total	0.000	0.193	0.455	0.648
Site YM-1	0.000	0.545	0.367	0.912
Total all sites	0.000	0.738	0.822	1.560

Central California Tiger Salamander

Status

Refer to page 33 of the *EACCS BO* (U.S. Fish and Wildlife Service 2012a) for information on status of the species within the EACCS boundary.

The action area is located within the EACCS's Conservation Zone 2 (Sites 62, 63, 64, 66, YM-1), and Conservation Zone 4 (Sites 56, 57, 58, 60, 61 and 68). The EACCS identifies the protection of breeding habitat for Central California tiger salamander as a conservation priority in Conservation Zone 4, and the protection of Frick Lake and surrounding uplands in Conservation Zones 4, and protection of vernal pool species recovery units in Conservation Zones 4. Protection of vernal pool habitats (utilized by Central California tiger salamander) is the only conservation priority in Zone 2 and would help in protecting habitat for this species. Impacts to this species from project activities in the action area will be avoided through the implementation of all appropriate EACCS and SMP Conservation Measures (see Table 5).

Critical Habitat

Critical habitat has been designated for California tiger salamander, but there are no units overlapping with any of the proposed maintenance sites.

Potential to Occur in the Action Area

Potential habitat is present at Sites 56, 57, and 68 and to a lower extent, Sites 58, 60 and 61. The remaining sites are not within suitable habitat and are therefore not discussed further.

There are 80 presumed extant records within the California Natural Diversity Database (CNDDB) records within five miles of Sites 56, 57, and 68. The presence of California tiger salamander within the BSA is well documented.

Bear Creek Basins and Altamont Creek

CNDDB Occurrence Number 753 (formerly 916[1]) covers the project areas for Site 56 and includes Frick Lake, the Bluffs development including all storm basins within it and both sides of Laughlin Road. The occurrence is 1200 feet northwest of Site 68. The record includes five California tiger salamander found in swimming pools in 2002 and 2013, documented larvae in Frick Lake in 2015 and within a storm basin where 20-50 larvae were encountered in 2017 as by-catch during large branchiopod surveys. The storm basin where California tiger salamander larvae were observed in 2017 is the same basin (BS-1.6) as Site 48. A roadkill California tiger salamander was encountered in February 2021 by SBI biologists on Laughlin Road (SBI 2021).

[1] CDFW updated CNDDB records for California tiger salamander in 2021 separating out occurrence numbers based on the Distinct Population Segments. When this was completed, it resulted in changed occurrence numbers for species records. The former record number has been included as it was previously referenced in other application materials related to the SMP.

Saddleback Basin

CNDDB Occurrence Number 14 and 1172 are immediately adjacent to the grassed swale features within the Saddleback Basin. Occurrence 14 includes records of breeding and adults from 1993 to 2019. The 2019 observation includes a roadkill CTS that was found in the northern most culvert at Site 57C along Ames Street. A total of 14 CTS adults (10 alive, 3 dead) have been observed in 2019, 2020 and 2021 during rain events along Ames Street by SBI biologists. Occurrence 1172 includes five CTS that were encountered during the Dalton Reservoir Replacement project in 2019 and 2020.

Arroyo Las Positas: Sites 58, 60 and 61

There are five presumed extant records within two miles of Sites 58, 60 and 61. The nearest extant record is from the Springtown Preserve area owned and managed by the City of Livermore and includes observations from the 1990's. This alkali sink habitat provides vernal pool habitat to support California tiger salamander breeding. The aquatic habitat within the Arroyo Las Positas near Sites 53 and 54 does not provide suitable breeding habitat for California tiger salamander. Grassland habitat is present within access areas for Site 54 where ground squirrel burrows present, however, the potential for them to support California tiger salamanders is considered low due to the history of disturbance and lack of suitable breeding habitat within dispersal distance of the site, and urban development. Impacts will be minimized through avoidance and minimization measures including having a qualified biologist conduct focused ground squirrel burrow surveys to flag burrows for avoidance prior to implementation. This will prevent crushing or burying any burrows that could serve as potential habitat.

Summary of California Tiger Salamander Potential to Occur

Based on the documented presence of California tiger salamander in the area, the habitat within and adjacent to the action area, and the biology and ecology of the California tiger salamander, this Biological Assessment presumes that California tiger salamander are likely to be present in the action area at Sites 56, 57, and 68 and impacts at these project sites will occur within upland dispersal habitat. The proposed effect determination for the work activities at Sites 56, 57 and 68 for California tiger salamander is *May Affect, Likely to Adversely Affect (LAA)*.

At Sites 58, 60 and 61 along the urbanized edge of the Arroyo Las Positas and former golf course in Springtown, impacts at project sites will occur within potentially suitable habitat, however, the potential for the species to occur during work periods is low based on the proposed project activities and work period restrictions. The proposed effect determination for the work activities at Sites 58, 60 and 61 for California tiger salamander is *May Affect, Not Likely to Adversely Affect (NLAA)* with implementation of avoidance and minimization measures.

Longhorn Fairy Shrimp

Status

Refer to the Longhorn Fairy Shrimp (*Branchinecta longiantenna*) 5-Year Review: Summary and Evaluation (U.S. Fish and Wildlife Service 2007a) for information on status of the species within the

EACCS boundary. Impacts to this species from project activities in the action area will be avoided through the implementation of all appropriate EACCS and SMP Conservation Measures (see Table 5).

The action area is located within the EACCS Conservation Zone 2 (Sites 62, 63, 64, 66), and Conservation Zone 4 (Sites 56, 57, 58, 60, 61). The EACCS identifies protection of vernal pool shrimp and longhorn fairy shrimp habitat, and vernal pool species recovery units, as priorities in Conservation Zone 4; surveys for occurrences of these species are also a priority in Conservation Zone 4. Protection of vernal pool habitat is a conservation priority in Zone 2.

Critical Habitat

Critical habitat has been designated for longhorn fairy shrimp, but there are no units in the vicinity of the proposed maintenance sites.

Potential to Occur in the Action Area

Potentially suitable habitat occurs in the vicinity of Sites 56 and 68. All other sites occur in stream reaches where ICF and/or Environmental Science Associates (ESA) have determined there is not suitable habitat and therefore are not discussed further.

There are three CNDDB records within five miles Sites 56 and 68 located in rock/sandstone outcrops from 1985, 2010 and 2011 (CDFW 2022). In the Livermore region, longhorn fairy shrimp are known only from small rock pools in limited locations on protected lands in Vasco Caves Regional Preserve and Brushy Peak Regional Preserve. This species is not expected to occur in stormwater basins in the Livermore Valley (ESA 2019).

In 2017, the City of Livermore had ESA complete focused habitat assessments to evaluate suitable habitat within the entire SMP area. In 2017, protocol level wet and dry surveys were completed for the City of Livermore by ESA for longhorn fairy shrimp presence in the SMP area in suitable habitat locations including the Bear Creek Basin BS-1(ESA 2017). Site 56 occurs in an unnamed basin which ESA determined, was not suitable habitat for longhorn fairy shrimp (ESA 2018, 2019).

Site 68 occurs within the AC-6 reach of Altamont Creek. Habitat assessments conducted in 2017 surveyed the entire reach and identified one pool (AC-6.1) within this reach. This pool is downstream of Site 68 and no suitable habitat was identified within the Site 68 project area. Subsequent surveys were conducted in pool AC-6.1 and no branchiopods were detected. Suitable habitat may be present upstream in reach AC-7 although the project extent has not been surveyed as it is on private land.

No longhorn fairy shrimp were found in any of the surveys completed in 2017 and Sites 56 and 68 do not provide suitable habitat requirements for longhorn fairy shrimp.

Based on the conditions noted above, this Biological Assessment is presuming that longhorn fairy shrimp are not likely to be present in the action area. The proposed effect determination for the work activities at Sites 56 and 68 for longhorn fairy shrimp is *No Effect*.

Vernal Pool Fairy Shrimp

Status

Refer to the Vernal Pool Fairy Shrimp (*Branchinecta lynchi*) 5-Year Review: Summary and Evaluation (U.S. Fish and Wildlife Service 2007b) for information on status of the species within the EACCS boundary. Impacts to this species from project activities in the action area will be avoided through the implementation of all appropriate EACCS and SMP Conservation Measures (see Table 5).

The action area is located within the EACCS Conservation Zone 2 (Sites 62, 63, 64, 66), and Conservation Zone 4 (Sites 56, 57, 58, 60, 61). The EACCS identifies protection of vernal pool shrimp and longhorn fairy shrimp habitat, and vernal pool species recovery units, as priorities in Conservation Zone 4; surveys for occurrences of these species are also a priority in Conservation Zone 4. Protection of vernal pool habitat is a conservation priority in Zone 2.

Critical Habitat

Designated critical habitat for vernal pool fairy shrimp (Unit 19C) is present in the northern portion of the SMP area. Critical Habitat Unit 19 totals 7,902 acres and contains vernal pool habitats within unique sandstone outcrops (US Fish and Wildlife Service 2006). These habitats include very small (less than 3.3 feet in diameter) clear water depression pools in sandstone outcrops which provide the necessary inundation to support vernal pool fairy shrimp. The unit represents the only known location that supports vernal pool fairy shrimp within sandstone outcrop pools. Unit 19 is comprised of three subunits in the general vicinity of Mount Diablo and Morgan Territory Regional Park (19A, 19B, 19C) and primarily consists of private land. Unit 19C is dominated by annual grasslands, and includes only a small percentage of urban and agricultural development (ICF International 2010). More than 95 percent of this unit includes undeveloped, natural land cover types.

Potential to Occur in the Action Area

Potentially suitable habitat occurs in the vicinity of Sites 56 and 68. All other sites occur in stream reaches where ICF and/or Environmental Science Associates (ESA) have determined there is not suitable habitat and therefore are not discussed further.

There are three CNDDB occurrences within five miles of the project sites and occur within North Livermore area – occurrences in the Springtown Alkali Sink, Frick Lake and rock outcrops located near the South Bay Aqueduct (CDFW 2022).

In 2017, the City of Livermore had ESA complete focused habitat assessments to evaluate suitable habitat within the entire SMP area. In 2017, protocol level wet and dry surveys were completed for the City of Livermore by ESA for vernal pool fairy shrimp presence in the SMP area in suitable habitat locations including the Bear Creek Basin BS-1 (ESA 2017).

Site 56 occurs in the unnamed basin which ESA determined, was not suitable habitat for vernal pool fairy shrimp (ESA 2018, 2019).

Site 68 occurs within the AC-6 reach of Altamont Creek. Habitat assessments conducted in 2017 surveyed the entire reach and identified one pool (AC-6.1) within this reach. This pool is downstream of Site 68 and no suitable habitat was identified within the Site 68 project area. Subsequent surveys were conducted in pool AC-6.1 and no branchiopods were detected. Suitable habitat may be present upstream in reach AC-7 although the project extent has not been surveyed as it is on private land.

No vernal pool fairy shrimp were found in any of the surveys completed in 2017 and Sites 56 and 68 do not provide suitable habitat requirements for vernal pool fairy shrimp.

Based on the conditions noted above, this Biological Assessment is presuming that vernal pool fairy shrimp are not likely to be present in the action area. The proposed effect determination for the work activities at Sites 56 and 68 for vernal pool fairy shrimp is *No Effect*.

Callippe Silverspot Butterfly

Status

Refer to the Callippe Silverspot Butterfly (*Speyeria callippe callippe*) 5-Year Review: Summary and Evaluation (U.S. Fish and Wildlife Service 2009a) for information on status of the species within the EACCS boundary. Impacts to this species from project activities in the action area will be avoided through the implementation of all appropriate EACCS and SMP Conservation Measures (see Table 5).

The action area is located within the EACCS Conservation Zone 2 (Sites 62, 63, 64, 66), and Conservation Zone 4 (Sites 56, 57, 58, 60, 61). The EACCS does not identify any priorities for Callippe silverspot butterfly in Conservation Zone 2 or 4 but does identify the need for surveys for occurrences of these species in other conservation zones.

Critical Habitat

Critical habitat has not been designated for Callippe silverspot butterfly.

Potential to Occur in the Action Area

There are no CNDDB occurrences in the study area (CDFW 2022) and none of the maintenance activity sites are within areas modeled as potential habitat in the EACCS (ICF 2010). The annual grassland present at or surrounding the 2022 project sites is highly unlikely to support the species due to their urban setting on a valley floor with flat topography. None of the Bay Area populations occur in similar habitat; host plants for Callippe silverspots tend to occur in hilly terrain. Sites within The Bluffs neighborhood and along the Arroyo Mocho do contain preferred nectaring plants, such as California buckeye (*Aesculus californica*) and thistles (*Centaurea* sp., *Carduus* sp. and *Cirsium* sp.).

Based on the conditions noted above, this Biological Assessment is presuming that Callippe silverspot butterfly are not likely to be present in the action area. The proposed effect determination for the work activities at all sites for Callippe silverspot butterfly is *No Effect*.

Alameda Whipsnake

Status

Refer to the Alameda Whipsnake (*Masticophis lateralis euryxanthus*) 5-Year Review: Summary and Evaluation (U.S. Fish and Wildlife Service 2011) for information on status of the species within the EACCS boundary. Impacts to this species from project activities in the action area will be avoided through the implementation of all appropriate EACCS and SMP Conservation Measures (see Table 5).

The action area is located within the EACCS Conservation Zone 2 (Sites 62, 63, 64, 66), and Conservation Zone 4 (Sites 56, 57, 58, 60, 61). The EACCS identifies protection of Alameda whipsnake habitat as a priority in Conservation Zone 4.

Critical Habitat

Critical habitat has been designated for Alameda whipsnake, but there are no units in the vicinity of the proposed maintenance sites.

Potential to Occur in the Action Area

There are four CNDDB occurrences of Alameda whipsnake within 5 miles of project sites with the nearest record being four miles north in Los Vaqueros Watershed (Occurrence Number 120) (CDFW 2022). Alameda whipsnake require scrub habitat and rock outcrops as their core habitat however, they use grassland, oak woodland and riparian areas for dispersal. There is no scrub habitat within the project sites and it is therefore not anticipated that Alameda whipsnakes are present at any of the project sites. Impacts to Alameda whipsnake will be avoided through the implementation of species-specific avoidance and minimization measures from the EACCS, which outline procedures for preconstruction survey prior to and during construction activities.

Based on the conditions noted above, this Biological Assessment is presuming that Alameda whipsnake are not likely to be present in the action area. The proposed effect determination for the work activities at all sites for Alameda whipsnake is *No Effect*.

San Joaquin Kit Fox

Status

Refer to the San Joaquin Kit Fox (*Vulpes macrotis mutica*) 5-Year Review: Summary and Evaluation (U.S. Fish and Wildlife Service 2010) for information on status of the species within the EACCS boundary. Impacts to this species from project activities in the action area will be avoided through the implementation of all appropriate EACCS and SMP Conservation Measures (see Table 5).

The action area is located within the EACCS Conservation Zone 2 (Sites 62, 63, 64, 66), and Conservation Zone 4 (Sites 56, 57, 58, 60, 61). The EACCS identifies protection and enhancement of linkages across Highway 580 and Vasco Road for San Joaquin kit fox as well as protection of lands within this region.

Critical Habitat

Critical habitat has not been designated for San Joaquin kit fox.

Potential to Occur in the Action Area

There are three occurrences of San Joaquin kit fox within five miles of the project sites (CDFW 2022). One occurrence is located in north Livermore east of Brushy Peak from 2002 (Occurrence Number 58) ; the second is located in the Altamont from 1989 along Flynn Road (Occurrence Number 43), and the third is located in the Altamont from 1989 near Vasco Road (Occurrence Number 63). San Joaquin kit fox occurs in numerous habitat types including grasslands, woodlands and wetlands but dens are typically constructed in relatively open, flat areas with short vegetation with friable soils (ICF International, 2010). The project sites do not occur on EACCS mapped potential core habitat for San Joaquin kit fox.

No dens of suitable size were observed during the baseline habitat assessment completed in December 2021 and March 2022. None of the 2022 project sites support open habitat suitable for the San Joaquin kit fox. Sites 56, 57, and 68 occur adjacent to open grasslands, however, work at this site will occur in stormwater basins surrounded by residential development, and the San Joaquin kit fox is not expected to den at this location. Impacts to San Joaquin kit fox will be avoided through the implementation of species-specific avoidance and minimizations measures from the EACCS, which outlines procedures for identifying and avoiding kit fox dens prior to and during construction activities.

Based on the conditions noted above, this Biological Assessment is presuming that San Joaquin kit fox are not likely to be present in the action area. The proposed effect determination for the work activities at all sites for San Joaquin kit fox is *No Effect*.

Palmate-Bracted Bird's Beak

Status

Refer to the Palmate-bracted bird's-beak (*Cordylanthus palmatus = Chloropyron palmatum*) 5-Year Review: Summary and Evaluation (U.S. Fish and Wildlife Service 2009b) for information on status of the species within the EACCS boundary. Impacts to this species from project activities in the action area will be avoided through the implementation of all appropriate EACCS and SMP Conservation Measures (see Table 5).

The action area is located within the EACCS Conservation Zone 2 (Sites 62, 63, 64, 66), and Conservation Zone 4 (Sites 56, 57, 58, 60, 61). The EACCS identifies protection of palmate-bracted bird's beak and its habitat as a priority in Conservation Zone 4.

Critical Habitat

Critical habitat has not been designated for palmate-bracted bird's beak.

Potential to Occur in the Action Area

There is one occurrence of Palmate-bracted bird's beak within five-miles of the project sites (CDFW 2022) in the Springtown Preserve near Sites 56, 57, 58, 60 and 61. Palmate-bracted bird's beak occurs in areas that are seasonally flooded, with saline-alkali soils, in lowland plains and basins, which include the edges of channels and drainages, alkali scalds, and grassy areas (U.S. Fish and Wildlife Service 2009b). The alkali species have the highest potential to occur near Sites 56, 57 and 68 which is adjacent to alkali scald habitat and Sites 58 and 60 along the Arroyo Las Positas which is east and south of the known occurrences at the Springtown Wetland Preserve. Previous surveys conducted in 2019 did not identify any palmate bracted bird's beak within or adjacent to the project area's located at Site 60.

Prior to project activities at 56, 57, 58, 60 and 61, a qualified botanist will conduct focused botanical surveys of the project site prior to the start of project activities for presence of this species. If the species is observed in or near the project site, the specimen(s) will be avoided, and the City will follow all necessary EACCS and SMP Conservation Measures.

Based on the conditions noted above, this Biological Assessment is presuming that Palmate-bracted bird's beak are not anticipated to be present in the action area. The proposed effect determination for the work activities at Sites 56, 57, 58, 60 and 61 for palmate bracted birds beak is *May Affect Not Likely to Adversely Affect (NLAA)* with implementation of avoidance and minimization measures.

Chapter 4
Effects of the Proposed Project

This chapter describes the potential direct, indirect, interrelated, interdependent, and cumulative effects of the proposed action on federally-listed species in the action area. Direct effects and indirect effects are discussed for each listed species. Interrelated and interdependent, growth-inducing, and cumulative effects are discussed at the end of this chapter. Figures depicting the extent of potential impacts at each maintenance site are provided in Attachment A.

Direct effects are defined as the direct or immediate effects of a proposed action on a species or its habitat. Direct effects can result from the action and can include the effects of interrelated and interdependent actions.

Indirect effects are caused by or result from the proposed action, are later in time, and are reasonably certain to occur. Indirect effects can occur outside the area directly affected by the action (U.S. Fish and Wildlife Service 1998).

Interrelated effects are from an interrelated action that is part of the proposed action and depends on the proposed action for its justification. *Interdependent effects* are effects from interdependent actions that have no independent utility apart from the action under consideration (U.S. Fish and Wildlife Service 1998).

Cumulative effects comprise the effects of future state, local, and private actions not involving a federal action that are reasonably certain to occur in the action area under consideration (U.S. Fish and Wildlife Service 1998).

Temporary effects are considered those where the disturbed area will be fully restored within 12 months of initial disturbance and where construction is also limited to the same 12-month period. The Programmatic Biological Opinion assumes that any temporary effects to vegetation or soil will be restored to current condition within 12 months and no further stream maintenance activities will occur. If similar stream maintenance activities occur to remove restored vegetation or soil in the same location, then this action is considered a permanent action.

Summary of Effects by Activity Type

The sediment and vegetation removal activities and their effects are consistent with those described in the EACCS BO. A brief summary of the sediment and vegetation removal effects for these project sites is described below. Refer to Tables 7 and 8 for a summary of permanent and temporary impacts on land cover types by site.

Sediment Removal

Temporary Effects

Overall, sediment removal activities would not significantly alter creek or stormwater basin function. Removal of fine sediment from the flood control basins or creek channel outfalls will improve water filtration and flow rates. As a result, storm-water basin ponding duration is anticipated to be lessened slightly and channel flows would be slightly increased.

Most effects from sediment removal will be temporary and localized as effects will be confined to the areas immediately surrounding culverts and target locations along streams. In addition, the time required to complete the work at each site will be short (approximately two weeks or less) and will occur during the dry season, when water levels are reduced or absent. In all areas except those involving placement of native gravel, most vegetation removed during stream maintenance activities is expected to reestablish to current conditions within a year.

Temporary creek and channel dewatering for sediment removal activities may adversely affect water quality and biological resources. Dewatering and construction activities would temporarily impact habitat for rare and listed species in and around all projects sites by temporarily impacting the streambed and bank and temporarily removing vegetation (willows and cattails). Dewatering is not anticipated at any sites at this time, however a dewatering plan has been outlined for all locations in the event it is required. This could temporarily increase turbidity in the water column surrounding the work site and encourage the transport of sediment downstream, degrading habitat quality for listed species. Once maintenance activities are completed, creek and channel flow would be restored and temporarily disturbed areas will be stabilized and returned to pre-project conditions within one year.

In-channel work could temporarily increase turbidity in the water column surrounding the work site and cause the transportation of sediment downstream that could adversely affect listed species habitat. Implementation of Livermore Stream Maintenance Program Conservation Measures (CM) 1 (maintenance work window), 2 (staging and stockpiling materials), 3 (creek and channel access), 6 (impact avoidance and minimization during dewatering) as well as General AMM Gen-12 through Gen-16 (addresses erosion control) will alleviate most of these effects.

Spills or leaking fuel or lubricants from equipment used in-channel or in-basin could temporarily or permanently contaminate water and/or the habitat; such spills and leaks could also harm maintenance workers and residents. These effects would be avoided or minimized by vehicle restrictions (in GEN-05, GEN-06, GEN-08, GEN-09), the requirement for a spill and prevention response plan (CM-9), required equipment and vehicle maintenance (CM-10), required equipment and vehicle cleaning (CM-11), limits on refueling 9 (CM-12), and requirements of on-site hazardous materials management (CM-13).

These temporary sediment and vegetation removal effects would be avoided or minimized through the conservation measures listed in the EACCS, the EACCS BO, and the Livermore SMP.

Permanent Effects

Sediment removal activities could adversely affect listed species' habitat through direct disturbance to the streambed and bank, in-channel vegetation removal, or channel dewatering. Some sediment removal would also remove vegetation that provides habitat for listed species; in nearly all instances where sediment is removed, growth of new vegetation within one year of disturbance should occur.

Vegetation Management

Temporary Effects

Vegetation management is generally categorized into three types of activities: vegetation removal, pruning, and planting. Methods for vegetation management vary, from the use of heavy machinery and chemical controls to selective tree pruning and hand weeding. These activities are focused on clearing over-grown vegetation or other debris that inhibits flow of channels or storm water drainage in basins.

Temporary effects from vegetation removal include canopy cover reduction, increased water flow, increased turbidity, and increased sediment loading; these effects should be gone within a year. Creek and channel vegetation removal at Site 51B is focused on maintaining the movement of water through the system and is expected to improve the channel flow through the work area. In-channel removal of vegetation is targeted at road crossings, culverts, and at storm drain outlets. Additionally, any vegetation removal work in the creek or channel that involves ground disturbance, such as root wad removal, may result in increased sediment loading to the creek, particularly if heavy equipment is used. Conservation measures and AMMs as described above for sediment removal will be required for any mechanized vegetation removal activities and sedimentation or erosion effects will be minimized and avoided. Vegetation management at Site 51B is targeted to maintain stream capacity and reducing fuel loads.

Planting activities will minimally affect creek, channel, or bank habitat because the majority of these activities are conducted by hand. If trenching is required for irrigation, an approved biologist will conduct pre-construction surveys and be present during construction. If trenches are not completed in one day, then they will be covered, or ramps provided within them, as specified in the EACCS BO AMMs. AMMs will be required for any mechanized vegetation removal activities and sedimentation and erosion control are minimized through measures listed above for sediment removal. Sedimentation from removal of vegetation on banks or in uplands will be minimized or avoided through CM-14 which requires revegetation, hydromulching, and erosion protection materials to reduce erosion from vegetation removal. Temporary effects from sediment loading and decreased water quality are mainly minimized by CM-1, which restricts the work window to the dry season.

Permanent Effects

Permanent effects from vegetation removal could result in the potential growth of invasive plants species and the potential for a small increase in channel flow. Vegetation removal, similar to sediment removal effects mentioned above, will improve the long-term infiltration, flow, and water quality. Invasive species management during project activities would minimize the invasion or re-invasion of invasive plant species such as cattails, pampas grass or giant reed (*Arundo donax*) and will also allow for replanting of native species. Revegetation activities as a result of CM-14 and CM-18 will minimally affect water quality or turbidly because the majority of these activities are conducted by hand.

Table 7. Temporary Impacts by Land Cover Type

Site ID	California Annual Grassland	Mixed Riparian Forest and Woodland	Perennial Freshwater Marsh	Pond	Riverine Stream	Ruderal	Sycamore Alluvial Woodland	Golf Course/ Urban Park	Developed (Urban-Suburban)	Total
Site 56						924				924
Site 57	3790				5600					9390
Site 58					9000	5972				14972
Site 60					3400					3400
Site 61					880					880
Site 62		24								24
Site 63		3700								3700
Site 64					9000					9000
Site 66		533			270					803
Site 68	1820				2400					4220
Site YM-1					31748	8000				39748
Total SF	5610	4257	0	0	62298	14896	0	0	0	87061
Total acres	0.129	0.098	0.000	0.000	1.430	0.342	0.000	0.000	0.000	1.999

Effects of Activities on Species

This section evaluates the effects of the 2022 SMP project sites on those species with potential to occur in the action areas at each project site location. Table 9 quantifies direct permanent and temporary impacts on potentially occurring federally-listed species by site. The details of those impacts are described for each species in the sections below. For the purposes of this Biological Assessment, direct impacts on listed species were quantified based on the acreage of impacted vegetation or sediment removal locations that may provide habitat for a given species. If a species has the potential to be present in a given project area, and full avoidance is not feasible, it is assumed that the full extent of the permanent or temporary impact on the affected land cover types would also apply to the species in question.

Construction activities could result in harassment, injury, or mortality of adults, young, and eggs of listed species on project sites through crushing, handling, fencing, sound, or vibration. These effects from construction equipment are consistent with those analyzed in the EACCS BO. The implementation of the Conservation Measures in the EACCS BO will minimize adverse effects to listed species during construction, but some harassment, injury, or mortality may still occur.

While project activities could directly result in the harassment and harm of listed species, the Livermore Stream Maintenance Program Conservation Measures and General Avoidance and Minimization Measures, the EACCS Species-specific Avoidance and Minimization Measures and General Avoidance and Minimization Measures, and the EACCS BO General Minimization Measures would help avoid and minimize the direct effects to listed species. As a result, harm and harassment of individuals from project maintenance or restoration activities would be minimized, but not fully avoided for California red-legged frog. Refer to the species-specific analysis below for more information for each species.

For listed species, Table 9 displays the permanent and temporary effects of the proposed project on species habitat. A more detailed description of project effects to each listed species is below.

Table 8. Permanent and Temporary Effects (acres) of the Proposed Projects on Species Habitat

Site ID	Species[1]					
	CRLF		CTS		PBBB	
	Perm	Temp	Perm	Temp	Perm	Temp
Site 56		0.021		0.021		A
Site 57		0.216		0.216		A
Site 58		0.344		A		A
Site 60		0.078		A		A
Site 61		0.020		A		A
Site 62		A				
Site 63		A				
Site 64		A				
Site 66		A				
Site 68		0.097		0.097		A
Site YM-1		A				
Total Acres	**0.000**	**0.776**	**0.000**	**0.334**	**N/A**	**A**

A = Suitable habitat present but effects will be avoided via implementation of avoidance and minimization measures or effects are discountable.

[1] Species abbreviations: CRLF = California red-legged frog, CTS = California tiger salamander, PBBB = Palmate bracted birds beak

California Red-Legged Frog and California Tiger Salamander

Direct Effects

Habitat-related effects on California red-legged frog and California tiger salamander will occur at Sites 56, 57, and 68. Temporary impacts to California red-legged frog and California tiger salamander in potentially suitable habitat will be addressed through avoidance and minimization measures including preconstruction surveys, burrow flagging and avoidance. Temporary impacts to California red-legged frog and California tiger salamander habitat are estimated to affect *0.776 acres* of California red-legged frog suitable breeding, non-breeding aquatic and upland habitat and California tiger salamander upland habitat, no impacts to breeding habitat for California tiger salamander will occur.

Habitat related effects on California red-legged frog only will occur at Sites 58, 60, 61, 62, 63, 64, 66 and YM-1. These include temporary effects on suitable aquatic and/or upland habitat associated with implementation, staging and access (Table 7).

Temporary habitat effects on California red-legged frog at sites will be addressed thorough avoidance and minimization measures including seasonal work period (work occurring August to October), working in dry conditions where feasible, preconstruction surveys by a Service approved biologist and full time biological monitoring during all construction related activities that occur within suitable habitats. When work cannot be conducted in dry conditions, anticipated at Sites 58, 60 and 61, all sites will be dewatered per SMP BMPs.

Temporary habitat effects to these species could occur where sediment removal and/or vegetation management activities disturb wetland and/or adjacent upland habitat that will be left to revegetate naturally (e.g., excavations not filled with rip-rap) or replanted with native vegetation (e.g., riparian trees and shrubs, native grass seed mix). Habitat that might provide forage, shelter, or protection from predators would not be available to frogs or salamanders during this time period and could increase the chance for predation or desiccation. Small mammal burrows providing upland refugia for frogs and salamander may also be affected during these activities and would have a similar effect on frogs and salamanders looking for shelter. Due to the temporary nature of the impacts it is anticipated new burrows would likely be created by onsite burrowing mammals within a year of activity completion. Implementation of SMP conservation measures 14 (Removal of Existing Vegetation), 15 (Invasive Plant Species Control Measures), and 17 (Planting and Revegetation after Soil Disturbance) would reduce the potential for such effects.

<u>Indirect Effects</u>

Potential harm could occur to habitat from the introduction of invasive species. The reduction of potential harm from these factors through conservation measures has already been discussed above.

Potential indirect effects on California red-legged frog and California tiger salamander include degradation of nearby habitat due to increased nonnative plant cover and temporary siltation of downstream reaches (from excess sediment generated during excavation activities and vegetation management). Implementation of SMP conservation measures 14 (Removal of Existing Vegetation), 15 (Invasive Plant Species Control Measures), and 18 (Planting and Revegetation after Soil Disturbance) would minimize such effects.

The increase in water amounts and channel flow rates from sediment and vegetation removal will not result in adverse permanent effects to frog or salamander habitat. In the channels and basins, stormflows will be slightly increased as stormwater will more readily enter the channels, but these areas will continue to be accessible for dispersal movement. Breeding, dispersal and aquatic non-breeding habitat where currently available would continue to be present after the completion of maintenance activities.

The EACCS identifies the Arroyo Mocho as a priority area for restoration activities for the California red-legged frog. Restoration along Arroyo Mocho and Arroyo Las Positas near the project sites will avoid placing trees that keep water temperature too cool for breeding too close to potential breeding pools. This planting site selection around potential breeding pools would allow sunlight to warm the pools and create breeding habitat in areas currently too shaded to provide warm enough water for breeding. Native plantings at all sites would provide more dispersal cover and foraging habitat for frogs during upland dispersal.

Palmate-bracted bird's beak

Direct Effects

Proposed activities at Sites 56, 57, 58, 60, 61 and 68 are not expected to result in permanent or temporary effects to palmate-bracted bird's beak, as ground disturbing activities will be limited to within the stream channel and basin locations, site and equipment access will occur on existing paved roads or trails and a qualified botanist will conduct pre-construction surveys to confirm the absence of the species within the work areas.

Indirect Effects

The primary indirect effect of proposed activities to palmate-bracted bird's beak would be habitat degradation due to increased cover of nonnative plants. The introduction of nonnative invasive plant species into habitat by construction equipment and vehicles will be limited through implementation of AMM GEN-10 from the EACCS (use of rice or weed-free straw in erosion control seed mixtures) and conservation measure 15 (BMP VEG-2; Invasive Species Control Measures) from the Livermore SMP.

Compensatory Mitigation

In addition to avoidance and minimization measures, compensation for permanent effects to species habitat is guided by the EACCS and the Programmatic Biological Opinion. The application of standardized mitigation ratios for each species is outlined in Tables 3-4 through 3-12 of the EACCS and Appendix C of the Programmatic Biological Opinion. These ratios are used by the Service to determine the level of mitigation necessary to offset project effects. Figures 3-6 through 3-16 of the EACCS show spatially explicit information about how the ratios are applied. The intent of the standardized ratios and figures is to keep the mitigation location as close as possible to the impact area with habitat similar or better to where the effects occur and to keep mitigation within the EACCS Study Area (the eastern half of Alameda County). Mitigation ratios are applied to the project site based on actual site conditions and habitat quality. Consistent with the EACCS, any compensation for project effects will occur within the EACCS Study Area. The Service will only consider compensation outside the EACCS Study Area on a case by case basis. The City of Livermore will pay all applicable fees for the acreage compensation of species habitat as required by the final BO appendage.

To compensate for unavoidable impacts on occupied or suitable, potentially occupied habitat for federally-listed species where avoidance measures may not fully ameliorate the risk of take, the City will mitigate for such impacts through: (1) the purchase of conservation credits from a USFWS- and CDFW-approved conservation bank; and (2) the establishment of suitable habitat, via permittee-responsible mitigation, on the project site. The mitigation ratios for federally-listed species follow the framework identified in the EACCS and are based on the location of the impact and corresponding location of the mitigation site. Table 10 provides the mitigation ratios that will be used to compensate for impacts on federally-listed species.

Specifically, the City will address unavoidable project effects on California red-legged frog and California tiger salamander at Sites 56, 57 and 68 through the purchase of conservation credits from a USFWS- and CDFW-approved conservation banks. The Ohlone West Conservation Bank currently has credits available for these species. If available, the City may purchase credits from the Collier Canyon Mitigation Bank. The City will purchase the credits and provide evidence of the purchase to USFWS per the terms and conditions of the final BO appendage.

The compensation lands will provide suitable habitat for breeding, feeding, or sheltering commensurate with or better than habitat lost as a result of the proposed project. Contributing to the conservation of land for this species will help maintain their geographic distribution and will contribute to species recovery by increasing the amount of habitat that is secure from development threats and other factors that can be addressed by habitat protection and management. Providing this compensatory habitat as part of the relatively large, contiguous block of conserved land within a mitigation bank may contribute to other recovery efforts for these species.

At Sites 58, 60 and 61, the City proposes to continue monitoring efforts that were approved in 2021 to address temporary impacts in the immediate area. This includes taking the funds that would be put towards mitigation credits to off-set temporary impacts to be used to support a Citizen Science outreach effort to inventory species and observations within the region using iNaturalist and focused aquatic and visual day and night surveys to evaluate conditions, presence, and distribution of native and non-native species within the reach. This information will be used to inform future maintenance activities in the area as well as volunteer efforts to return and restore the former Springtown Golf Course. Upon approval of this compensation approach the City will provide a formal survey proposal for review and approval.

Mitigation ratios used in Table 10 were determined based on the standardized mitigation ratios in the EACCS. All temporary impacts must be restored to pre-project conditions within 12 months of construction. Table 10 indicates the required mitigation for permanent and temporary species impacts from 2022 projects.

Table 9. Federally-Listed Species Mitigation Ratios

Species	Impact		Mitigation Ratio[1]		Required Mitigation (acres)
	Perm	Temp	Perm (3:1)	Temp (1:1)	
California red-legged frog and California tiger salamander - Sites 56, 57, 68	--	0.334	--	0.334	0.334

California red-legged frog - Sites 58, 60, 61	--	0.442	--	0.442	0.442
[1]Permanent mitigation ratios are calculated per EACCS Table 3-7. Temporary impact ratios are consistent with previous SMP projects.					

[2] The temporary mitigation required as part of compensation for habitat disturbance for California red-legged frog at Sites 58, 60 and 61 is proposed to be replaced with funding tocontinue to support a focused biological assessment within the Arroyo Las Positas in the Springtown reach to determine distribution of native amphibians and non-native predators to inform future maintenance activities restoration priorities.

Effects from Interrelated and Interdependent Actions

Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are actions that have no independent utility apart from the action under consideration. No interrelated or interdependent effects on longhorn fairy shrimp, vernal pool fairy shrimp, Callippe silverspot butterfly, California tiger salamander, California red-legged frog, Alameda whipsnake, or San Joaquin kit fox would result from implementation of the project.

Cumulative Effects

For purposes of the ESA, cumulative effects are defined as “the effects of future state or private activities not involving federal activities that are reasonably certain to occur within the action area of an action subject to consultation” (50 CFR 402.02). Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation, pursuant to Section 7 of the ESA.

The geographic context for the project cumulative impact assessment is the Livermore area, within and immediately surrounding the city of Livermore in the context of the larger East Alameda County region. The project cumulative impacts below are discussed in the context of the maintenance actions within the action area.

The City of Livermore currently owns and maintains reaches of covered creeks and channels for flood control and storm drain management purposes, as well as for fire hazard reduction. Zone 7 Water District owns and maintains other portions of these creeks and channels as well as other creeks in the region. Zone 7 regularly performs routine channel maintenance, including activities similar to those proposed in the project. Other cumulative development projects currently in varying stages of development within the Livermore area include commercial, industrial, office, mixed-use, hotel, and residential developments. With future cumulative development in the Livermore area, it is reasonable to expect there would be a loss of federally-listed species and their habitat.

Cumulative Effects Conclusions

Implementation of the project could result in incidental take of longhorn fairy shrimp, vernal pool fairy shrimp, Callippe silverspot butterfly, California tiger salamander, California red-legged frog, Alameda whipsnake, or San Joaquin kit fox. However, various factors limit the level of take that could result from maintenance activities of the project.

Ongoing vehicular traffic, agriculture activities, maintenance operations, and existing development within the action area already generate a level of background disturbance for federally-listed species that may be present. The ongoing City of Livermore and Zone 7 stream maintenance activities and other development projects in the Livermore area may contribute to increased hydraulic capacity in Eastern Alameda County; however, state and federal regulations on construction activities and stormwater management will serve to limit such increases and associated adverse effects on water quality. As such, the proposed actions, once they are implemented, are not anticipated to result in a significant increase in background disturbance for longhorn fairy shrimp, vernal pool fairy shrimp, Callippe silverspot butterfly, California tiger salamander, California red-legged frog, Alameda whipsnake, or San Joaquin kit fox in and around the action area.

The existing disturbed character of much of the habitat within the action area in combination with the limited amount of undeveloped habitat in the surrounding area, reduce the likelihood that federally-listed species would occur in the action area where they have not been documented in the past. With future development in Eastern Alameda County, it is reasonable to expect that there would be a loss of similar habitat. The project will improve the quality of the existing habitat and result in long-term beneficial effects on federally-listed species.

Implementation of the Conservation Measures in the SMP and applicable impact avoidance, minimization, and mitigation measures in the EACCS and EACCS BO requires that there would be no loss of habitat for longhorn fairy shrimp, vernal pool fairy shrimp, Callippe silverspot butterfly, California tiger salamander, California red-legged frog, Alameda whipsnake, or San Joaquin kit fox. With implementation of these impact avoidance, minimization, and mitigation measures, the project is not expected to increase the loss and fragmentation of habitat for the federally-listed species, beyond current levels. Additionally, since these federally-listed species are protected under federal (and in some cases state) laws, it is assumed that all cumulative development would comply with ESA and CESA regulations, as well as other applicable regulations, reducing the potential cumulative impact from development projects in the Livermore area.

For these reasons, with implementation of the avoidance and minimization measures, the potential for incremental cumulative impacts on longhorn fairy shrimp, vernal pool fairy shrimp, Callippe silverspot butterfly, California tiger salamander, California red-legged frog, Alameda whipsnake, or San Joaquin kit fox, resulting from actions associated with the project is low, and the project’s contribution to cumulative impacts related to effects on federally-listed species and their habitat would be negligible.

Conclusions and Determinations

This Biological Assessment assesses the effects of the project on the federally-listed longhorn fairy shrimp, vernal pool fairy shrimp, Callippe silverspot butterfly, California tiger salamander, California red-legged frog, Alameda whipsnake, palmate-bracted birds beak, and San Joaquin kit fox, in accordance with Section 7 of the ESA of 1973, as amended.

A Biological Assessment may conclude that a proposed action would have one of the following results, with the associated requirements.

- *No effect.* The effects of the action would not affect any listed species or its critical habitat.
- *May affect, not likely to adversely affect.* The effects of the action on a species or its critical habitat are likely to be insignificant, discountable, or wholly beneficial; informal consultation is required.
- *May affect, likely to adversely affect.* The action is likely to directly or indirectly have an adverse effect on a listed species or its critical habitat; formal consultation is required.

Proposed effect determinations for each species or critical habitat designation are summarized below.

- **California red-legged frog—**
  - Sites 56, 57, 58, 60, 61, 68 - May affect, likely to adversely affect (LAA)
  - Sites 62, 63, 64, 66, YM-1 - May affect, not likely to adversely affect with implementation of avoidance and minimization measures (NLAA). This is supported by previous determination under the FEMA Programmatic BO consultation for work at Holmes Street Bridge along the Arroyo Mocho in 2020 that also resulted in a NLAA determination.
- California tiger salamander
  - Sites 56, 57, 68 - May affect, likely to adversely affect (LAA)
  - Sites 62, 63, 64, 66 – No effect
  - Sites 58, 60, 61 - May affect, not likely to adversely affect (NLAA) with implementation of avoidance and minimization measures
- Longhorn fairy shrimp—No effect
- Vernal pool fairy shrimp—No effect
- Designated critical habitat, vernal pool fairy shrimp—No effect
- Callippe silverspot butterfly—No effect
- Alameda whipsnake—No effect
- San Joaquin kit fox— No effect
- Palmate-bracted bird's beak – May affect, not likely to adversely affect (NLAA) with implementation of avoidance and minimization measures

Chapter 5
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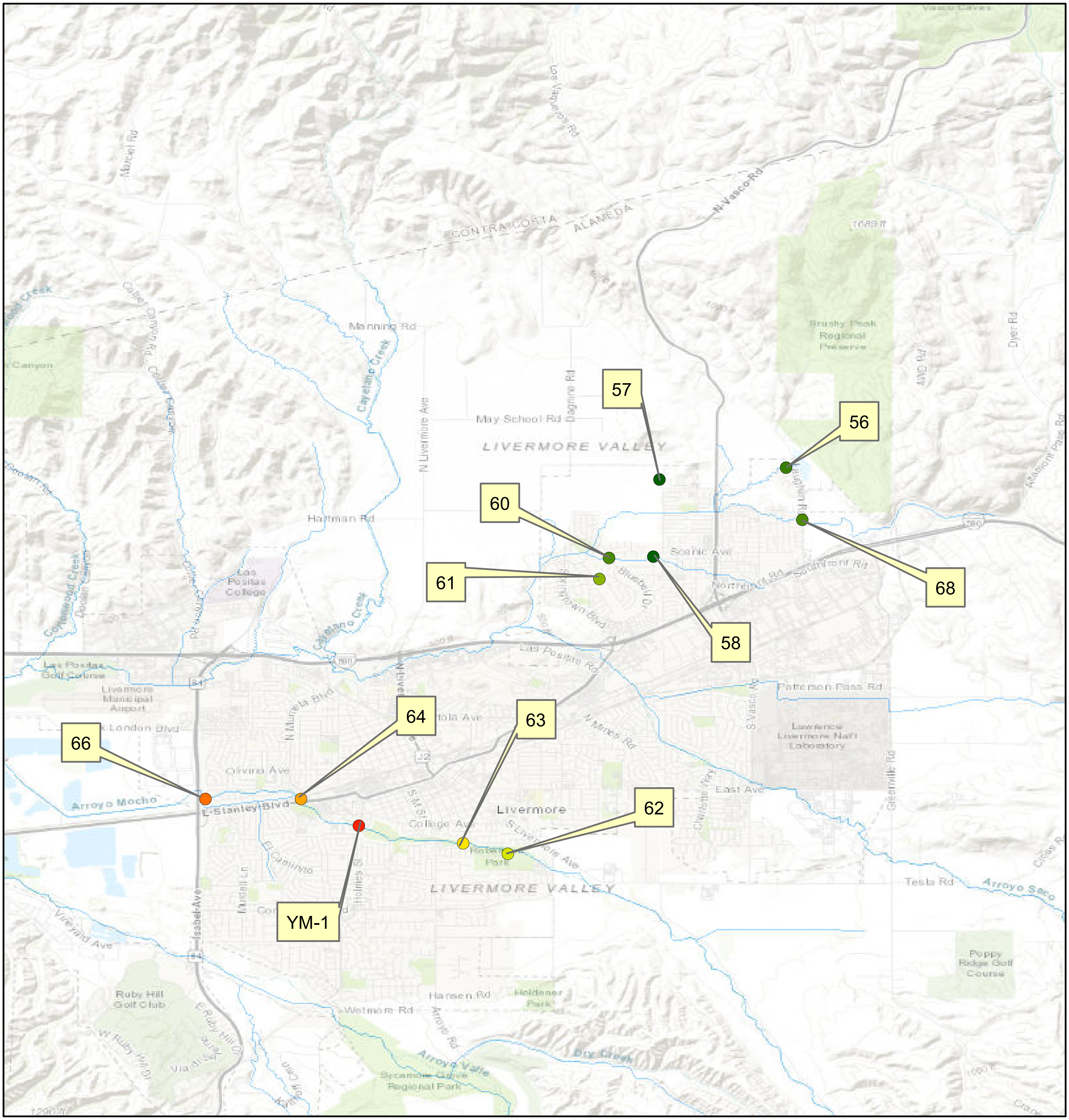
Attachment A

Figures and Action Impact Area Maps



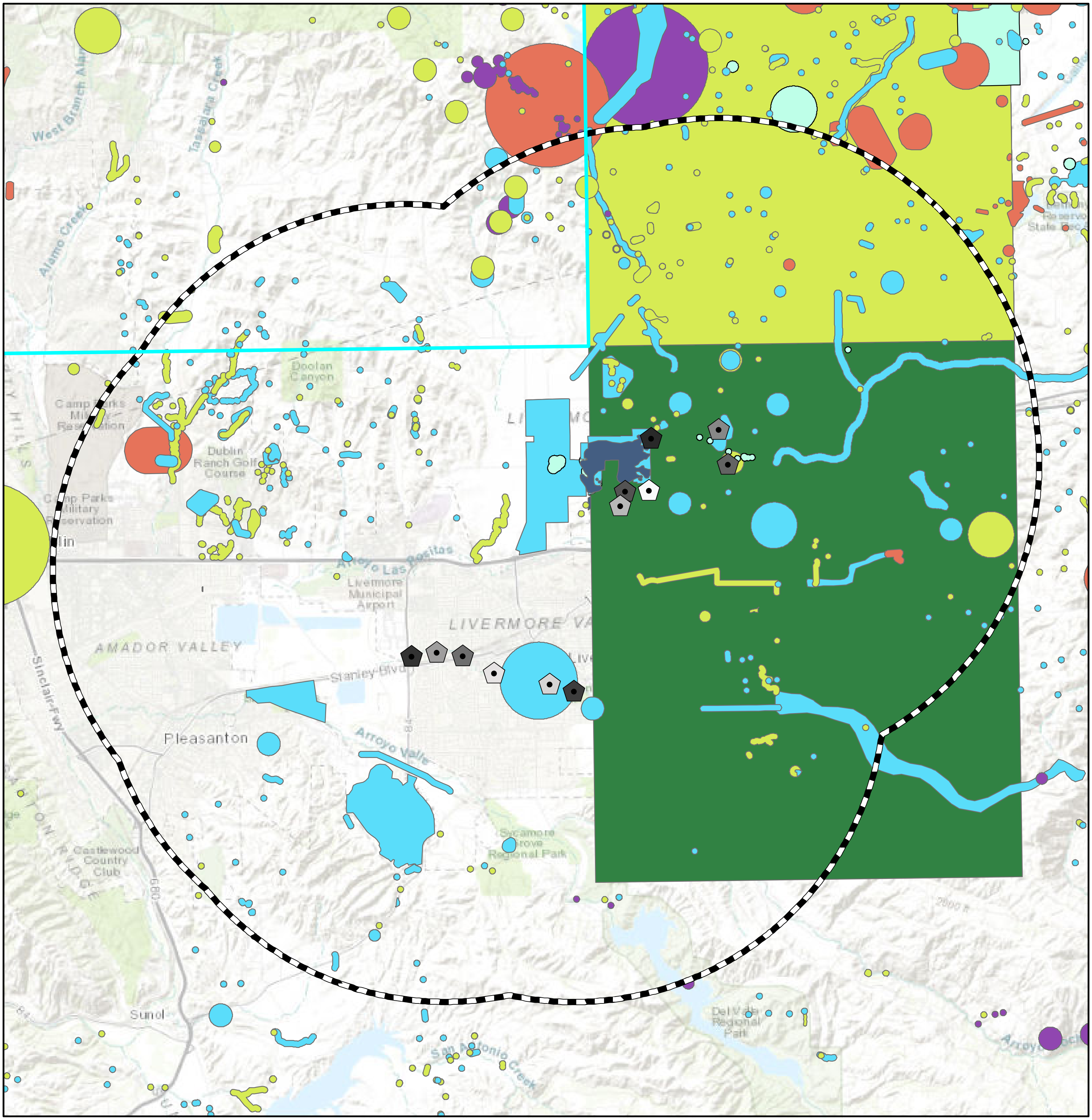
56 57 58 60 61 62 63 64 66 68 YM-1

N

0 0.75 1.5 3 Miles

Figure 1
2022 SMP Locations

City of Livermore
2022 Stream Maintenance Program
March 2022



2022 5 miles
Alameda whipsnake
California red-legged frog
California tiger salamander - central California DPS
San Joaquin kit fox
longhorn fairy shrimp
palmate-bracted bird's-beak
vernal pool fairy shrimp

0 1 2 4 Miles

N

Figure 2
CNDDB Occurrences

City of Livermore
2022 Stream Maintenance Program
March 2022

56 - Access

56 - Temporary (Outfall Sediment and Vegetation Revmoval)

Unnamed Stormwater Basin

Upland dispersal (CRLF and CTS)

N

0 0.0125 0.025 0.05 Miles

Figure A-1
Site 56 - The Bluffs Neighborhood
City of Livermore
2022 Stream Maintenance Program
March 2022

SBI
Swaim Biological Inc.

57a - Access

57a - Temporary (Outfall Sediment and Vegetation Removal)

57a - Temporary (Sediment and Vegetation Removal)

57b - Access

57b - Temporary (Sediment and Vegetation Removal)

Upland CRLF and CTS

Figure A-2
Site 57a and 57b - Saddleback

City of Livermore
2022 Stream Maintenance Program
March 2022

N

0 0.015 0.03 0.06 Miles

SBI
Swaim Biological Inc.

57b - Access
57b - Temporary (Sediment and Vegetation Removal)
57c - Access and Staging
57c - Temporary (Sediment)
57c - Temporary (Vegetation and Debris Removal*)
Existing Disturbed Area
Upland CRLF and CTS

*57c - Vegetation and debris removal does not include ground disturbance

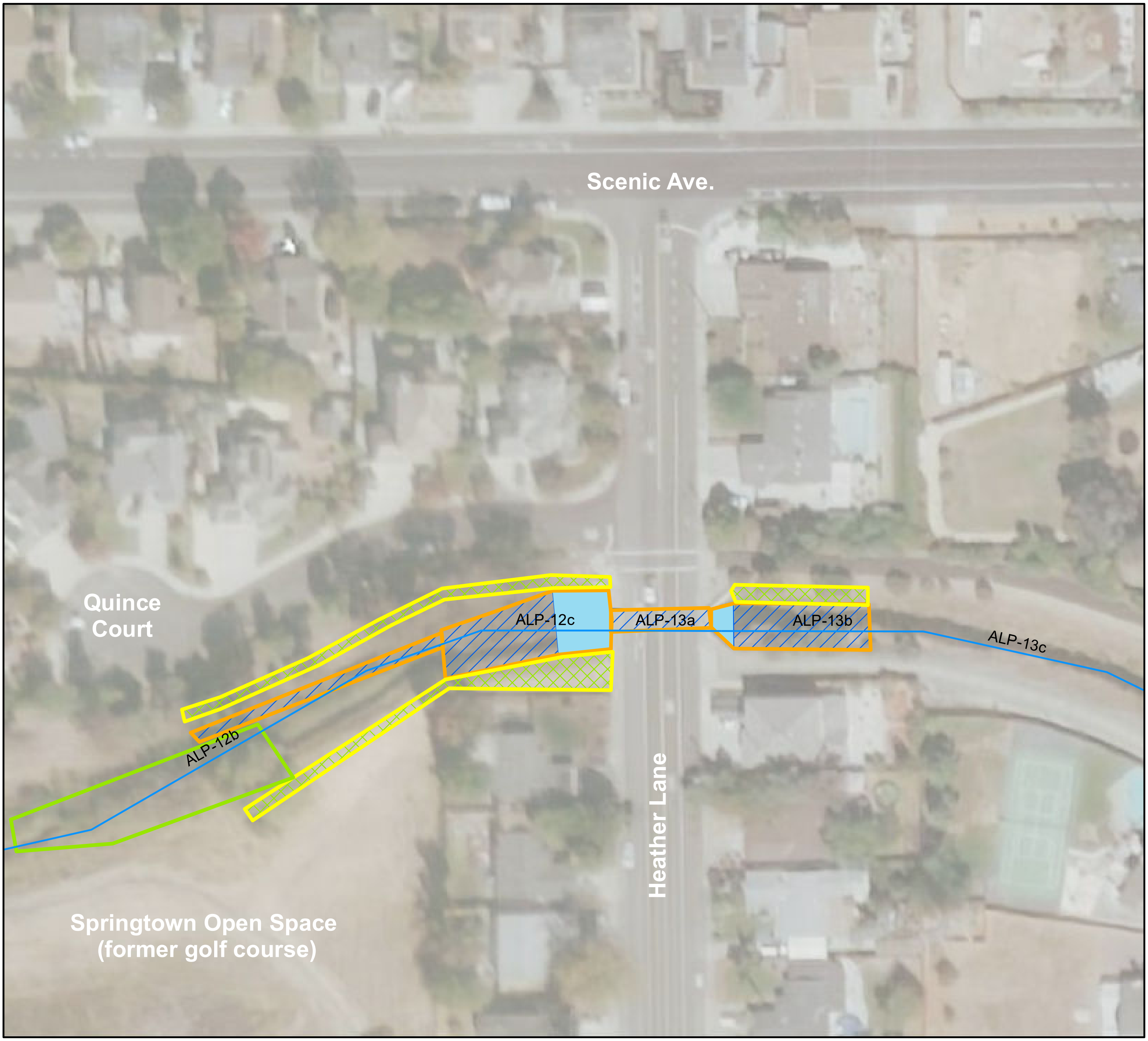
0 0.0175 0.035 0.07 Miles

N

Figure A-3
Site 57b and 57c - Saddleback

City of Livermore
2022 Stream Maintenance Program
March 2022

SBI
Swaim Biological Inc.



58 - Access Northeast
58 - Access Northwest
58 - Access Southwest
58 - Temporary (Downstream Sediment, Vegetation and Debris Removal)
58 - Temporary (North Low Flow Channel)
58 - Temporary (Sediment Removal in culverts)
58 - Temporary (Upstream Sediment, Vegetation and Debris Removal)
59a - Quince Court Willow limbing and debris removal
Non Breeding Aquatic
Open Water Breeding
Upland Dispersal (CRLF)

Figure A-4
Site 58 Heather Lane, 59a Quince Court

City of Livermore
2022 Stream Maintenance Program
March 2022

0 0.0125 0.025 0.05 Miles

N

*59a - Vegetation and debris removal does not include ground disturbance

SBI

59 - Access and Staging
59b - Hercules Court Willow limbing and debris removal
60 - Access Downstream
60 - Access Upstream
60 - Downstream Sediment and Vegetation Removal
60 - Upstream Sediment and Vegetation Removal
Existing Disturbed Area
Non Breeding Aquatic
Open Water Breeding

Figure A-5
Site 59b Hercules Court, Site 60 Bluebell Drive

City of Livermore
2022 Stream Maintenance Program
March 2022

N

0 0.0175 0.035 0.07 Miles

*59 - Vegetation and debris removal does not include ground disturbance

SBI Swaim Biological Inc.

60 - Access Downstream
60 - Access Upstream
60 - Downstream Sediment and Vegetation Removal
60 - Upstream Sediment and Vegetation Removal
61 - Access
61 - Temporary (Sediment and Vegetation Removal)
Access to Drying Location
Drying Location (Sites 58, 60, 61)
Existing Access Road
Existing Disturbed Area
Non Breeding Aquatic
Open Water Breeding

0 0.0375 0.075 0.15 Miles

N

Figure A-6
Site 61 Springtown Open Space Outfall
City of Livermore
2022 Stream Maintenance Program
March 2022

SBI

62 - Access

62 - Temporary (Sediment and Vegetation Removal)

Existing Disturbed Area

Upland Dispersal (CRLF)

Figure A-7
Site 62 Arroyo Mocho Floodplain Outfall

City of Livermore
2022 Stream Maintenance Program
March 2022

0 0.0175 0.035 0.07 Miles

N

SBI

63 - Temporary (Himalayn Blackberry and Debris Management)

Upland Dispersal (CRLF)

Figure A-8
Site 63 West Robertson Park
Vegetation Management at Outfall

City of Livermore
2022 Stream Maintenance Program
March 2022

0 0.0175 0.035 0.07 Miles

N

SBI
Swaim Biological Inc.

64 - Access and Staging
64 - Scour pool
64 - Sediment, Vegetation and Debris Removal
65 - Gate Valve to Trail Bridge 1
Existing Disturbed Area
Non Breeding Aquatic

0 0.0175 0.035 0.07 Miles

N

Figure A-9
Site 64 Stanley Bridge

City of Livermore
2022 Stream Maintenance Program
March 2022

SBI
Swaim Biological Inc.

Figure A-10
Site 65 Arroyo Mocho Low Flow Channel
Site 66 Rockrose Street

City of Livermore
2022 Stream Maintenance Program
March 2022

68 - Access Downstream
68 - Access Upstream
68 - Temporary (Sediment and Vegetation Removal)
Non Breeding Aquatic
Upland Habitat (CRLF and CTS)

Figure A-11
Site 68 Laughlin Road Bridge Culvert

City of Livermore
2022 Stream Maintenance Program
March 2022

0 0.01 0.02 0.04 Miles

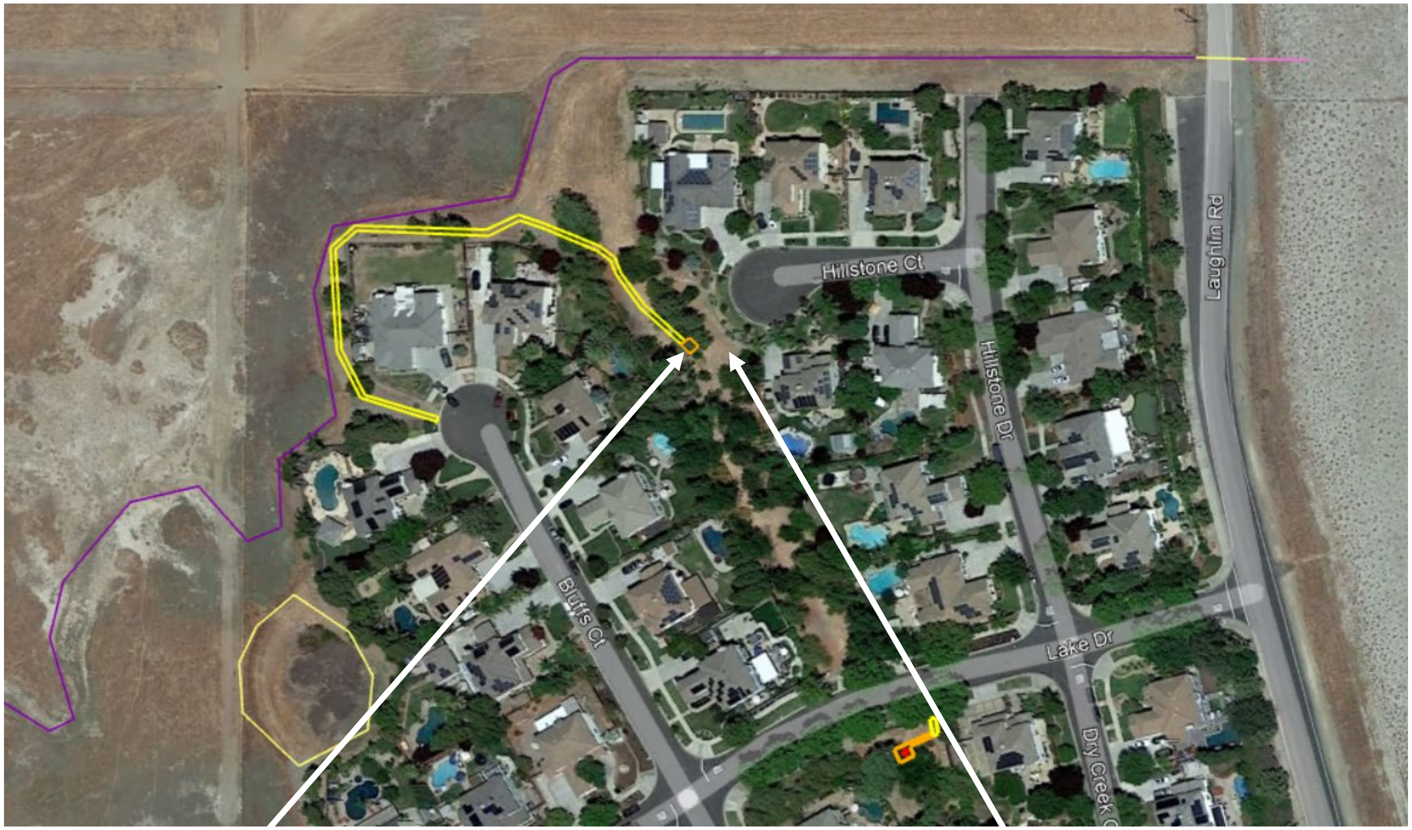
N

SBI

Attachment B

Representative Photos

Photodocumentation Site 56- Hillstone Court at Bear Creek Basins



Outfall with cottonwood at outlet

Court and berm separating basin and outfall

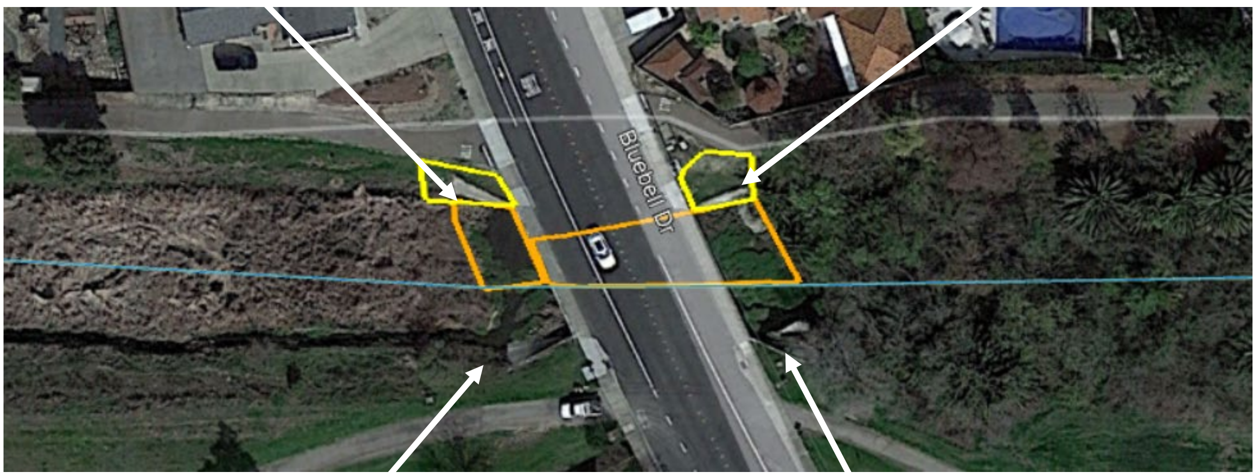
Photodocumentation Site 57A/B/C Saddleback Features

Photo Documentation Site 58 – Heather Lane Bridge Culvert on Arroyo Las Positas

Photo Documentation Site 60 – Sediment and Vegetation Management at Bluebell Bridge Culvert on Arroyo Las Positas

Downstream looking south

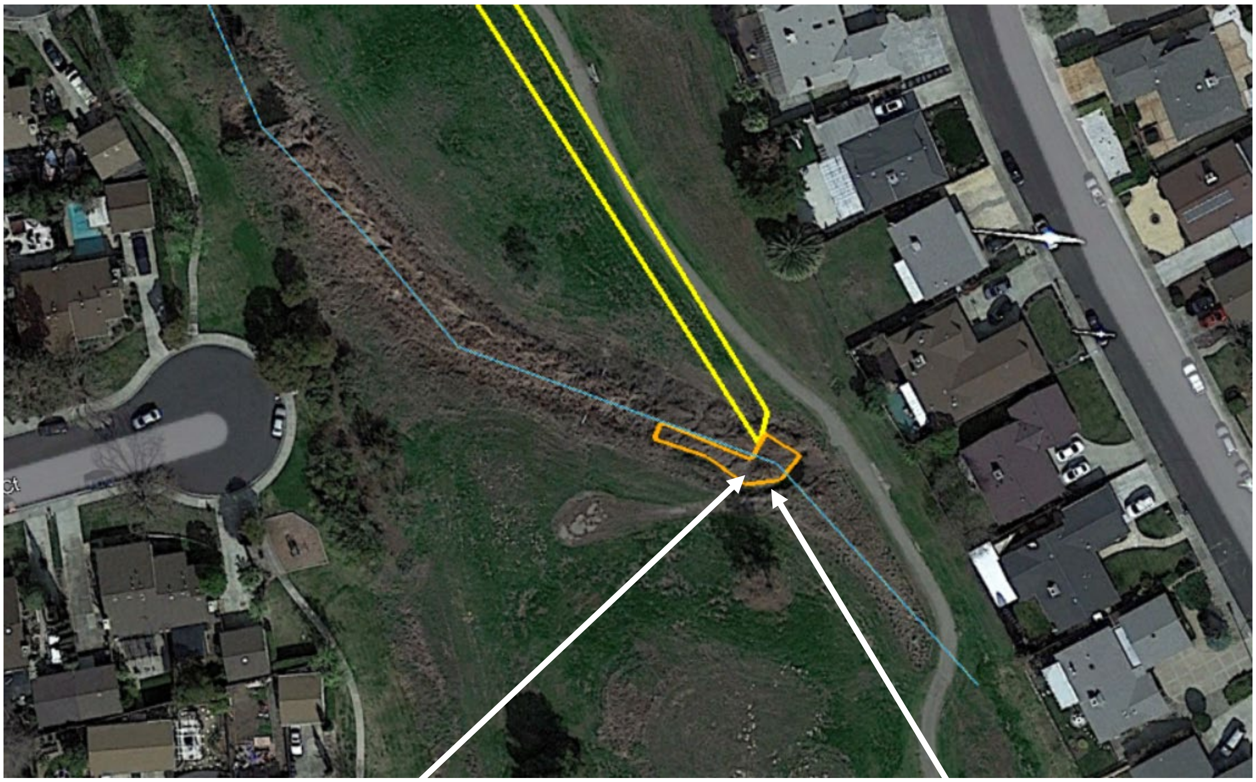
Upstream looking south



Downstream looking north

Upstream looking north

Photo Documentation Site 61 – Sediment and Vegetation Management at Outfall on Springtown Open Space, Tributary to Arroyo Las Positas



Cattails looking east towards homes on Hollyhock St.

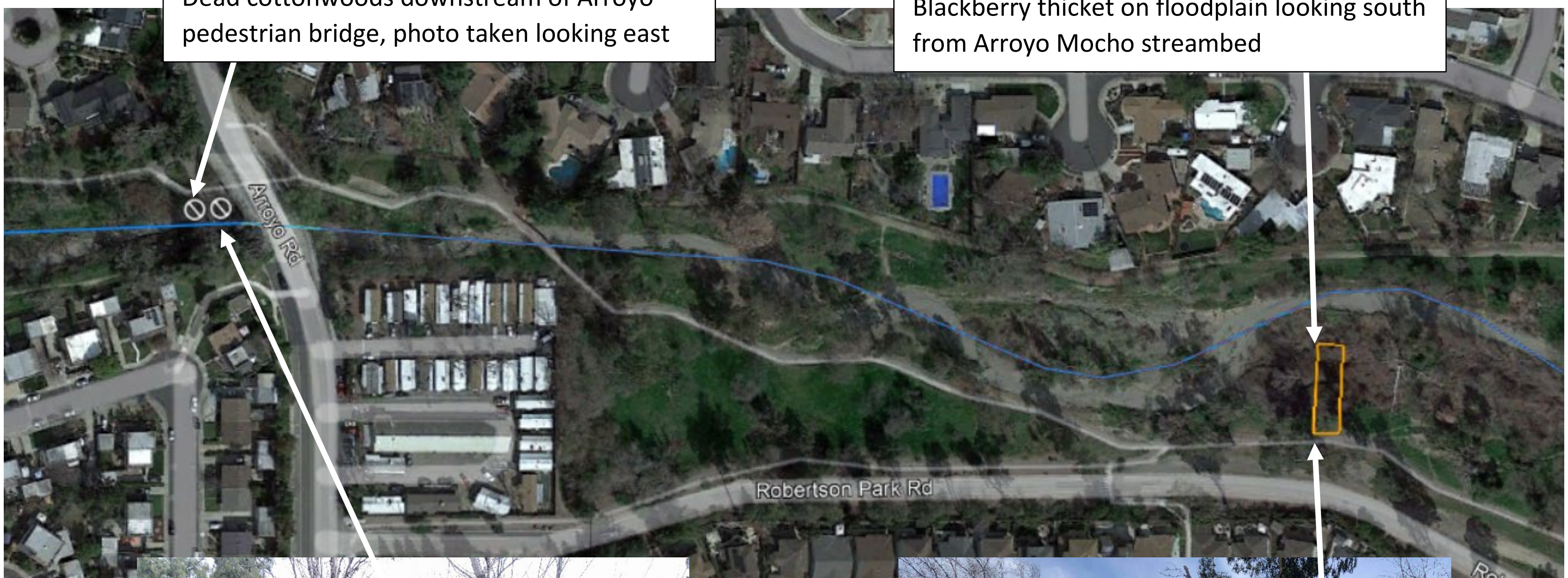
Looking west towards homes on Gladiolus Court.

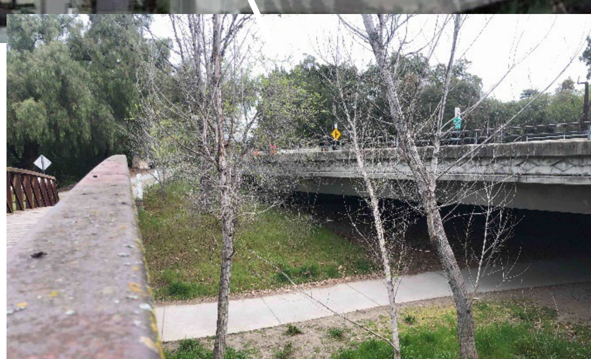
Photodocumentation Site 62 Outfall at Robertson Dog Park on Arroyo Mocho

Photo Documentation Site 63 –Vegetation Management at Outfall and Arroyo Road Bridge along Arroyo Mocho

Dead cottonwoods downstream of Arroyo pedestrian bridge, photo taken looking east

Blackberry thicket on floodplain looking south from Arroyo Mocho streambed





Dead cottonwoods upstream of Arroyo pedestrian bridge, photo taken looking north

Blackberry thicket on floodplain looking north from Arroyo Mocho bike trail

Photo Documentation Site 64 – Sediment and Vegetation Management between Stanley Road Bridge and Old Railroad Bridge on Arroyo Mocho

Debris caught in old railroad bridge piers, looking south

Scour pool below concrete of old railroad bridge, looking east

Stanley Bridge, pedestrian trail and Arroyo Mocho, looking southwest

Photodocumentation Site 66- Rockrose Outfall on Arroyo Mocho Low Flow Channel

Culvert that connects to Stanley Reach	Culvert under Rockrose

Photodocumentation Site 68 Laughlin Road Bridge Culvert on Altamont Creek

Attachment C
Conservation Measures

EACCS and EACCS BO Exceptions

The following exceptions to the Conservation Measures stated in the EACCS will apply to the projects in this appendage:

General Minimization Measures Exception:

15. Silt fencing or wildlife exclusion fencing will be used to prevent listed species from entering the project area. Exclusion fencing will be at least 3 feet high and the lower 6 inches of the fence will be buried in the ground to prevent animals from crawling under. The remaining 2.5 feet will be left above ground to serve as a barrier for animals moving on the ground surface. The fence will be pulled taut at each support to prevent folds or snags. Fencing shall be installed and maintained in good condition during all construction activities. Such fencing shall be inspected and maintained daily until completion of the project. The fencing will be removed only when all construction equipment is removed from the site. ***EXCEPTION: Exclusionary fencing to prevent listed species from entering the work site will only be placed at worksites where activities will take place for more than one day.***

Livermore SMP

Conservation Measure 1 (BMP GEN-1): Maintenance Work Window

1. All ground-disturbing maintenance activities occurring in the creek or channel (i.e., from top-of-bank to top-of-bank) will take place during the low-flow period, between May 1 and October 31. Extensions of this period require the advance approval of the USACE, SFB RWQCB, CDFW, and/or USFWS (as appropriate) on a project-by-project basis.

2. Once the first significant rainfall occurs, all in-channel equipment and/or diversion structures shall be removed. Exposed soils in upland areas will be stabilized through hydroseeding or with erosion control fabric/blankets. Significant rainfall is defined as 0.5 inch of rain in a 24-hour period.

3. Work on the upper banks of creeks or channels (e.g., vegetation, road, and V-ditch maintenance) may be conducted year-round. Ground-disturbing activities will be conducted only during periods of dry weather.

4. With the exception of emergencies, construction work will be limited to the hours between 7 a.m. and 8 p.m. Routine maintenance activities conducted by the City in residential areas will not occur on Saturdays, Sundays, or City-observed state holidays, except during emergencies or with advance notification of surrounding residents (weekend or holiday work will be limited to the hours between 9 a.m. and 3 p.m.).

Conservation Measure 2 (BMP GEN-2): Staging and Stockpiling of Materials

1. Staging will occur on access roads, surface streets, or other disturbed areas that are already compacted and support only ruderal vegetation to the extent feasible. Similarly, to the extent practical, all maintenance equipment and materials (e.g., road rock and project spoil) will be

contained within the existing service roads, paved roads, or other pre-determined staging areas. Staging areas for equipment, personnel, vehicle parking, and material storage shall be sited as far as possible from major roadways.

2. Stockpiling of material will occur on disturbed, barren, or ruderal surfaces that do not support habitat for focal species.

3. All maintenance-related items, including equipment, stockpiled material, temporary erosion control treatments, and trash, will be removed within 72 hours of project completion. All residual soils and/or materials will be cleared from the project site.

4. As necessary, to prevent sediment-laden water from being released back into waters of the State during transport of spoils to disposal locations, truck beds will be lined with an impervious material (e.g., plastic) or the tailgate blocked with wattles, hay bales, or other appropriate filtration material. If appropriate, and only within the active project area where the sediment is being loaded into the trucks, trucks may drain excess water by slightly tilting the loads and allowing the water to drain out through the applied filter.

5. Building materials and other maintenance-related materials, including chemicals and sediment, will not be stockpiled or stored where they could spill into water bodies or storm drains or where they could cover aquatic or riparian vegetation.

6. No runoff from the staging areas may be allowed to enter waters of the State, including the creek channel or storm drains, without being subjected to adequate filtration (e.g., vegetated buffer, hay wattles or bales, silt screens). The discharge of decant water from any on-site temporary sediment stockpile or storage areas to waters of the State, including surface waters or surface water drainage courses outside of the active project site, is prohibited.

7. During the dry season, no stockpiled soils shall remain exposed and unworked for more than 30 days. During the wet season, stockpiled soils shall be surrounded by properly installed and maintained silt fencing or other means of erosion control. When there is the reasonable possibility of precipitation, stockpiled soils shall additionally be covered.

8. All spoils will be disposed of in an approved location. Sediments that are found to contain contaminants in excess of hazardous materials disposal criteria will be stockpiled separately on heavy plastic, pending disposal at an appropriate hazardous materials disposal location.

9. Pipes, culverts, and similar materials greater than 4 inches in diameter will be stored so as to prevent focal wildlife species from using these as temporary refuges, and these materials will be inspected each morning for the presence of animals prior to being moved.

Conservation Measure 3 (BMP GEN-3): Creek and Channel Access

1. Access points to creeks and channels for the purposes of stream maintenance will be minimized according to need. Access points should avoid large mature trees, native vegetation, or other significant habitat features as much as possible. Temporary access points shall be sited and

constructed to minimize tree removal. Vernal pools will be avoided.

2. In considering creek and channel access routes, slopes of greater than 20% shall be avoided if possible. Any sloped access points will be examined for evidence of instability and either revegetated or filled with compacted soil, seeded, and stabilized with erosion control fabric as necessary to prevent future erosion.

3. Personnel will use the appropriate equipment for the job to minimize disturbance to and compaction of the creek or channel bottom. Appropriately tired vehicles, either tracked or wheeled, will be used, depending on the site and maintenance activity.

4. Vehicles and equipment will be parked on pavement, existing roads, and previously disturbed areas to the extent practicable.

Conservation Measure 4 (BMP BR-1): Area of Disturbance

1. Activities will avoid damage to or loss of native vegetation to the maximum extent feasible.

2. To the extent feasible, vernal pool habitats will not be affected. Vernal pools, clay flats, alkaline pools, ephemeral stock tanks, sandstone pools, or roadside ditches, if present, will be avoided, and a qualified biologist will stake or flag an exclusion zone prior to construction activities. The exclusion zone will be fenced with orange construction zone and erosion control fencing (to be installed by construction crew). The exclusion zone will encompass the maximum practicable distance from the worksite and at least 250 feet from the aquatic feature, wet or dry. The hydrology feeding into exclusion zones shall not be modified or changed.

3. If potential dens are present, their disturbance and destruction will be avoided.

4. Prior to ground-disturbing activities in sensitive habitats, project construction boundaries and access areas will be flagged or temporarily fenced will be installed during construction to reduce the potential for vehicles and equipment to stray into adjacent habitats.

5. Soil disturbance shall not exceed the minimum area necessary to complete the operations as described.

6. Trenches will be backfilled as soon as possible. Open trenches will be searched each day prior to construction to ensure no focal species are trapped. Earthen escape ramps will be installed at intervals prescribed by a qualified biologist.

7. In locations where the removal of sediment and associated vegetative cover is required to reestablish a low-flow channel, the area of disturbance shall be limited to no more than one half the width of the creek or channel in any given year to the extent feasible in order to maintain adequate foraging and cover habitat for special-status species.

Conservation Measure 5 (BMP BR-2): Pre-Maintenance Educational Training

1. At the beginning of each maintenance season and before conducting stream maintenance activities, all personnel will participate in an educational training session conducted by a qualified

biologist[2] or an appropriately experienced and/or trained staff member. Training will include review of environmental laws and avoidance and minimization BMPs that must be followed by all personnel to reduce or avoid effects on focal species during SMP activities. This training will include instruction on how to identify bird nests, recognize special-status species that may occur in the work areas, and the appropriate protocol if any nests or listed species are found during project implementation.

2. Personnel who miss the first training session or are hired later in the season must participate in a make-up session before conducting maintenance activities.

3. Contracts with contractors, construction management firms, and subcontractors will obligate all contractors to comply with these requirements and BMPs.

Conservation Measure 6 (BMP BR-4): Impact Avoidance and Minimization During Dewatering

1. All dewatering activities conducted in creeks and channels bearing state- or federally listed species shall comply with the terms and conditions of the Biological Opinion issued by USFWS and the 2081 Incidental Take Permit issued by CDFW for the SMP.

2. Prior to dewatering, the best means to bypass flow through the work area will be determined to minimize disturbance to the creek or channel and avoid direct mortality of fish and other aquatic vertebrates. The area to be dewatered will encompass the minimum area necessary to perform the maintenance activity. The period of dewatering will be the minimum amount of time needed to perform the maintenance activity. Where feasible and appropriate, dewatering will occur via gravity-driven systems. Where feasible and appropriate, diversion structures shall be installed on concrete sections of the creek or channel, such as concrete box culverts, which are often used at road crossings. Pumps used to dewater coffer dams or to divert live stream flow around dewatered work areas shall be screened and maintained throughout the construction period to prevent the entrainment of amphibians or their larvae.

3. A species relocation plan (BMP BR-5) shall be implemented as a reasonable best effort to ensure that native fish and other native aquatic vertebrates and macroinvertebrates are not stranded.

4. In-stream cofferdams shall be built only from materials such as gravel bags, clean gravel, or rubber bladders, which will cause little or no siltation or turbidity. Visqueen shall be placed over gravel bags to minimize water seepage into the maintenance areas. The Visqueen shall be firmly anchored to the creek or channel bed to minimize water seepage. If necessary, the footing of the dam shall be keyed into the creek or channel bed at an appropriate depth to capture the majority of subsurface flow needed to dewater the creek or channel bed.

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[2] A biologist (including those specializing in botany, wildlife, and fisheries) is determined to be qualified through a combination of academic training and professional experience in biological sciences and related resource management activities. Resumes will be submitted to CDFW and USFWS for approval prior to commencement of biological surveys, as stated in CDFW and USFWS permit conditions.

5. When use of gravity-fed dewatering is not feasible and pumping is necessary to dewater a work site, a temporary siltation basin and/or use of silt bags may be required to prevent sediment from re-entering the wetted creek or channel.

6. Downstream flows adequate to prevent fish or vertebrate stranding will be maintained at all times during dewatering activities. Bypass pipe diameter will be sized to accommodate, at a minimum, twice the summer baseflow.

7. Diverted and stored water will be protected from maintenance activity-related pollutants, such as soils or equipment lubricants or fuels.

8. If necessary, discharged water will pass over some form of energy dissipater to keep erosion of the downstream creek or channel to a minimum. Silt bags will be placed on the end of discharge hoses and pipes to remove sediment from discharged water.

9. For full creek or channel dewatering, filtration devices or settling basins will be provided as necessary to ensure that the turbidity of discharged water is not visibly more turbid than it is in the creek or channel upstream of the maintenance site. If increases in turbidity are observed, additional measures shall be implemented, such as a larger settling basin or additional filtration. If increases in turbidity persist, turbidity measurements will be taken on a regular basis (i.e., at least daily) up- and downstream of the cofferdam enclosure. Data recorded will be compared against Regional Water Quality Control Board Basin Plan (Basin Plan) water quality standards. In general, turbidity in discharged water should be no more than 110% of receiving water turbidity if the receiving water's turbidity is greater than 50 nephelometric turbidity units (NTU) and no greater than five NTU above receiving water turbidity if the receiving water's turbidity is less than 50 NTU. If Basin Plan standards are being exceeded, additional measures shall be installed and monitored to ensure Basin Plan standards are met.

10. When maintenance is completed, the flow diversion structure shall be removed as soon as possible. Impounded water will be released at a reduced velocity to minimize erosion, turbidity, or harm to fish or amphibians downstream. Cofferdams will be removed so surface elevations of water impounded above the cofferdam will not be reduced at a rate greater than 1 inch per hour.

11. The area disturbed by flow bypass mechanisms will be restored at the completion of the project. This may include, but is not limited to, recontouring the area and planting of riparian vegetation as appropriate.

Conservation Measure 7 (BMP BR-6): On-Call Wildlife Biologist

1. A qualified biologist will be on call and available to visit a project site at any point during maintenance activities in the event a special-status species is encountered.

Conservation Measure 8 (BMP BR-8): Nesting Migratory Bird and Raptor Pre-maintenance Surveys

2. To the extent feasible, maintenance activities, including tree trimming, will take place outside the

migratory bird and raptor nesting period (February 15 through August 15 for most birds). During the nesting bird season, work sites that are less densely vegetated will be prioritized to facilitate pre-maintenance surveys and decrease the likelihood of disturbing undiscovered nests.

3. If maintenance activities must be scheduled to occur during the nesting season, a qualified wildlife biologist, one who is familiar with the species and habitats in the planning area, will be retained to conduct pre-maintenance surveys for raptors and nesting birds within suitable nesting habitat within 300 feet of SMP activities. The surveys should be conducted within 1 week before initiation of maintenance activities within those habitats. If no active nests are detected during surveys, activities may proceed. Vegetation removal activities will be conducted under the guidance of a biologist. If active nests are detected then Measure 3 would be implemented.

4. If active nests are identified within the SMP Area, non-disturbance buffers shall be established at a distance that is great enough to minimize disturbance based on the nest location, topography, cover, and species' tolerance to disturbance. Buffer size shall be determined in cooperation with CDFW. If active nests are found within 300 feet of the project area, a qualified biologist shall be on-site as necessary to monitor the nests for signs of nest disturbance. If it is determined that maintenance activity is resulting in nest disturbance, work shall cease immediately and CDFW and USFWS shall be contacted. Buffers will be developed through consultation with CDFW. Buffers will remain in place until biologists determine that the young have successfully fledged or nests have been otherwise abandoned.

Conservation Measure 9 (BMP HAZ-1): Spill Prevention and Response Plan

1. The City will develop a Spill Prevention and Response Plan prior to commencement of maintenance activities. The plan will summarize the measures required under BMPs HAZ-2 through HAZ-6. It will also require that:

2. Equipment and materials for cleanup of spills be available on-site and that spills and leaks will be cleaned up immediately and disposed of properly.

3. Prior to entering the work site, all field personnel shall be appropriately trained in spill prevention, hazardous material control, and cleanup of accidental spills.

4. Field personnel shall implement measures to ensure that hazardous materials are properly handled and the quality of water resources is protected by all reasonable means.

5. Spill prevention kits shall always be in proximity when using hazardous materials (e.g., crew trucks and other logical locations). All field personnel shall be advised of these locations and trained in the appropriate use of the kits.

6. The City will routinely inspect the work site to verify that the Spill Prevention and Response Plan is properly implemented and maintained. The City will notify contractors immediately if there is a noncompliance issue and will require compliance.

7. Absorbent materials will be used on small spills located on impervious surface rather than hosing

down the spill; wash waters shall not discharge to the storm drainage system or surface waters. For small spills on pervious surfaces such as soils, wet materials will be excavated and properly disposed of rather than burying them. The absorbent materials will be collected and disposed of properly and promptly.

8. As defined in 40 CFR 110, a federal reportable spill of petroleum products is the spilled quantity that:
9. Violates applicable water quality standards;
10. Causes a film or sheen on, or discoloration of, the water surface or adjoining shoreline; or
11. Causes a sludge or emulsion to be deposited beneath the surface of the water or adjoining shorelines.
12. If a spill is reportable, the contractor's superintendent will notify the City, and the City will take action to contact the appropriate safety and cleanup crews to ensure that the Spill Prevention and Response Plan is followed. A written description of reportable releases must be submitted to the SFB RWQCB and the California Department of Toxic Substances Control (DTSC). This submittal must contain a description of the release, including the type of material, and an estimate of the amount spilled, the date of the release, an explanation of why the spill occurred, and a description of the steps taken to prevent and control future releases. The releases will be documented on a spill report form.
13. If an appreciable spill has occurred and results determine that project activities have adversely affected surface water or groundwater quality, a detailed analysis will be performed to the specifications of DTSC to identify the likely cause of contamination. This analysis will include recommendations for reducing or eliminating the source or mechanisms of contamination. Based on this analysis, the City or contractors will select and implement measures to control contamination, with a performance standard that surface and groundwater quality must be returned to baseline conditions. These measures will be subject to approval by the City, DTSC, and the SFB RWQCB.

Conservation Measure 10 (BMP HAZ-2): Equipment and Vehicle Maintenance

1. All vehicles and equipment will be kept clean. An excessive build-up of oil or grease will be avoided.
2. All equipment used in the creek or channel will be inspected for leaks each day prior to initiation of work. Action will be taken to prevent or repair leaks, if necessary.
3. Vehicle and equipment maintenance activities will be conducted off-site or in a designated, protected area, away from the creek or channel, where vehicle fluids and spills can be handled with reduced risk to water quality.
4. If maintenance must occur on-site, designated areas will not directly connect to the ground, surface waters, or the storm drainage system to prevent the runon of stormwater and runoff of

spills. The service area will be clearly designated with berms, gravel bags, or other barriers.

5. Secondary containment, such as a drain pan or drop cloth, to catch spills or leaks will be used when removing or changing fluids. Fluids will be stored in appropriate containers with covers and properly recycled or disposed of off-site.
6. Cracked batteries will be stored in a non-leaking secondary container and removed from the site.
7. Spill cleanup materials will be stockpiled where they are readily accessible.
8. Incoming vehicles and equipment will be checked for leaking oil and fluids (including delivery trucks and employee and subcontractor vehicles). Leaking vehicles or equipment will not be allowed on-site.

Conservation Measure 11 (BMP HAZ-3): Equipment and Vehicle Cleaning

1. Equipment will be cleaned of any sediment or vegetation before transferring to and using in a different watershed to avoid spreading pathogens or exotic/invasive species between watersheds.
2. Vehicles and equipment will not be washed on-site. Vehicle and equipment washing will occur on an appropriate wash rack at the City maintenance center.
3. Conservation Measure 12 (BMP HAZ-4): Refueling
4. Vehicles or equipment will not be refueled within 100 feet of a wetland, creek, channel, or other waterway unless a bermed and lined refueling area is constructed.
5. For stationary equipment that must be fueled on-site, secondary containment, such as a drain pan or drop cloth, shall be provided in such a manner to prevent an accidental spill of fuels to underlying soil, surface water, or the storm drainage system.

Conservation Measure 13 (BMP HAZ-5): On-Site Hazardous Materials Management

1. The products used and/or expected to be used and the end products that are produced and/or expected to be produced after their use will be inventoried.
2. As appropriate, containers will be properly labeled with a “Hazardous Waste” label, and hazardous waste will be properly recycled or disposed of off-site.
3. Contact of chemicals with precipitation will be minimized by storing chemicals in watertight containers or a storage shed (completely enclosed) with appropriate secondary containment to prevent any spillage or leakage.
4. Quantities of equipment fuels and lubricants greater than 55 gallons shall be provided with secondary containment that is capable of containing 110% of the primary container(s).
5. Petroleum products, chemicals, cement, fuels, lubricants, and non-storm drainage water or water contaminated with the aforementioned materials shall not be allowed to enter receiving waters

or the storm drainage system.

6. Sanitation facilities (e.g., portable toilets) will be surrounded by a berm, and a direct connection to the storm drainage system or receiving water will be avoided.

7. Sanitation facilities will be regularly cleaned and/or replaced and inspected regularly for leaks and spills.

8. Waste disposal containers will be covered when they are not in use, and a direct connection to the storm drainage system or receiving water will be avoided.

9. All trash that is brought to a project site during maintenance activities (e.g., plastic water bottles, plastic lunch bags) will be removed from the site daily.

Conservation Measure 14 (BMP VEG-1): Removal of Existing Vegetation

1. Vegetation pruning and removal activities will be conducted under the guidance of a staff biologist or certified arborist.

2. Only vegetation that is noxious, invasive, or hazardous or could obstruct creek or channel flows will be removed. Herbaceous layers that provide erosion protection and habitat value will be left in place. Invasive plant species that inhibit the health and/or growth of native riparian trees will be targeted for removal.

3. Where a choice between species that may be removed to maintain flood conveyance is feasible, slower growing species such as oaks (*Quercus* spp.) or Western sycamores (*Platanus racemosa*) that develop large canopies will be preferentially preserved because these species take longer to establish and provide essential nesting habitat for cavity nesters and food sources for a variety of resident and migratory animals and birds. Faster growing species such as alders (*Alnus* spp.) and cottonwoods (*Populus* spp.) are the second priority for preservation; these single-trunked species offer the benefit of improved flood conveyance and reduced roughness compared with multi-trunked species.

4. Vegetation will be removed and/or pruned in such a manner that creek or channel roughness is reduced while allowing the maximum amount of vegetation to remain in place. Trees will be trimmed or pruned to reduce impedance of floodflows while allowing the canopy to develop. Specifics for each site will differ, but typical options include climbing up to remove lower branches that have potential to interfere with floodflows and pruning into a “fan,” roughly parallel to flow direction. In areas where extensive vegetation removal is desirable to maintain floodflow capacity, phasing of removal shall be considered so that some vegetation may remain in place to provide habitat to birds.

5. Vegetation management will emphasize the preservation of large, mature trees that provide a well-developed overstory for bird habitat and a canopy closure for creek and channel shading; they also add vertical complexity to the riparian corridor. This includes species such as Western sycamore, which shall be avoided whenever feasible. Vegetation management will be conducted

in a manner that maximizes shading over the active channel. Larger trees will be retained on both sides of north/south-flowing streams and on the south side of east/west-flowing streams. Where vegetation is removed from the active channel, removal will target nonnative species and native species that are stiff and/or multi-trunked, such as arroyo willow (*Salix lasiolepis*). Trees will never be topped because this encourages shrubby growth and weak branch attachments.

6. Large woody debris, stumps, or root wads that are fully or partially buried and do not present a flood hazard shall be allowed to remain in place to provide habitat and maintain bank stability.

7. If vegetation requires removal for access to project site, nonnative species and/or quick-growing species shall be targeted first for removal. Removal of native, mature trees will be avoided whenever possible.

8. To the extent feasible, removed native vegetation shall be saved to replant after maintenance or plant in other nearby sites. This includes the reuse of mulch and willow sprigs where possible.

Conservation Measure 15 (BMP VEG-2): Invasive Plant Species Control Measures

1. Construction equipment shall arrive at the maintenance project site clean and free of soil, seed, and plant parts to reduce the likelihood of introducing new weed species.

2. Any imported fill material, soil amendments, gravel, etc., required for construction and/or restoration activities that would be placed within the upper 12 inches of the ground surface shall be free of vegetation and plant material.

3. Certified weed-free imported erosion-control materials shall be used.

4. Invasive species (such as pampas grass [*Cortaderia* spp.] and giant reed [*Arundo donax*]), occurring within sediment or vegetation management locations shall be flagged for removal by a biologist who is familiar with the identification of such species. Invasive species shall then be removed consistent with the recommendations of the California Invasive Plant Council (Cal-IPC) (http://www.cal-ipc.org). Invasive species, along with associated duff and topsoil, shall be disposed of at the County landfill. These materials shall not be allowed to be integrated with other on-site topsoil materials intended for salvage and replacement.

5. Invasive species removal shall occur before weed species seed set whenever feasible.

6. Invasive species removed from the maintenance project site shall be handled in a manner that prevents the spread of seed and shall be contained such that stray plant parts do not leave the site or contaminate adjacent areas.

Conservation Measure 16 (BMP VEG-3): Use of Herbicides and Pesticides

1. All herbicide and pesticide use shall be consistent with all Federal Insecticide, Fungicide, and Rodenticide Act label instructions and any use conditions issued by the Alameda County Agricultural Commissioner.

2. Herbicide use will be restricted to the minimum amount needed to ensure adequate control of

vegetation.

3. Application of herbicides or pesticides to upland areas shall not be made within 72 hours of predicted rainfall.

4. Herbicides and pesticides will not be directly applied to waters of the United States.

5. No herbicide will be applied within 100 feet of exclusion zones (see BMP BR-1), except when applied to cut stumps or frilled stems or injected into stems. No broadcast applications will be applied.

6. Herbicides and pesticides, including AquaMaster© and Renovate©, will not be used within 60 feet of areas identified in the court-ordered stipulated injunction for the protection of California red-legged frogs. The City will review the details and exceptions in the court order and comply with the herbicide use buffers as appropriate.

Conservation Measure 17 (BMP VEG-5): Planting and Revegetation after Soil Disturbance

This BMP applies to revegetation activities not associated with mitigation actions. Mitigation actions will have project-specific requirements and success criteria.

1. Sites where maintenance activities result in exposed soil will be stabilized to prevent erosion and revegetated with native vegetation as soon as feasible after maintenance activities are complete.

2. Revegetation will occur at a ratio of at least 1½:1 to account for initial mortality of plantings.

3. If soil moisture is deficient, new vegetation will be supplied with supplemental water until vegetation is firmly established.

4. To the extent possible, native grass seed will be used when seeding a project site.

5. Erosion control fabric, hydromulch, or other mechanism will be applied as appropriate to provide protection to seeds, hold them in place, and help retain moisture. To discourage the introduction and establishment of invasive plant species, seed mixtures/straw used within natural vegetation will be either rice straw or weed-free straw.

6. When erosion control matting is required, plastic mono-filament netting or similar material containing netting shall not be used at the project. Acceptable substitutes include coconut coir matting or tackified hydroseeding compounds.

7. Revegetation shall be regularly monitored for survival for at 5 years or until 80% minimum survival/cover is achieved (80% revegetation coverage is relative to natural coverage of the associated habitat). If invasive species colonize the area, action shall be taken to control their spread; options include hand and mechanical removal and replanting with native species.

Conservation Measure 18 (BMP WQ-4): Dechlorination Procedures for Discharges into Creeks and Channels

1. Bazooka (or equivalent) dechlorination equipment will be attached to potable water supplies used

to perform maintenance activities in and around creeks and channels.

2. Chlorine residual will be sampled following attachment of the dechlorination equipment and shall not exceed 0.05 milligrams per liter. Chlorine residual levels shall be monitored 15 minutes after start-up and every half hour during the steady-state discharge of water from a dechlorinating device to verify proper performance during the entire period of discharge.

3. Use the minimum amount of water necessary to complete maintenance activities in and around creeks and channels. When feasible, use vacuum trucks to collect “flush” waters.