CHILDREN'S HEALTH COUNCIL SAN FRANCISQUITO CREEK BANK STABILIZATION PROJECT – PHASE II

AIR QUALITY ASSESSMENT

Palo Alto, California

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Introduction

The report addresses air quality impacts associated with planned construction improvements to stabilize a small section of the San Francisquito Creek bank in Palo Alto on the property of the Children's Health Council (CHC). The project site is located at 650 Clark Way in Palo Alto, California. The project site is bordered by San Francisquito Creek and is surrounded primarily by residential homes, retail, and institutional facilities. This analysis was conducted following guidance provided by the Bay Area Air Quality Management District (BAAQMD).[1]

Project Description

Recent active erosion of the channel banks on the CHC property, accelerated during the 2016 – 2017 rainy season, has resulted in the loss of approximately 20 horizontal feet of the creek bank and 7,500 square feet of CHC's outdoor learning area. The channel banks in the area of accelerated erosion are approximately 30 feet high, and intact soils behind the bank failure are cracking and near failure. Due to the nature, location, and time-sensitivity of the creek bank failure, an emergency project was approved by the City of Palo Alto in 2018 (Phase I of the proposed project). The purpose of Phase I was to stabilize the eastern bank of San Francisquito Creek to prevent further loss of outdoor learning areas used by CHC's students and minimize hazards to public safety due to imminent continued bank loss. Phase I of the project, completed in 2019, included emergency installation of 19 concrete "shear pins" and steel tie-backs, set back from the creek bank by about 6 feet and extending 20 feet vertically below the existing creek bed. The shear pin wall stabilized the property behind the eroding bank to prevent imminent dangers to the property and human safety. The shear pins are a line-of-last-defense against bank retreat and loss of property into the creek, but do not protect the existing character of San Francisquito Creek, which supports significant ecological resources.

In approving the Phase I emergency project, the City required a secondary project (Phase II) that is meant to minimize risk of future exposure to the shear pin wall, maintain or improve sediment transport by minimizing continued erosion along the base of the wall adjacent the subject property, and maintain or otherwise improve stream function. The proposed project is a direct response to these City requirements.

The Project proposes construction of a living log crib wall with rock toe protection to stabilize the proposed project site. This wall would have a natural aesthetic, provide immediate protection, and encourage the establishment of woody plant species. The crib wall design includes stacked layers of 1.5-foot-diameter logs and rootwads, alternating in direction like a log cabin, but rather than building a vertical wall, the structure would be at a 1:1 slope. Each log would be pinned to the logs below using steel bolts, nuts, and washers to provide redundancy in structural loading. Rock toe protection would be required to prevent the channel from undercutting the crib wall. Following completion of final grading and work on the lower and upper channel bank, riparian areas within the limit of grading would be replanted.

Prior to installing the crib wall and rock toe, site preparation activities would need to take place. This would include vegetation removal, construction of a temporary access route, fish salvage (if

[1] Bay Area Air Quality Management District, *CEQA Air Quality Guidelines*, May 2017.

necessary), and installing a water diversion structure to dewater the work area (if necessary). The project will result in impacts to stream and riparian habitat, as well as air quality. Several avoidance or minimization efforts would be implemented. The following measures would minimize air quality impacts:

- Implement BAAQMD recommended Best Management Practices for controlling air pollutant emissions, mostly dust from ground disturbances.
- Require all diesel-powered construction equipment that is larger than 25 horsepower and operating at the site for more than 2 days to be rated by U.S. EPA as Tier 4 engines or equivalent. Where Tier 4 engines are not available, Tier 2 or 3 engines that are equipped with diesel particulate filters, rated by the California Air Resources Board as a Level 3 Verified Diesel Emission Control Device (VDEC), would be used.
- Construction disturbance or removal of vegetation will be restricted to the minimum footprint necessary to complete the work. The work area will be delineated where necessary with high visibility markers to minimize impacts to habitat beyond the work limit. Project activities will avoid impacts to riparian vegetation to the greatest extent possible.
- Areas of ground disturbance will be revegetated using a native erosion control seed mix, with species composition appropriate for the habitat type, or will be covered with rock, wood chips, or other suitable erosion control materials as appropriate (applicable to non-sensitive habitats only).

The design life of the project is 50 years or more, assuming the plantings thrive. The crib wall would require minimal maintenance other than irrigation and maintenance if damage or debris collection occurs due to large storm events. Negligible air quality impacts are anticipated during the constructed lifetime of the project.

Significance Thresholds

In June 2010, BAAQMD adopted thresholds of significance to assist in the review of projects under CEQA and these significance thresholds were contained in the District's 2011 *CEQA Air Quality Guidelines*. These thresholds were designed to establish the level at which BAAQMD believed air pollution emissions would cause significant environmental impacts under CEQA. The thresholds were challenged through a series of court challenges and were mostly upheld. BAAQMD updated the *CEQA Air Quality Guidelines* in 2017 to include the latest significance thresholds that were used in this analysis are summarized in Table 1.

Table 1. BAAQMD Air Quality Significance Thresholds

Criteria Air Pollutant	Construction Thresholds	Operational Thresholds	
	Average Daily Emissions (lbs./day)	Average Daily Emissions (lbs./day)	Annual Average Emissions (tons/year)
ROG	54	54	10
NO_x	54	54	10
PM_{10}	82 (Exhaust)	82	15
$PM_{2.5}$	54 (Exhaust)	54	10
CO	Not Applicable	9.0 ppm (8-hour average) or 20.0 ppm (1-hour average)	
Fugitive Dust	Construction Dust Ordinance or other Best Management Practices	Not Applicable	
Health Risks and Hazards	**Single Sources Within 1,000-foot Zone of Influence**	**Combined Sources (Cumulative from all sources within 1,000-foot zone of influence)**	
Excess Cancer Risk	>10.0 per one million	>100 per one million	
Hazard Index	>1.0	>10.0	
Incremental annual $PM_{2.5}$	>0.3 µg/m^3	>0.8 µg/m^3	

Note: ROG = reactive organic gases, NOx = nitrogen oxides, PM_{10} = course particulate matter or particulates with an aerodynamic diameter of 10 micrometers (µm) or less, $PM_{2.5}$ = fine particulate matter or particulates with an aerodynamic diameter of 2.5µm or less.

Construction Air Quality Impacts

The Bay Area is considered a non-attainment area for ground-level ozone and $PM_{2.5}$ under both the Federal Clean Air Act and the California Clean Air Act. The area is also considered non-attainment for PM_{10} under the California Clean Air Act, but not the federal act. The area has attained both State and federal ambient air quality standards for carbon monoxide. As part of an effort to attain and maintain ambient air quality standards for ozone and PM_{10}, the BAAQMD has established thresholds of significance for these air pollutants and their precursors. These thresholds are for ozone precursor pollutants (ROG and NOx), PM_{10}, and $PM_{2.5}$ apply to both construction period and operational period impacts.

Construction Period Emissions

Construction activity is anticipated to include some site preparation (e.g., removal of vegetative debris and construction of access areas) and then mostly activities described as site grading. The closest sensitive receptors are the single-family residences immediately adjacent to the opposite side of the creek. Construction period emissions were modeled using the California Emissions Estimator Model, Version 2016.3.2 (CalEEMod). Inputs to the model include the following inputs:

Land Use:	Other Non-Asphalt Surfaces of one acre,
Duration:	2.5 months or 55 working days,
Material import:	2,500 cubic yards,
Material Export:	1,450 cubic yards,
Equipment Usage:	2 Excavators at 6hrs/day ea.,
	1 Rubber Tired Loader at 6hrs/day,
	1 Off Highway Truck at 6hrs/day,
	1 Generator at 8hrs/day,
Equipment Type:	Tier 4 Final, and
Traffic:	CalEEMod defaults for trip generation, type, and travel length.

Total emissions are reported in Table 2. The average daily emissions are also reported in Table 2. These are compared against the significance thresholds for average daily emissions. Construction period emissions do not exceed significance thresholds.

Table 2. Uncontrolled Construction Period Emissions

Year	ROG	NOx	PM_{10} Exhaust	$PM_{2.5}$ Exhaust	GHG
Uncontrolled Construction Emissions Per Year (Tons)	0.01 tons	0.11 tons	0.01 tons	0.01 tons	91 metric tons
Average Daily Construction Emissions Per Year (pounds/day)[1]	0.5 lbs./day	3.9 lbs./day	0.1 lbs./day	0.1 lbs./day	--
BAAQMD Thresholds (pounds per day)	*54* lbs./day	*54* lbs./day	*82* lbs./day	*54* lbs./day	--
Exceed Threshold?	No	No	No	No	No

[1] Assumes 55 construction workdays.

Construction Community Health Risk Impacts

Construction equipment and associated heavy-duty truck traffic generates diesel exhaust, which is a known TAC. These exhaust air pollutant emissions would not be considered to contribute substantially to existing or projected air quality violations. Construction exhaust emissions may still pose health risks for sensitive receptors such as surrounding residents. Diesel exhaust poses both a potential health and nuisance impact to nearby receptors. The primary community risk impact issues associated with construction emissions are cancer risk and exposure to $PM_{2.5}$. A qualitative health risk assessment of the project construction activities was conducted that evaluated potential health effects of sensitive receptors at these nearby residences from construction emissions of diesel particulate matter (DPM) and $PM_{2.5}$.[2]

The CalEEMod model provided total annual PM_{10} exhaust emissions (assumed to be DPM) for the off-road construction equipment and for exhaust emissions from on-road vehicles, with total emissions from construction of 0.0015 tons (3 pounds). The emissions are a result of grading activities, haul trucks and worker travel, and vendor deliveries during construction. Construction of the project would also result in some fugitive dust emissions, although extensive ground disturbance is not anticipated. Fugitive $PM_{2.5}$ dust emissions were calculated by CalEEMod as 0.002 tons (4 pounds) for the overall construction period.

[2] DPM is identified by California as a toxic air contaminant due to the potential to cause cancer.

Qualitative Construction Community Risk Analysis

Nearby residents are assumed to be exposed to construction emissions continuously over the course of the 2- to 3-month active construction period. These residences are assumed to include infants and small children that are more sensitive to the effects of TACs, especially DPM. Given the close proximity of residential sensitive receptors to project site, uncontrolled construction activities could result in potentially significant impacts in terms of excess cancer risk to any infants present or increased annual $PM_{2.5}$ concentrations caused by construction equipment and traffic exhaust and fugitive dust. The construction contractor should be required to ensure that diesel-powered equipment used for this project meets the best available measures to reduce emissions. We recommend the following condition of approval to ensure emissions are reduced and result in less-than-significant impacts.

> ***Condition AQ-1:*** **Include basic measures to control dust and exhaust during construction.**
>
> During any construction period ground disturbance, the project shall ensure that the project contractor implement measures to control dust and exhaust. Implementation of the measures recommended by BAAQMD and listed below would reduce the air quality impacts associated with grading and new construction to a less-than-significant level. The contractor shall implement the following Best Management Practices that are required of all projects:
>
> 1. All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.
>
> 2. All haul trucks transporting soil, sand, or other loose material off-site shall be covered.
>
> 3. All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
>
> 4. All vehicle speeds on unpaved roads shall be limited to 15 miles per hour (mph).
>
> 5. All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.
>
> 6. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations [CCR]). Clear signage shall be provided for construction workers at all access points.

7. All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation.

8. Post a publicly visible sign with the telephone number and person to contact at the Lead Agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. The Air District's phone number shall also be visible to ensure compliance with applicable regulations.

***Condition AQ-2*: The project shall use equipment that has low DPM or zero emissions, implementing the following measures:**

1. All mobile diesel-powered off-road equipment larger than 25 horsepower and operating on the site for more than two days shall meet U.S. EPA particulate matter emissions standards for Tier 4 or use engines meeting the Tier 2 or 3 standards that include particulate matter emissions control equivalent to CARB Level 3 VDEC devices. Alternatively (or in combination), the use of alternatively-fueled or electric equipment (i.e., non-diesel) would be consistent with this requirement.

2. Avoid staging of construction equipment near portions of the site that are adjacent to residences.

Effectiveness of Conditions

Implementation of Condition AQ-1 is considered to reduce fugitive emissions by about 10 percent. Implementation of Condition AQ-2 would further reduce on-site diesel exhaust emissions by at least 85 percent and up to 90 percent when compared against a statewide fleet mix assumed by the CalEEMod model. These measures would represent the best available control measures to reduce localized construction impacts that could adversely affect sensitive receptors. The project would have a *less-than-significant* impact with respect to community risk caused by construction activities with implementation of these mitigation measures.

Operational Air Quality Impacts

There would be no operational impacts associated with this project.

Supporting Documentation

Attachment 1 includes the CalEEMod output for project construction emissions.

Attachment 1: CalEEMod Modeling Output

650 Clark Way Creek Improvements

Santa Clara County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	1.00	Acre	1.00	43,560.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	58
Climate Zone	4			**Operational Year**	2022
Utility Company	City of Palo Alto Public Utilities				
CO2 Intensity (lb/MWhr)	354.26	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Construction only

Land Use - Assume 1 acre maximum disturbance as repair area about 275ft long by 100ft or less

Construction Phase - One 2.5 month long phase (described as 2-3 months)

Off-road Equipment - Assume equipment operates 6hrs average per day excapt genrator at 8hrs

Grading - import export quantities

Construction Off-road Equipment Mitigation - Tier 4 equipment and BMPs

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15

tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	2.00	55.00
tblConstructionPhase	PhaseEndDate	6/17/2021	8/31/2021
tblGrading	AcresOfGrading	0.00	1.00
tblGrading	MaterialExported	0.00	1,450.00
tblGrading	MaterialImported	0.00	2,500.00
tblOffRoadEquipment	LoadFactor	0.36	0.36
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	OffRoadEquipmentType		Rubber Tired Loaders
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Generator Sets
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.0420	0.4324	0.3674	1.0200e-003	7.7800e-003	0.0158	0.0236	2.0000e-003	0.0150	0.0169	0.0000	90.7242	90.7242	0.0192	0.0000	91.2050
Maximum	**0.0420**	**0.4324**	**0.3674**	**1.0200e-003**	**7.7800e-003**	**0.0158**	**0.0236**	**2.0000e-003**	**0.0150**	**0.0169**	**0.0000**	**90.7242**	**90.7242**	**0.0192**	**0.0000**	**91.2050**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.0124	0.1075	0.4782	1.0200e-003	7.3600e-003	1.4800e-003	8.8400e-003	1.9400e-003	1.4700e-003	3.4000e-003	0.0000	90.7241	90.7241	0.0192	0.0000	91.2049
Maximum	**0.0124**	**0.1075**	**0.4782**	**1.0200e-003**	**7.3600e-003**	**1.4800e-003**	**8.8400e-003**	**1.9400e-003**	**1.4700e-003**	**3.4000e-003**	**0.0000**	**90.7241**	**90.7241**	**0.0192**	**0.0000**	**91.2049**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**70.43**	**75.13**	**-30.16**	**0.00**	**5.40**	**90.66**	**62.57**	**3.00**	**90.17**	**79.93**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	6-1-2021	8-31-2021	0.4731	0.1186
		Highest	0.4731	0.1186

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	3.7300e-003	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**3.7300e-003**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**2.0000e-005**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	3.7300e-003	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**3.7300e-003**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**2.0000e-005**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Grading	Grading	6/16/2021	8/31/2021	5	55	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 1

Acres of Paving: 1

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Grading	Rubber Tired Loaders	1	6.00	203	0.36
Grading	Excavators	2	6.00	158	0.38
Grading	Generator Sets	1	8.00	84	0.74
Grading	Off-Highway Trucks	1	6.00	402	0.38
Grading	Rubber Tired Dozers	0	6.00	247	0.40
Grading	Tractors/Loaders/Backhoes	0	7.00	97	0.37
Grading	Graders	0	6.00	187	0.41

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Grading	5	13.00	0.00	494.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Replace Ground Cover

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Grading - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					7.5000e-004	0.0000	7.5000e-004	9.0000e-005	0.0000	9.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0390	0.3655	0.3448	8.0000e-004		0.0156	0.0156		0.0147	0.0147	0.0000	69.7771	69.7771	0.0183	0.0000	70.2355
Total	**0.0390**	**0.3655**	**0.3448**	**8.0000e-004**	**7.5000e-004**	**0.0156**	**0.0164**	**9.0000e-005**	**0.0147**	**0.0148**	**0.0000**	**69.7771**	**69.7771**	**0.0183**	**0.0000**	**70.2355**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.9400e-003	0.0661	0.0144	1.9000e-004	4.1900e-003	2.1000e-004	4.3900e-003	1.1500e-003	2.0000e-004	1.3500e-003	0.0000	18.5999	18.5999	8.4000e-004	0.0000	18.6210
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.1000e-003	7.6000e-004	8.1800e-003	3.0000e-005	2.8400e-003	2.0000e-005	2.8500e-003	7.5000e-004	2.0000e-005	7.7000e-004	0.0000	2.3471	2.3471	5.0000e-005	0.0000	2.3485

Total	**3.0400e-003**	**0.0668**	**0.0226**	**2.2000e-004**	**7.0300e-003**	**2.3000e-004**	**7.2400e-003**	**1.9000e-003**	**2.2000e-004**	**2.1200e-003**	**0.0000**	**20.9471**	**20.9471**	**8.9000e-004**	**0.0000**	**20.9695**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					3.4000e-004	0.0000	3.4000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	9.4000e-003	0.0407	0.4556	8.0000e-004		1.2500e-003	1.2500e-003		1.2500e-003	1.2500e-003	0.0000	69.7771	69.7771	0.0183	0.0000	70.2354
Total	**9.4000e-003**	**0.0407**	**0.4556**	**8.0000e-004**	**3.4000e-004**	**1.2500e-003**	**1.5900e-003**	**3.0000e-005**	**1.2500e-003**	**1.2800e-003**	**0.0000**	**69.7771**	**69.7771**	**0.0183**	**0.0000**	**70.2354**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.9400e-003	0.0661	0.0144	1.9000e-004	4.1900e-003	2.1000e-004	4.3900e-003	1.1500e-003	2.0000e-004	1.3500e-003	0.0000	18.5999	18.5999	8.4000e-004	0.0000	18.6210
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.1000e-003	7.6000e-004	8.1800e-003	3.0000e-005	2.8400e-003	2.0000e-005	2.8500e-003	7.5000e-004	2.0000e-005	7.7000e-004	0.0000	2.3471	2.3471	5.0000e-005	0.0000	2.3485
Total	**3.0400e-003**	**0.0668**	**0.0226**	**2.2000e-004**	**7.0300e-003**	**2.3000e-004**	**7.2400e-003**	**1.9000e-003**	**2.2000e-004**	**2.1200e-003**	**0.0000**	**20.9471**	**20.9471**	**8.9000e-004**	**0.0000**	**20.9695**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Other Non-Asphalt Surfaces	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Other Non-Asphalt Surfaces	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Other Non-Asphalt Surfaces	0.610498	0.036775	0.183084	0.106123	0.014413	0.005007	0.012610	0.021118	0.002144	0.001548	0.005312	0.000627	0.000740

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	3.7300e-003	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Unmitigated	3.7300e-003	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	9.1000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	2.8200e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Total	**3.7300e-003**	**0.0000**	**1.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**2.0000e-005**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	9.1000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	2.8200e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Total	**3.7300e-003**	**0.0000**	**1.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**2.0000e-005**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Other Non-Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Other Non-Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Part 7. Tree Survey

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ENVIRONMENTAL CONSULTANTS

December 2, 2019

Terry Boyle
Chief Financial Officer
Children's Health Council
650 Clark Way
Palo Alto, CA 94304

Re: Tree Survey/Tree Preservation Report, San Francisquito Creek Bank Restoration Project, Palo Alto, Santa Clara County, CA.

Dear Mr. Boyle:

This letter summarizes the methods and results of an arborist survey performed on February 6, 2018, and November 1, 2019 at the site of the San Francisquito Creek Bank Restoration Project (Project) located at 650 Clark Way in Palo Alto, Santa Clara County, California (Project Area). The survey was conducted by ISA-Certified Arborist, Scott Yarger (ISA #WE-9300A) for the purpose of assessing a potential hazard tree that is proposed for removal as part of the creek bank stabilization. This report was prepared in accordance with the City of Palo Alto requirement for a tree survey letter report to be submitted when an application request for tree removal is submitted. The survey also documented the presence of all trees within and directly adjacent to the Project Area (including protected and non-protected), as defined by Chapter 8.10, "Tree Preservation and Management Regulations" (Tree Ordinance). Lastly, this letter provides Best Management Practices (BMPs) for managing protected trees during construction, to prevent injury from construction-related activities, and to ensure that trees not proposed for removal are preserved in their current state.

The purpose of the Project is to stabilize a portion of the eastern San Francisquito Creek bank that runs adjacent to Children's Health Council (CHC) property, a school that specializes in providing education and clinical services to children and teens with learning differences. The project is needed to prevent further loss of outdoor learning areas used by CHC's students. Phase 1 of the Project which was completed in 2019, included construction of a system of shear pins and a tie beam, along the top of the eroding bank, to prevent further erosion. The shear pins consist of a cast-in-drilled-hole (CIDH) pier reinforced with a wide flange steel beam or a circular cage of reinforcing steel.

Phase 2 of the Project will rebuild and stabilize approximately 275 linear feet of bank along San Francisquito Creek between the top of the eroding bank and the channel of the creek. The Project will construct a live log crib wall supported by a geoengineered foundation on the east bank of the creek. The crib wall foundation consists of large boulders, cobble alluvium, and rootwads secured together and embedded within the bank. The crib wall structure consists of wooden logs and will be anchored to the foundation and existing bank with support anchors and rooted vegetation. Slopes on and above the crib wall will be graded and planted with native trees, shrubs, and

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grasses. Project work is scheduled to commence in May 1, 2021 and be completed by October 15, 2021, thus minimizing impacts to aquatic species and habitat.

Regulatory Background

The City of Palo Alto Municipal code regulates the protection of specific trees on public and private properties in the City in order to preserve and protect the economic, aesthetic, and environmental values mature trees provide to the citizens of Palo Alto. A "tree" is defined by the Tree Ordinance as: "any woody plant which has a trunk four inches or more in diameter at four and one-half feet above natural grade level." A "protected tree" is defined as: any coast live oak (*Quercus agrifolia*) or valley oak (*Quercus lobata*) measuring 11.5 inches in diameter (36 inch circumference) when measured at breast height (4.5 feet above grade; "DBH"), or any coast redwood (*Sequoia sempervirens*) measuring 18 inches DBH (57 inches circumference). Additional protections are afforded to "heritage trees" which receive designation by a vote of the City council, and "street trees" which are situated in the City right-of-way.

A tree removal permit from the City of Palo Alto is required to remove, damage, or relocate or to conduct ground disturbance work within the "dripline area" of a protected tree on private property. "Dripline area" is defined per the Tree Ordinance as, "a radial area surrounding a tree trunk location equal to ten times the tree's DBH," (i.e. a 12-inch DBH coast live oak would have a radial dripline area of 120 inches or 10 feet). Additional regulations and guidelines governing the protection of trees during construction, removal of protected trees, replacement of permitted tree removal, and format and content of tree reports required as tree removal permit applications is provided in the City's Tree Protection Manual.

Tree removal permit applications for protected tree removals require payment of a $145.00 review process fee, and may include conditions of approval including tree replacement plantings or payment of in-lieu fees. The size and number of replacement trees are determined by the Tree Technical Manual and are based on the canopy size of the tree, with smaller size trees typically requiring replacement at a two to one ratio (trees replaced for trees removed), and the largest size trees requiring replacement at up to a six to one ratio. However, if the City authorizes removal of a protected tree because it is "dead, dangerous, or a nuisance, no tree replacement is required."

Methods

On February 6, 2018, and November 1, 2019, ISA-Certified Arborist, Scott Yarger, traversed the Project Area and vicinity on foot to evaluate, identify and inventory all trees as defined per the Tree Ordinance. Locations of surveyed trees were recorded using a handheld GPS unit with sub-meter accuracy. Each tree was given an aluminum tree tag with unique identification number. Several surveyed trees had been previously surveyed as indicated by old aluminum tree tags. If the tree had been previously surveyed, the old tree tag number was recorded. Information including species, DBH, dripline radius, approximate height, health, structure, and overall condition ratings were recorded. In cases where an irregular bulge or one or more scaffold branches were located at breast height, the diameter was measured below the irregular feature in order to best represent the size of the tree.

As described above, this letter report was prepared in accordance with the City's Tree Protection Manual for inclusion in a tree removal application for tree removal, not in connection with a development project. As a conservative measure, the survey included all "trees" as defined by the Tree Ordinance within the Project Area.

General notes on the condition of the protected trees were taken, including health, structure, and overall condition. Assessment of the health, structure, and overall condition of each tree was conducted according to the narratives listed in Table 1.

Table 1. Rating narratives for tree assessment

Health	
Good	Tree is free from symptoms of disease and stress
Fair	Tree shows some symptoms of disease or stress including twig and small branch dieback, evidence of fungal / parasitic infection, thinning of crown, or poor leaf color
Poor	Tree shows symptoms of severe decline
Structure	
Good	Tree is free from major structural defects.
Fair	Tree shows some structural defects in branches but overall structure is stable.
Poor	Tree shows structural failure of a major branch or co-dominant trunk, or structural insecurity such as major heart rot or cavities which could affect the tree's overall stability.
General Condition	
Good	Tree shows condition of foliage, bark, and overall structure characteristic of the species and lacking obvious defect, or disease
Fair	Tree shows condition of foliage, bark, and overall structure characteristic of the species with some evidence of stress, defect, or disease
Poor	Tree shows condition of foliage, bark, and overall structure uncharacteristic of the species and/or with obvious evidence of stress, defect, decline or disease.

Results

A total of 26 trees were identified within the Project Area and immediately surrounding area, including four trees which are of large enough and of a qualifying species to be considered protected per the Tree Ordinance. A complete list of all trees surveyed is presented in Attachment A. A map showing the location of each tree in relation to Project activities is provided in Attachment B. Tree protection buffers (i.e. driplines), for protected trees proposed for removal as measured in accordance with the Tree Ordinance as a radius 10 times the trunk diameter are shown on Attachment B. Representative photographs of trees proposed for removal as well as trees that will be preserved are provided in Attachment C. Protected trees within the Project Area were composed of one species, coast live oak (*Quercus agrifolia*). Other tree species surveyed within this Project Area included California bay (*Umbellularia californica*), blue gum (*Eucalyptus globulus*), California buckeye (*Aesculus californica*), coast redwood (*Sequoia sempervirens*), red willow (*Salix laevigata*), blue elderberry (*Sambucus nigra* ssp. *caerulea*), bigleaf maple (*Acer macrophyllum*), and silver wattle (*Acacia dealbata*).

The largest surveyed tree was a very large, overmature, multi-trunk California bay (tree #747) which measured approximately 118.2 inches aggregate DBH. The largest single-trunk tree, was an approximately 65-inch DBH blue gum (tree #743).

The overall condition, health, and structure of trees inventoried during this assessment ranged from poor to good, with most trees ranking fair in all categories. A total of six trees are proposed for removal to facilitate construction of the Project. Two of the trees proposed for removal are large enough in size and of qualifying species to be considered ordinance-protected, therefore requiring a tree removal permit from the City of Palo Alto to remove. The two ordinance-protected trees proposed for removal include tree #724, a 14.1-inch DBH coast live oak tree which is located on the precipice of the eroding creek bank. It has been severely undermined by erosion, and has broken and exposed roots including the taproot, and significant structural roots expsed. Failure of this tree would exacerbate erosion, and it would pose a safety hazard if left in place.

The second ordinance-protected tree proposed for removal is a 12.6-inch DBH coast live oak (tree #996) which is located at toe of slope at the bottom of the eroding creekbank along the downstream limit of the proposed crib wall. This tree is similar to tree #724 in that it is generally healthy and in good condition, with poor structure, which is undermined by the eroding creek bank. The remaining non-protected trees proposed for removal include two California buckeyes (tree #746 and #991), one small shrubby red willow (tree #987) within the creek bed, and one 4-inch DBH coast live oak (tree #997), which is growing along the eroding creek bank.

Trees ranking poor in structure included the large, overmature, non-protected California bay trees (trees #747, #748, and #749). Each of the bay trees that rated poor in structure had extensive heart rot, evident by numerous cavities and the presence of artist's conk (*Ganoderma applanatum*) fungal fruiting bodies. The heart rot in these trees was extensive, and was observed throughout the crown. Large tree cavities in basal trunks and scaffold branches were host to numerous beehives, and previous limb failures and crown dieback was observed in these trees.

Trees that ranked "good" in all categories included, one protected coast live oak tree (tree #754), a dominant, mature tree with good form, vigor and structure, located in a tree island in the parking lot turnaround, and two non-protected coast redwood trees (trees #752, and #753) located in the interior of the school playfield. As shown in Attachment B, construction activity will occur within the dripline of the protected coast live oak tree, tree #754. Recommended BMPs to preserve this protected tree during construction are provided below.

The observed maladies and considerations of severity, along with species characteristics guided the assignment of the structural condition, health, and overall condition score for each tree. The overall condition, structural condition, health of inventoried trees was found to be generally fair. Table 2 below summarizes the assessment results of all inventoried trees in the Project Area.

Table 2. Tree Assessment Results Summary

Criteria Assessed/Rating	Condition	Health	Structure
Good	7 (27%)	9 (35%)	4 (15%)
Fair	16 (62%)	17 (65%)	12 (46%)
Poor	3 (11%)	0 (0%)	10 (39%)

Summary and Recommendations

The Project Area four trees which are considered protected under the Tree Ordinance, all of which are coast live oak trees (trees #742, #751, #754, and #996). The Project Area contains 22 non-protected trees. The proposed Project would remove just two protected coast live oak trees (trees #742, and #996), and four non-protected trees (trees #746, #987, #991, and #997), and would preserve the remaining 20 trees. Trees proposed for removal are not viable for preservation due hazardous growing conditions along the rapidly eroding creek bank or location within the limit of grade of the Project. A tree removal permit shall be obtained for the removal of the two protected coast live oak trees. It is my professional judgement that both of the protected trees proposed for removal tree are in risk of failure and, as outlined in Section 3.10 "When Tree Replacement is Required" of the Tree Technical Manual, tree replacement is not required for a tree removal that is authorized by the City because it is, "dead, dangerous, or a nuisance." If left in place with or without the project, the trees proposed for removal has the potential to fail, causing accelerated erosion of the creek bank on-site and debris-related flooding off-site. Therefore, the trees is considered dangerous and no replacement is proposed.

A complete list of all trees surveyed within the Project Area is presented in Attachment A. A figure displaying the locations of all surveyed trees, tree removals and preserved trees, as well as tree protection fencing is presented in Attachment B. Representative photographs of trees proposed for removal as well as trees that will be preserved are provided in Attachment C. Tree Hazard Evaluation Forms for the two protected trees proposed for removal, trees #742, and #996 are provided in Attachment D.

Tree Protection and Preservation Plan

Construction-related ground disturbance can have negative impacts to tree health and longevity via mechanical injury to roots, trunks, or branches, soil compaction, and changes in existing grade for instance. In accordance with Section 2, "Protection of Trees During Construction" of the City of Palo Alto Tree Technical Manual, a "Tree Protection and Preservation Plan is required if any activity is proposed within the dripline of a Protected or Designated Tree." The only protected tree which is proposed for preservation is protected coast live oak tree #754. This section provides a Tree Protection and Preservation Plan (Plan) which assesses potential impacts to tree #754, and recommends avoidance and minimization measures to reduce potential construction-related impacts to a less than significant level.

Tree #754 is a mature, healthy tree with good form, vigor and structure, located in a tree island in the parking lot turnaround. The entirety of the tree dripline area (as defined above as 10 times the trunk diameter) is located within the limit of disturbance. However, the tree is unlikely to be significantly impacted, as it is outside of the limit of grade. Construction activities intersecting with the tree's dripline area are limited to vehicle access and staging on existing asphalt surrounding the tree.

However, as described above, Projects including construction activities within protected tree driplines area required to implement tree protection measures outlined in Section 2, "Protection of Trees During Construction" of the City of Palo Alto Tree Technical Manual. In order to avoid and minimize damage to protected trees which are designated for preservation and not proposed for direct impact by project activities, the Project shall follow all tree protection guidelines outlined in Section 2, "Protection of Trees During Construction" as excerpted and adapted to site

specifications below. Tree protection measures that are deemed not applicable due to construction specifications are omitted from this Plan.

Pre-construciton Requirements

A. Site Plan. All trees to be preserved shall be shown on site plans. In addition, for protected trees, the site plans shall show the trunk diameter, dripline and tree protection zone (TPZ) to be enclosed with specified fencing as a bold dashed line. The TPZ is herein defined as equal to the tree's dripline area (i.e. a radial distance from the tree trunk equal to ten times the trunk diameter).

B. Verification of Tree Protection. The project arborist or contractor shall verify in writing that all preconstruction protection measures have ben met. Written verification must be submitted to and approved by the Planning Department prior to grading permit issuance.

C. Pre-construction Meeting. The demolition, grading and underground contractors, construction superintendent and other pertinent personnel are required to meet with the project arborist at the site prior to beginning work to review procedures, tree protection measures and to establish haul routes, staging areas, contacts, watering, etc.

D. Protective Tree Fencing for Protected Trees. Fenced enclosures shall be erected around trees to be protected to achieve three primary goals, (1) to keep the foliage crowns and branching structure clear from contact by equipment, materials and activities; (2) to preserve roots and soil conditions in an intact and non-compacted state and; (3) to identify the tree protection zone (TPZ) in which no soil disturbance is permitted and activities are restricted, unless otherwise approved.

   As described above, the only protected tree designated for preservation that is within the limit of work is tree #754. Since this tree is located in a planting strip/tree island within the parking lot turnaround, it is already protected from intrusion by the existing curb. Therefore installation of a temporary chainlink tree protection fence at the edge of the curb will provide sufficient protection.

   Tree fencing shall be erected before demolition, grading or construction begins and remain in place until final inspection of the project permit. A warning sign shall be prominently displayed on each fence. The sign shall be a minimum of 8.5 x 11-inches and clearly state: WARNING - Tree Protection Zone - This fence shall not be removed and is subject to a penalty according to Palo Alto Municipal Code Section 8.10.110.9.

   Although not ordinance protected, as a conservative measure, temporary tree protection fencing should be installed along the southern dripline of the clump of mature bay trees to prevent inadvertent damage from heavy machinery access

Damage to Trees, and Periodic Inspections

Adherence to the above recommended and required tree protection measures will ensure that significant damage to protected trees to be preserved will not occur. However, any damage to trees incidental during construction shall be reported to the project arborist, job superintendent or

City arborist within 6 hours of the damage so that appropriate damage mitigation in compliance with the Tree Technical Manual can be implemented in a timely manner.

The City may require monthly inspections by the project arborist or landscape architect to verify tree protection measures for protected trees are being implemented in accordance with this plan and the City's Tree Technical Manual.

Please feel free to contact me or Brian Bartell if you have any questions or concerns.

Sincerely yours,

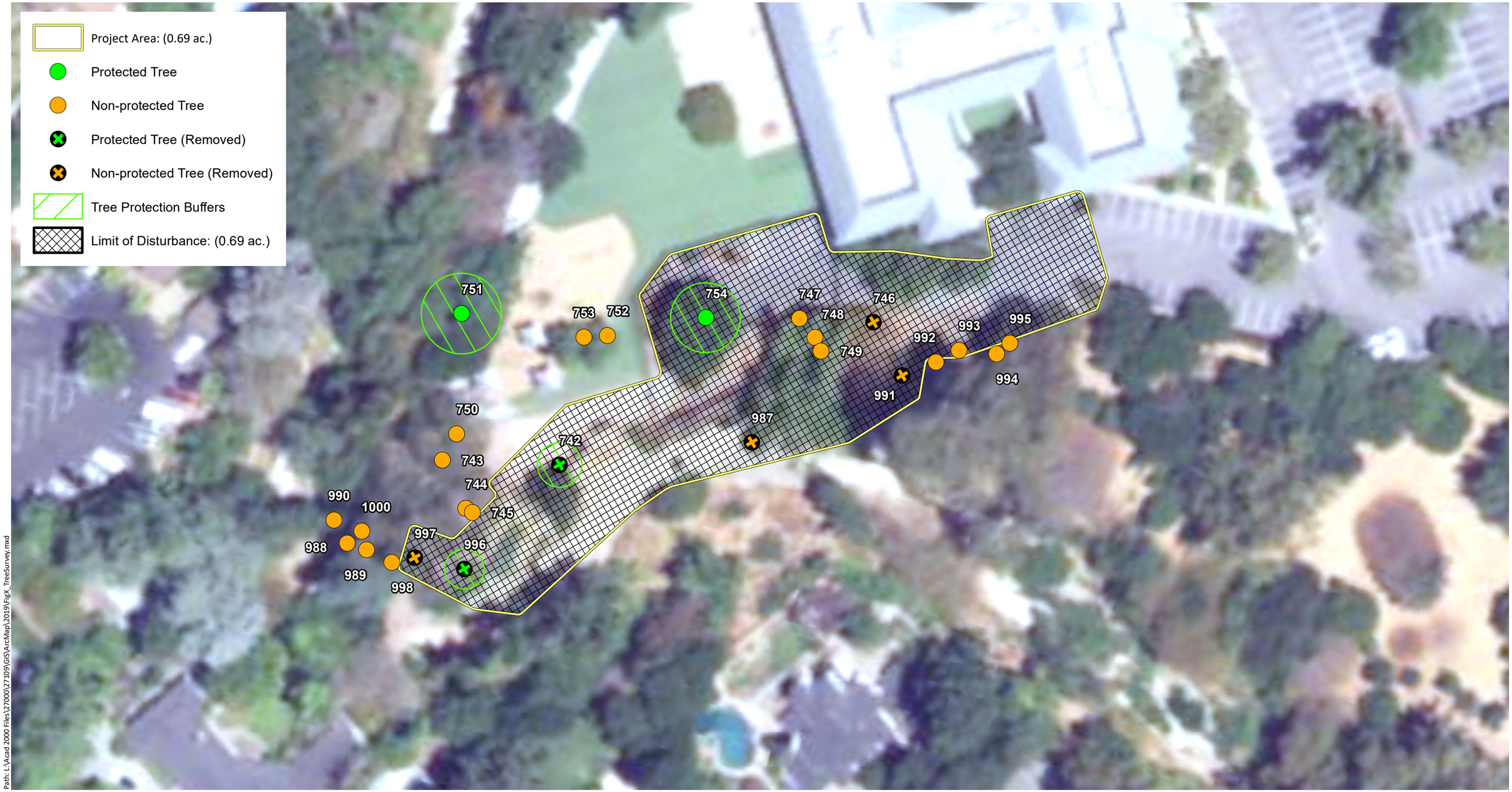
Scott Yarger
ISA-Certified Arborist WE-9300A
yarger@wra-ca.com

Enclosures:

Attachment A – Tree Survey Table
Attachment B – Tree Removal and Protection Plan
Attachment C – Representative Photographs
Attachment D – Tree Hazard Evaluation Forms

Attachment A. Children's Health Council San Francisquito Creek Bank Restoration Project Tree Survey. February 2018 & November 2019.

Tag_ID	Species	Common Name	Multistem	Ordinance Protected Tree	Tree Impact	DBH_1	DBH_2	DBH_3	DBH_4	DBH_5	Total DBH (inches)	Dripline Area (feet)	Estimated Height (feet)	Condition	Health	Structure
742	*Quercus agrifolia*	Coast live oak	No	Yes	Remove	14.1	0.0	0.0	0.0	0.0	14.1	11.8	30	Fair	Good	Poor
743	*Eucalyptus globulus*	Blue gum	No	No	Preserve	50.0	0.0	0.0	0.0	0.0	50	41.7	60	Fair	Fair	Fair
744	*Quercus agrifolia*	Coast live oak	No	No	Preserve	4.0	0.0	0.0	0.0	0.0	4	3.3	8	Good	Good	Fair
745	*Quercus agrifolia*	Coast live oak	Yes	No	Preserve	6.2	1.5	0.0	0.0	0.0	7.7	6.4	1	Good	Good	Fair
746	*Aesculus californica*	California buckeye	Yes	No	Remove	8.9	10.3	10.5	4.8	5.1	39.6	33.0	25	Good	Good	Fair
747	*Umbellularia californica*	California bay	Yes	No	Preserve	33.2	34.0	32.0	19.0	0.0	118.2	98.5	34	Fair	Fair	Poor
748	*Umbellularia californica*	California bay	Yes	No	Preserve	23.1	35.0	0.0	0.0	0.0	58.1	48.4	45	Fair	Fair	Poor
749	*Umbellularia californica*	California bay	Yes	No	Preserve	28.0	14.0	14.5	10.0	12.0	78.5	65.4	45	Fair	Fair	Poor
750	*Eucalyptus globulus*	Blue gum	No	No	Preserve	19.3	0.0	0.0	0.0	0.0	19.3	16.1	35	Fair	Fair	Fair
751	*Quercus agrifolia*	Coast live oak	Yes	Yes	Preserve	20.0	10.1	12.0	0.0	0.0	42.1	35.1	40	Good	Good	Fair
752	*Sequoia sempervirens*	Coast redwood	No	No	Preserve	16.1	0.0	0.0	0.0	0.0	16.1	13.4	35	Good	Good	Good
753	*Sequoia sempervirens*	Coast redwood	No	No	Preserve	14.8	0.0	0.0	0.0	0.0	14.8	12.3	35	Good	Good	Good
754	*Quercus agrifolia*	Coast live oak	No	Yes	Preserve	22.1	0.0	0.0	0.0	0.0	22.1	18.4	30	Good	Good	Good
987	*Salix laevigata*	Red willow	Yes	No	Remove	4.0	1.0	1.0	0.0	0.0	6	5.0	8	Fair	Fair	Poor
988	*Acacia dealbata*	Silver wattle	No	No	Preserve	5.5	0.0	0.0	0.0	0.0	5.5	4.6	11	Poor	Fair	Poor
989	*Acacia dealbata*	Silver wattle	Yes	No	Preserve	4.5	4.0	0.0	0.0	0.0	8.5	7.1	12	Poor	Fair	Poor
990	*Acer macrophyllum*	Bigleaf maple	Yes	No	Preserve	8.0	7.0	7.0	6.1	0.0	28.1	23.4	35	Poor	Fair	Poor
991	*Aesculus californica*	California buckeye	Yes	No	Remove	11.9	11.3	0.0	0.0	0.0	23.2	19.3	28	Fair	Fair	Fair
992	*Ailanthus altissima*	Tree of Heaven	No	No	Preserve	6.1	0.0	0.0	0.0	0.0	6.1	5.1	30	Fair	Fair	Fair
993	*Sambucus nigra* ssp. *caerulea*	Blue elderberry	Yes	No	Preserve	5.5	2.6	1.0	1.0	1.0	11.1	9.3	12	Fair	Fair	Poor
994	*Eucalyptus globulus*	Blue gum	Yes	No	Preserve	65.0	0.0	0.0	0.0	0.0	65	54.2	70	Fair	Fair	Good
995	*Eucalyptus globulus*	Blue gum	No	No	Preserve	51.5	0.0	0.0	0.0	0.0	51.5	42.9	70	Fair	Fair	Fair
996	*Quercus agrifolia*	Coast live oak	No	Yes	Remove	12.6	0.0	0.0	0.0	0.0	12.6	10.5	33	Fair	Good	Poor
997	*Quercus agrifolia*	Coast live oak	No	No	Remove	4.0	0.0	0.0	0.0	0.0	4	3.3	12	Fair	Fair	Fair
998	*Acacia dealbata*	Silver wattle	No	No	Preserve	6.1	0.0	0.0	0.0	0.0	6.1	5.1	45	Fair	Fair	Fair
1000	*Acacia dealbata*	Silver wattle	No	No	Preserve	9.7	0.0	0.0	0.0	0.0	9.7	8.1	40	Fair	Fair	Fair



Path: L:\Acad 2000 Files\27000\27109\GIS\ArcMap\2019\FigX_TreeSurvey.mxd

Sources: Esri Streaming - NAIP 2016 | Prepared By: SGillespie, 3/9/2020

Attachment B. Tree Removal Protection Plan

Children's Health Council
Creek Bank Restoration
Palo Alto, California

0 50 100 Feet

N

wra
ENVIRONMENTAL CONSULTANTS

Photograph 1. Photograph depicting protected coast live oak tree (tree #742), which is proposed for removal. The eroding creek bank, exposed roots, and slight lean can be seen at left.

Photograph 2. Photograph depicting tree #742, which is proposed for removal. The tree is outwardly asymptomatic of pests or disease, but is severely undercut by the eroding creek bank, making preservation infeasible.

Photograph 3. Tree #754, a protected coast live oak tree designated for preservation.

Photograph 4. Tree #996, a protected coast live oak tree, which is significantly undercut by the eroding creek bank. Tree #998 is proposed for removal, as it is within the limit of grade, and is not feasible to preserve.

A Photographic Guide to the Evaluation of Hazard Trees in Urban Areas

TREE HAZARD EVALUATION FORM 2nd Edition

Site/Address: 650 Clark Way, Palo Alto, CA

Map/Location: (see letter report)

Owner: public ____ private X unknown ____ other ____

Date: 2/6/18 Inspector: Scott Yaeger ISA#WE-9306A TRAQ

Date of last inspection: N/A

HAZARD RATING:

Failure Potential	+	Size of part	+	Target Rating	=	Hazard Rating
4	+	2	+	1	=	7

____ Immediate action needed

____ Needs further inspection

____ Dead tree

TREE CHARACTERISTICS

Tree #: 724 **Species:** Coast live oak

DBH: 14.1 in. **# of trunks:** 1 **Height:** 30 ft. **Spread:** 10 ft. r.

Form: ☒ generally symmetric ☐ minor asymmetry ☐ major asymmetry ☐ stump sprout ☐ stag-headed

Crown class: ☒ dominant ☐ co-dominant ☐ intermediate ☐ suppressed

Live crown ratio: 90 % **Age class:** ☐ young ☒ semi-mature ☐ mature ☐ over-mature/senescent

Pruning history: ☐ crown cleaned ☐ excessively thinned ☐ topped ☐ crown raised ☐ pollarded ☐ crown reduced ☐ flush cuts ☐ cabled/braced ☒ none ☐ multiple pruning events Approx. dates: ____

Special Value: ☐ specimen ☐ heritage/historic ☐ wildlife ☐ unusual ☐ street tree ☐ screen ☐ shade ☒ indigenous ☒ protected by gov. agency

TREE HEALTH

Foliage color: ☒ normal ☐ chlorotic ☐ necrotic **Epicormics?** Y (N)

Foliage density: ☒ normal ☐ sparse **Leaf size:** ☐ normal ☐ small

Annual shoot growth: ☐ excellent ☒ average ☐ poor **Twig Dieback?** Y N

Woundwood development: ☐ excellent ☒ average ☐ poor ☐ none

Vigor class: ☐ excellent ☒ average ☐ fair ☐ poor

Growth obstructions:

☐ stakes ☐ wire/ties ☐ signs ☐ cables

☐ curb/pavement ☐ guards

☒ other Rapidly eroding creek bank

Major pests/diseases: Tree is asymptomatic but is undercut with exposed taproot and structural roots at risk of failing.

SITE CONDITIONS

Site Character: ☐ residence ☐ commercial ☐ industrial ☐ park ☐ open space ☐ natural ☐ woodland\forest

Landscape type: ☐ parkway ☐ raised bed ☐ container ☐ mound ☐ lawn ☐ shrub border ☐ wind break

Irrigation: ☒ none ☐ adequate ☐ inadequate ☐ excessive ☐ trunk wettled

Recent site disturbance? (Y) N ☐ construction ☒ soil disturbance ☐ grade change ☐ line clearing ☐ site clearing

% dripline paved: (0%) 10-25% 25-50% 50-75% 75-100% **Pavement lifted?** Y N

% dripline w/ fill soil: (0%) 10-25% 25-50% 50-75% 75-100%

% dripline grade lowered: (0%) 10-25% 25-50% 50-75% 75-100%

Soil problems: ☐ drainage ☐ shallow ☐ compacted ☐ droughty ☐ saline ☐ alkaline ☐ acidic ☐ small volume ☐ disease center ☒ history of fail ☐ clay ☐ expansive ☐ slope ____° aspect: ____

Obstructions: ☐ lights ☐ signage ☐ line-of-sight ☐ view ☐ overhead lines ☐ underground utilities ☐ traffic ☐ adjacent veg. ☐ ____

Exposure to wind: ☒ single tree ☐ below canopy ☐ above canopy ☐ recently exposed ☐ windward, canopy edge ☐ area prone to windthrow

Prevailing wind direction: Unknown Occurrence of snow/ice storms ☒ never ☐ seldom ☐ regularly

TARGET

Use Under Tree: ☐ building ☐ parking ☐ traffic ☐ pedestrian ☒ recreation ☐ landscape ☐ hardscape ☐ small features ☐ utility lines

Can target be moved? Y (N) **Can use be restricted?** (Y) N

Occupancy: ☒ occasional use ☐ intermittent use ☐ frequent use ☐ constant use

TREE DEFECTS

ROOT DEFECTS:

Suspect root rot: Y (N) **Mushroom/conk/bracket present:** Y (N) **ID:** _____

Exposed roots: [X] severe ☐ moderate ☐ low **Undermined:** [X] severe ☐ moderate ☐ low

Root pruned: N/A distance from trunk **Root area affected:** >50 % **Buttress wounded:** Y (N) **When:** _____

Restricted root area: ☐ severe ☐ moderate [X] low **Potential for root failure:** [X] severe ☐ moderate ☐ low

LEAN: ~5 deg. from vertical ☐ natural ☐ unnatural ☐ self-corrected **Soil heaving:** (Y) N

Decay in plane of lean: Y (N) **Roots broken** (Y) N **Soil cracking:** (Y) N

Compounding factors: Channel incision - rapidly eroding creek bank **Lean severity:** ☐ severe ☐ moderate [X] low

CROWN DEFECTS: Indicate presence of individual defects and rate their severity (s = severe, m = moderate, l = low)

DEFECT	ROOT CROWN	TRUNK	SCAFFOLDS	BRANCHES
Poor taper	N/A	N/A	N/A	N/A
Bow, sweep				
Codominants/forks				
Multiple attachments				
Included bark				
Excessive end weight				
Cracks/splits				
Hangers				
Girdling				
Wounds/seam				
Decay				
Cavity				
Conks/mushrooms/bracket				
Bleeding/sap flow				
Loose/cracked bark				
Nesting hole/bee hive				
Deadwood/stubs				
Borers/termites/ants				
Cankers/galls/burls				
Previous failure				

HAZARD RATING

Tree part most likely to fail: Roots - whole tree

Inspection period: _____ annual _____ biannual _____ other _____

Failure Potential + Size of Part + Target Rating = Hazard Rating

4 + 2 + 1 = 7

Failure potential: 1 - low; 2 - medium; 3 - high; 4 - severe
Size of part: 1 - <6" (15 cm); 2 - 6-18" (15-45 cm); 3 - 18-30" (45-75 cm); 4 - >30" (75 cm)
Target rating: 1 - occasional use; 2 intermittent use; 3 - frequent use; 4 - constant use

HAZARD ABATEMENT

Prune: ☐ remove defective part ☐ reduce end weight ☐ crown clean ☐ thin ☐ raise canopy ☐ crown reduce ☐ restructure ☐ shape

Cable/Brace: _____ **Inspect further:** ☐ root crown ☐ decay ☐ aerial ☐ monitor

Remove tree: (Y) N **Replace?** Y N **Move target:** Y N **Other:** _____

Effect on adjacent trees: [X] none ☐ evaluate

Notification: [X] owner ☐ manager [X] governing agency **Date:** See letter report

COMMENTS

The tree is at severe risk of failure due to broken and exposed structural roots resulting from a rapidly eroding creek bank. Preservation is not feasible

A Photographic Guide to the Evaluation of Hazard Trees in Urban Areas

TREE HAZARD EVALUATION FORM 2nd Edition

Site/Address: 650 Clark Way, Palo Alto, CA

Map/Location: (see letter report)

Owner: public ___ private X unknown ___ other ___

Date: 11/1/19 Inspector: Scott Yaeger ISA #WE-9908A

Date of last inspection: N/A

HAZARD RATING:

3 (Failure Potential) + 2 (Size of part) + 1 (Target Rating) = 6 (Hazard Rating)

___ Immediate action needed

___ Needs further inspection

___ Dead tree

TREE CHARACTERISTICS

Tree #: 996 Species: Coast live oak

DBH: 12.6 # of trunks: 1 Height: 33ft Spread: 10ft dia.

Form: ☐ generally symmetric ☒ minor asymmetry ☐ major asymmetry ☐ stump sprout ☐ stag-headed

Crown class: ☒ dominant ☐ co-dominant ☐ intermediate ☐ suppressed

Live crown ratio: 90 % **Age class:** ☐ young ☒ semi-mature ☐ mature ☐ over-mature/senescent

Pruning history: ☐ crown cleaned ☐ excessively thinned ☐ topped ☐ crown raised ☐ pollarded ☐ crown reduced ☐ flush cuts ☐ cabled/braced ☒ none ☐ multiple pruning events Approx. dates: ___

Special Value: ☐ specimen ☐ heritage/historic ☐ wildlife ☐ unusual ☐ street tree ☐ screen ☐ shade ☒ indigenous ☒ protected by gov. agency

TREE HEALTH

Foliage color: ☒ normal ☐ chlorotic ☐ necrotic **Epicormics?** Y (N)

Foliage density: ☒ normal ☐ sparse **Leaf size:** ☐ normal ☐ small

Annual shoot growth: ☐ excellent ☒ average ☐ poor **Twig Dieback?** Y N

Woundwood development: ☐ excellent ☒ average ☐ poor ☐ none

Vigor class: ☐ excellent ☒ average ☐ fair ☐ poor

Growth obstructions:

☐ stakes ☐ wire/ties ☐ signs ☐ cables

☐ curb/pavement ☐ guards

☒ other eroding creek bank

Major pests/diseases: Tree has poor structure with corrected lean growing in highly erosive creek bank.

SITE CONDITIONS

Site Character: ☐ residence ☐ commercial ☐ industrial ☐ park ☐ open space ☐ natural ☐ woodland\forest

Landscape type: ☐ parkway ☐ raised bed ☐ container ☐ mound ☐ lawn ☐ shrub border ☐ wind break

Irrigation: ☒ none ☐ adequate ☐ inadequate ☐ excessive ☐ trunk wettled

Recent site disturbance? (Y) N ☐ construction ☒ soil disturbance ☐ grade change ☐ line clearing ☐ site clearing

% dripline paved: (0%) 10-25% 25-50% 50-75% 75-100% **Pavement lifted?** Y N

% dripline w/ fill soil: (0%) 10-25% 25-50% 50-75% 75-100%

% dripline grade lowered: (0%) 10-25% 25-50% 50-75% 75-100%

Soil problems: ☐ drainage ☐ shallow ☐ compacted ☐ droughty ☐ saline ☐ alkaline ☐ acidic ☐ small volume ☐ disease center ☒ history of fail ☐ clay ☐ expansive ☐ slope ___° aspect: ___

Obstructions: ☐ lights ☐ signage ☐ line-of-sight ☐ view ☐ overhead lines ☐ underground utilities ☐ traffic ☐ adjacent veg. ☐ ___

Exposure to wind: ☒ single tree ☐ below canopy ☐ above canopy ☐ recently exposed ☐ windward, canopy edge ☐ area prone to windthrow

Prevailing wind direction: unknown **Occurrence of snow/ice storms** ☒ never ☐ seldom ☐ regularly

TARGET

Use Under Tree: ☐ building ☐ parking ☐ traffic ☐ pedestrian ☒ recreation ☐ landscape ☐ hardscape ☐ small features ☐ utility lines

Can target be moved? Y (N) **Can use be restricted?** (Y) N

Occupancy: ☒ occasional use ☐ intermittent use ☐ frequent use ☐ constant use

TREE DEFECTS

ROOT DEFECTS:

Suspect root rot: Y (N) **Mushroom/conk/bracket present:** Y N **ID:** _____

Exposed roots: ☐ severe ☒ moderate ☐ low **Undermined:** ☒ severe ☐ moderate ☐ low

Root pruned: N/A distance from trunk **Root area affected:** 50 % **Buttress wounded:** Y (N) **When:** _____

Restricted root area: ☐ severe ☐ moderate ☒ low **Potential for root failure:** ☒ severe ☐ moderate ☐ low

LEAN: _____ deg. from vertical ☐ natural ☐ unnatural ☒ self-corrected **Soil heaving:** (Y) N

Decay in plane of lean: Y (N) **Roots broken** (Y) N **Soil cracking:** (Y) N

Compounding factors: Rapidly eroding creek bank **Lean severity:** ☐ severe ☒ moderate ☐ low

CROWN DEFECTS: Indicate presence of individual defects and rate their severity (s = severe, m = moderate, l = low)

DEFECT	ROOT CROWN	TRUNK	SCAFFOLDS	BRANCHES
Poor taper	N/A	N/A	N/A	N/A
Bow, sweep				
Codominants/forks				
Multiple attachments				
Included bark				
Excessive end weight				
Cracks/splits				
Hangers				
Girdling				
Wounds/seam				
Decay				
Cavity				
Conks/mushrooms/bracket				
Bleeding/sap flow				
Loose/cracked bark				
Nesting hole/bee hive				
Deadwood/stubs				
Borers/termites/ants				
Cankers/galls/burls				
Previous failure				

HAZARD RATING

Tree part most likely to fail: Roots - Whole tree

Inspection period: _____ annual _____ biannual _____ other _____

Failure Potential + Size of Part + Target Rating = Hazard Rating

3 + 2 + 1 = 6

Failure potential: 1 - low; 2 - medium; 3 - high; 4 - severe
Size of part: 1 - <6" (15 cm); 2 - 6-18" (15-45 cm); 3 - 18-30" (45-75 cm); 4 - >30" (75 cm)
Target rating: 1 - occasional use; 2 intermittent use; 3 - frequent use; 4 - constant use

HAZARD ABATEMENT

Prune: ☐ remove defective part ☐ reduce end weight ☐ crown clean ☐ thin ☐ raise canopy ☐ crown reduce ☐ restructure ☐ shape

Cable/Brace: _____ **Inspect further:** ☐ root crown ☐ decay ☐ aerial ☐ monitor

Remove tree: (Y) N **Replace?** Y N **Move target:** Y N **Other:** _____

Effect on adjacent trees: ☒ none ☐ evaluate

Notification: ☐ owner ☐ manager ☒ governing agency **Date:** See letter report

COMMENTS

Tree is at risk of failure due to lean and undermined roots, and rapidly eroding creek bank. preservation is not feasible due to location in limit of grade of bank stabilization improvements (ie. crib wall).

Part 10. Section 7 Biological Assessment

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Biological Assessment

Prepared for Department of Army - Corps of Engineers

Section 7 Endangered Species Act Consultation

Children's Health Council, San Francisquito Creek Bank Stabilization – Phase 2, Santa Clara County, California

Prepared for:
Children's Health Council
650 Clark Way
Palo Alto, CA 94304

Contact: Terry Boyle
tboyle@chconline.org

Prepared by:
WRA, Inc.
2169-G East Francisco Blvd
San Rafael, California 94901

Contact: Bianca Clarke
clarke@wra-ca.com

WRA Project: 27109

Date: April 2020

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF APPENDICES

LIST OF ABBREVIATIONS

Applicant	Children's Health Council
BA	Section 7 Biological Assessment
BMP(s)	Best Management Practice(s)
CCC	Central California Coast
CDFW	California Department of Fish and Wildlife
CHC	Children's Health Council
CNDDB	California Natural Diversity Database
Corps	U.S. Army Corps of Engineers
CRLF	California red-legged frog
DPS	Distinct Population Segment
EFH	Essential Fish Habitat
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FR	Federal Register
NMFS	National Marine Fisheries Service
OHWM	Ordinary High Water Mark
PCE	Primary Constituent Elements
steelhead	Central California Coast Distinct Population Segment steelhead
SWPPP	Storm Water Pollution Prevention Plan
TOB	Top of Bank
USFWS	United States Fish and Wildlife Service
WRA	WRA, Inc.

DEFINITIONS

Action Area	The Action Area includes the Project Area (areas subject to disturbance associated with construction), as well as approximately a 150 foot buffer upstream and downstream for Project related disturbance or species relocations. Additionally the Action Area includes the perennial pool below Searsville Dam. The pool below Searsville Dam will be used for relocation of any steelhead if suitable habitat is not present upstream or downstream of the Project Area (e.g. due to dry conditions or Private Property restrictions). The location of the Action Area is shown in Figure 1 (Appendix A). The extent of the Action Area around the Project Area is shown in Figure 2 (Appendix A).
Project Area	Approximately 0.7-acre area within the Action Area containing San Francisquito Creek and mixed riparian woodlands as well as developed uplands associated with the Children's Health Council School where the Project will take place. Figure 2, Appendix A.
Project	The Project will use a combination of live log crib wall sections to protect and stabilize the bank along the Applicants property within the Project Area.
Service-approved Biologist	A biologist or biological monitor whose scientific qualifications have been approved by NMFS and/or USFWS

1.0 INTRODUCTION

WRA, Inc. (WRA) on behalf of Children's Health Council (CHC, Applicant) submits this Biological Assessment (BA) in accordance with legal requirements set forth under Section 7 of the Endangered Species Act (ESA) (16 U.S.C. 1536 (c)) and follows ESA guidance provided by the National Marine Fisheries Service (NMFS), and United States Fish and Wildlife Service (USFWS) in accordance with standards established in the National Environmental Policy Act. Children's Health Council is a provider of education and clinical services to children and teens with autism, ADHD, anxiety and depression, and other learning differences. CHC consists of two on-site schools, a therapy center, clinics for underserved families, community education center, outdoor learning area/playground, and serves approximately 150 students daily.

The purpose of this BA is to review the proposed Action, the San Francisquito Creek Bank Stabilization – Phase 2 Project (Project) in sufficient detail to determine to what extent the Project may affect any of the endangered or threatened species or designated critical habitats listed below.

The Project is located approximately 0.6 mile southwest of the intersection of El Camino Real (Highway 82) and Sand Hill Road, in the center of urban development associated with the City of Palo Alto (Action Area, Figure 1, Appendix A). The Action Area includes the Project Area (areas subject to disturbance associated with construction), as well as an approximately 150 foot buffer for Project related disturbance or species relocations as well as a perennial pool below Searsville Dam. The pool below Searsville Dam will be used for relocation of any steelhead if suitable habitat is not present directly downstream of the Project Area (e.g. due to dry conditions or Private Property restrictions). The location of the Action Area is shown in Figure 1 (Appendix A). Details concerning the Action Area, Project Area and Project elements are shown in Figure 2 (Appendix A).

1.1 Federal Listed or Candidate Species Considered

1.1.1 Federal Listed Species that May Be Affected by the Proposed Action

The following listed species may be affected by the proposed Action:

- Central California Coast (CCC) Distinct Population Segment (DPS) steelhead (steelhead, *Oncorhynchus mykiss irideus*) - Threatened
- California red-legged frog (CRLF, *Rana draytonii*) – Threatened

1.1.2 Federal Listed Species that are Not Likely to be Adversely Affected by the Proposed Action

There are no Federal-listed species that merit this determination for this Project.

1.1.3 Federal Listed Species that will have No Effect by the Proposed Action

- Salt-marsh harvest mouse (*Reithrodontomys raviventris*) – Endangered
- Yellow-billed cuckoo (*Coccyzus americanus occidentalis*) – Threatened
- Marbled murrelet (*Brachyramphus marmoratus*) – Threatened
- Bald eagle (*Haliaeetus leucocephalus*) – Delisted
- California least tern (*Sterna antillarum browni*) – Endangered
- Ridgeway's clapper rail (*Rallus longirostris obsoletus*) – Endangered
- Western snowy plover (*Charadrius nivosus (alexandrines) nivosus*) – Threatened

- California tiger salamander (*Ambystoma californiense*) – Threatened
- San Francisco gartersnake (*Thamnophis sirtalis tetrataenia*) – Endangered
- Delta smelt (*Hypomesus transpacificus*) – Threatened
- Green sturgeon (*Acipenser medirostris*) – Threatened
- Longfin smelt (*Spirinchus thaleichthys*) – Threatened
- San Bruno elfin butterfly (*Callophrys mossii bayensis*) – Endangered
- Bay checkerspot butterfly (*Euphydryas editha bayensis*) – Threatened
- San Mateo thorn-mint (*Acanthomintha duttonii*) – Endangered
- Crystal Springs fountain thistle (*Cirsium fontinale var. fontinale*) – Endangered
- Marin western flax (*Hesperolinon congestum*) – Threatened
- Two-fork clover (*Trifolium amoenum*) – Endangered

The majority of the aforementioned species have been found to have a No Effect determination due to the absence of habitat. The Project Area is primarily a creek channel, surrounded on all sides for at least 1.5 miles (with the exception of San Francisquito Creek) by dense urban development which precludes natural habitats such as salt marsh, vernal pools, old growth forest or other such habitats required to support aforementioned listed species. Due to the total absence of habitat, these species have no potential to occur and will be unaffected by the Action.

All of the aforementioned species in Section 1.1 are addressed in more detail in Appendix B. Those species found to have *No Effect* (Section 1.1.3) are not considered further in this analysis. Any species that *May Be Affected* (Section 1.1.1) are evaluated in more detail below.

1.2 Critical Habitat

Critical habitat is a term defined and used by the ESA as a specific, designated geographic area that contains features essential for the conservation of a threatened or endangered species and that may require special management and protection. The ESA requires federal agencies to consult with the USFWS and NMFS to conserve listed species within critical habitat areas and to ensure that any activities or projects they fund, authorize, or carry out on such lands will not jeopardize the survival of a threatened or endangered species; this requirement applies even if the subject listed species are considered absent in the focal area

Critical Habitat is designated for CCC DPS steelhead on San Francisquito Creek (70 FR 52488 - 52627). Figure 3 (Appendix A) includes areas defined as “Perennial Stream”. In accordance with the definition of the extent of critical habitat under 70 FR 52488, areas identified as “Perennial Stream” are the same areas which are also designated as critical habitat (Figure 3, Appendix A).

1.3 Essential Fish Habitat

Essential Fish Habitat (EFH) for Chinook and Coho Salmon is present within the Project Area. An assessment of effects to EFH is included as Appendix C.

1.4 Consultation to Date

Interagency meetings including USFWS and NMFS staff were held on September 14, 2017 and March 14, 2019 in which details of the bank stabilization were discussed, and feedback from the regulatory agencies was received.

On March 26, 2019, WRA initiated a request for technical assistance with Brian Meux and Dan Logan of the NMFS. The technical assistance request focused on review of the crib wall design

in association with steelhead habitat in San Francisquito Creek. The technical assistance concluded on June 18, 2019, and WRA has integrated the recommendations of NMFS staff into the project design.

On December 30, 2019, WRA communicated with Joseph Terry of the USFWS to discuss the potential for CRLF within the Project Area. It was recommended in the email response from USFWS that the Project should seek take coverage for CRLF due to the nature of development surrounding San Francisquito Creek which may provide the only natural corridor which CRLF could use when dispersing from potential breeding sites to the west of the Project Area. On this recommendation the BA was updated to include take of CRLF.

No other consultation has yet been initiated for this Project.

1.5 Current Management Direction

Lands which contain the Project Area are currently owned by Stanford and are leased to the Applicant to operate a school. A section of the school is currently threatened by bank erosion along San Francisquito Creek. To protect school facilities, the Applicant proposes to stabilize the creek bank, but following this work, no additional projects are planned to occur within the creek channel.

2.0 DESCRIPTION OF THE PROPOSED ACTION

2.1 Location

The Project Area straddles the boundary line between Santa Clara, and San Mateo Counties and is located approximately 0.6 mile southwest of the intersection of El Camino Real and Sand Hill Road, in the center of urban development associated with the City of Palo Alto. The Project Area is at the northwestern edge of the CHC campus located at 650 Clark Way in Palo Alto. Details concerning the Project Area are shown in Figure 2 (Appendix A).

2.2 Existing Conditions

The banks of San Francisquito Creek at the margins of the school's outdoor learning area, are at risk for erosion and are identified as a high priority for stabilization in the San Francisquito Creek Joint Powers Authority Bank Stabilization and Revegetation Master Plan. Recent active erosion of the channel banks on the CHC property accelerated during the 2016 – 2017 rainy season, resulting in the loss of approximately 50 horizontal feet of the creek bank and 7,500 square feet of CHC's outdoor learning area. The channel banks in the area of accelerated erosion are approximately 30 feet high and vertical. Intact soils behind the bank failure are cracking and near failure.

In 2019, a shear pin wall was installed above the top of bank to provide protection to critical resources on the CHC campus. As a condition of approval for the shear pin wall (referred to as "Phase 1" of the project), the City of Palo Alto required that additional in-channel improvements be installed based on comment they received from the San Francisquito Creek Joint Powers Authority (JPA) and the Santa Clara Valley Water District. Details of the shear pin wall were shared with regulatory agencies, including the USFWS and NMFS on September 14, 2017 and it was determined that no potential effects to species listed under the ESA would occur from the shear pin wall installation.

The CHC property line is defined by the historic centerline of San Francisquito Creek. The Project would take place on CHC property within San Francisquito Creek, below the top of bank (TOB). Channel banks in this area are approximately 30 feet high. A gravel access road, where the Phase I shear pin wall was installed (2019), forms the northeastern boundary of the Project Area, followed by the CHC playground, containing landscaped grass and shrubs and built children's play equipment (Figure 2, Appendix A). In the area of proposed work, San Francisquito Creek is bordered by single-family residences under West Menlo Park jurisdiction to the west and south. The property is also designated as Major Institution/Special Facility according to the City of Palo Alto Comprehensive Plan, which is defined as "institutional…lands that are either publicly owned or operated as non-profit organizations."

Vegetation within the Project Area is sparse and primarily composed of non-native grasses and herbs, as well as coast live oak (*Quercus agrifolia*), California bay (*Umbellularia californica*), and California buckeye (*Aesculus californica*). Any biological communities within the Project Area are detailed below in Table 1. Photographs of the Project Area are included in Appendix D.

Table 1. Biological Community Acreages within the Project Area

Community Type	**Project Area (Acres)**
Landscaped/Developed	0.32
Unvegetated/Ruderal	0.15
Perennial Stream	0.14
Mixed Riparian Woodland	0.08
Total	**0.69**

Landscaped/Developed

The Project Area contains approximately 0.32 acre of landscaped/developed area. These areas are located in the east portion of the Project Area and are outside or above TOB. Landscaped/Developed areas include the existing outdoor learning area/playground, a paved parking lot turnaround, gravel access pathways, fencing, and landscaped areas. Landscaped areas contain a mixture of ornamental and native tree species including pear (*Pyrus* sp.), coast redwood (*Sequoia sempervirens*), and coast live oak.

Unvegetated/Ruderal

Crib wall work within the unvegetated/ruderal area includes 0.15 acre of permanent disturbance to the bare/eroded portions of San Francisquito Creek. Disturbance includes excavation of 189 cubic yards of artificial fill and native fill material, grading, and placement of approximately 735 cubic yards of fill for the crib wall structure and backfill material. The temporary access road extends into the unvegetated/ruderal area and will disturb approximately 0.01 acre (614 square feet; includes area above the Ordinary High Water Mark [OHWM] and below TOB) and requires the placement of approximately 150 cubic yards of clean fill.

Perennial Stream (San Francisquito Creek)

San Francisquito Creek is a perennial stream that occupies approximately 275 linear feet (0.14 acre) of the Project Area. The creek is confined within an approximately 30-foot deep by 60-foot wide fluvial terrace. Within the Project Area, San Francisquito Creek flows roughly south to north. The creek bed in undisturbed portions of channel contains cobbles mixed with gravel, sand, and silts. Disturbed portions of the creek bed contain artificial fill material, including brick, concrete and native material eroded from the bank. The creek contains well-developed meanders and point bar complexes upstream and downstream of the Project Area. During the rainy season, the wetted creek channel varies between 10 to 20 feet wide and approximately 3 feet deep. During summer months or times of low precipitation, the channel becomes shallow and narrow (approximately 1 to 2 feet wide); occasionally drying completely with the exception of pockets of standing water.

Woody species observed on the banks of San Francisquito Creek include, polished willow (*Salix laevigata*), coast live oak, tree of heaven (*Ailanthus altissima*), and California bay (*Umbellularia californica*). Portions of the creek bank slumped into the creek are primarily denude of vegetation or contain sparse cover of tobacco tree (*Nicotiana glauca*), French broom (*Genista monspessulana*), and native and non-native forb species including Bermuda buttercup (*Oxalis pes-caprae*), stinging nettle (*Urtica dioica*), and poison hemlock (*Conium maculatum*). The OHWM was mapped based on evidence of bed and bank indicators, scouring, and/or sediment sorting. The TOB was mapped based on geomorphic position within the landscape, extent of erosion, and break in slope.

Mixed Riparian Woodland

Crib wall work within the vegetated riparian area includes 0.08 acre (3,485 square feet) of permanent disturbance as a result of the placement of bioengineered bank stabilization materials, excavation of 101 cubic yards of artificial and native fill material, grading, and placement of approximately 315 cubic yards of fill for the crib wall structure and backfill material. The temporary access road will also extend into the riparian area and will disturb 0.01 acre (553 square feet, includes area above OHWM and below TOB) requiring placement of approximately 191 cubic yards of clean fill.

Riparian vegetation removal will disturb 0.06 acre below TOB and entail the removal of six trees; three coast live oak (*Quercus agrifolia*), two California buckeyes (*Aesculus californica*), and one red willow (*Salix laevigata*). All trees to be removed are located on the east bank. In addition, understory poison oak patches and herbaceous cover will be cleared and grubbed. Details of all trees inventoried are included in the Tree Survey Report included in Part 7 of this permit application package. Tree species proposed for removal are depicted on Sheet C-4.0 in Part 9. Project Plans.

Riparian habitat disturbed in the Project Area will be restored immediately following final grading activities. Riparian revegetation totals approximately 0.15 acre (6,360 square feet). Riparian revegetation is discussed further in Section 2.2.2 above and described in further detail is Part 16. HMMP. In accordance with the City of Palo Alto's Tree Technical Manual, Ordinance-sized trees will be protected with tree protection fencing and signage before construction activities commence; protection fencing and signage will remain in place for duration of work. Tree replacement will occur at a minimum of a 3:1 ratio for the number of trees removed, with new native tree species planted to add greater diversity to the riparian cover within the Project Area.
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2.3 Description of the Proposed Action

2.3.1 Action Agency

The Action Agency is the Army Corps of Engineers (Corps).

2.3.2 Applicant

Children's Health Council is the Applicant and will be responsible for avoidance and minimization measures related to the Action. The address and contact information for CHC is:

Children's Health Council
650 Clark Way
Palo Alto, CA 94304
Contact: Terry Boyle
tboyle@chconline.org650-688-3602

This biological assessment was prepared by WRA, Inc., and WRA serves as the Authorized Agent. Contact information for the Authorized Agent is:

WRA, Inc.
2169-G East Francisco Blvd.
San Rafael, California 94901
Contact: Bianca Clarke
(415) 454-8868 x 1470

2.3.3 Purpose of Action

The purpose of the Action is to mitigate bank erosion and failures along the creek which are threatening to further erode and collapse parts of the Children's Health Council school facility.

Due to the nature, location, and time-sensitivity of the creek bank failure, an emergency project was approved by the City of Palo Alto on September 24, 2018 (Phase I of the proposed project). The purpose of Phase I was to stabilize the eastern bank of San Francisquito Creek to prevent further loss of outdoor learning areas used by CHC's students and minimize hazards to public safety due to imminent continued bank loss. Phase I of the project, completed in February 2019, included emergency installation of 19 concrete "shear pins" and steel tie-backs, set back from the creek bank by about 6 feet and extending 20 feet vertically below the existing creek bed. The shear pin wall is meant to stabilize the property behind the eroding bank and prevent imminent dangers to the property and human safety. The shear pins are a line-of-last-defense against bank retreat and loss of property into the creek, but do not protect the existing character of San Francisquito Creek, which supports significant ecological resources.

In approving the Phase I emergency project, the City of Palo Alto stipulated a number of Conditions of Approval. The thirteenth condition states, "Following approval of this project, the property owner or its designee shall apply for permits with the City of Palo Alto and other applicable agencies to complete in-channel creek bank stabilization." The condition goes on to say that, "the purpose of this secondary project would be to minimize risk of future exposure to the shear pin wall, maintain or improve sediment transport by minimizing continued erosion along

the base of the wall adjacent the subject property, and maintain or otherwise improve stream function." The Project is a direct response to this Condition of Approval from the City.

2.3.4 Description of the Proposed Action

The Project is focused on bank stabilization which will be accomplished by the construction of a live log crib wall along the east side of San Francisquito Creek. Work on the crib wall is located downslope of the shear pin wall constructed during Phase I (completed spring 2019). To access the creek channel a temporary access pathway will be constructed to allow construction equipment and construction personnel access to the work area and is discussed further below. All work will occur below the TOB, with some work also occurring below the OHWM. The most recent draft plan set at the time of the submission of this document are attached as Appendix E. Species-specific measures are discussed in greater detail in Section 4.2.

Site Access, Staging, and Dewatering

To accomplish the bank stabilization work, a temporary access route will be constructed in the eastern edge of the Project Area (Figure 2, Appendix A). The access route will connect to the CHC parking lot and is located in an area with relatively gradual slopes. Approximately 291 cubic yards of material will be placed to create the access ramp from TOB down into the channel. Vegetation removal will be required to facilitate access road construction and will consist of removing native and non-native shrubs and understory vegetation. Clearing will entail removal of six trees; two mature coast live oak and four smaller trees including two California buckeyes, one coast live oak, and one red willow (*Salix laevigata*). No paving is proposed for the temporary access route which will also be removed once construction is complete. Existing paved areas above the top of bank will be used for the storage and staging of materials throughout the course of the project.

Crib wall work will start once the Project Area is established and prepared including implementation of species avoidance and minimization measures, vegetation removal, construction of the temporary access route into the work area, and any dewatering operations are completed. If dewatering is required, a dewatering plan has been included as Appendix F. The contents of the plan will only be enacted if flows are present at the time the Project is initiated.

Equipment

Construction equipment used to complete the Project may include general use service vehicles (i.e. pickup trucks), excavators, haul trucks, dewatering equipment (i.e. pumps, generators, and piping), trailers, and assorted power and hand tools. All construction and equipment will be staged above the TOB and outside the limit of grading (Figure 2, Appendix A).

Bank Stabilization and Crib Wall Installation

Creek stabilization work will entail the excavation of native sediment with some amounts of eroded brick and artificial fill. All artificial debris removed will be off-hauled to an appropriate disposal site as it is not an appropriate material for backfill within a perennial stream system. Native sediment will be removed from the Project Area and evaluated for re-use. If reuse is not appropriate, the native material will be off-hauled as well to an appropriate disposal site.

Once the east bank of San Francisquito Creek is excavated, a new channel bank will be rebuilt in approximately the same elevation and location as the existing bank with the bioengineered crib

wall. Work includes grading, placement of boulder and cobble fill, placement, anchoring, and pinning of rootwads and crib logs, placement of engineered fill, and native seeding and planting within the riparian area. Clean boulder, cobble, and engineered fill material will be imported and placed below TOB. The boulder grade control will serve as the foundation of the crib wall and prevent the channel from undercutting the crib wall. Above the foundation, a "Lincoln-log" style structure crib wall will be embedded into the creek bank. The structure will consist of stacked 1.5-foot diameter logs, either Douglas fir (*Pseudotsuga menziesii*), coast redwood, or another native riparian tree if determined necessary (no eucalyptus will be used), at a 1:1 slope along the bank. The structure will be secured together with threaded rebar and helical anchors in the bank. The first log level of the crib wall will use tie-back logs, which are logs set into the bank, braced to resist the force of the streamflow. In addition, the first level of the crib wall will also include 13 rootwads, spaced approximately 10 feet apart. The rootwads provide additional streambank protection and interstitial space for fish habitat. Rootwads are strategically located at existing pools in the creek to help reduce water velocities during high flow events and to provide habitat and flow refugia for steelhead. Engineered fill material, consisting of clean gravel and cobble sized material, will be placed within and behind the crib wall cavities. The upper channel bank, area above the crib wall, will be back filled and graded to a maximum slope of 2:1 up to the existing vertical face below TOB. A portion of the exposed vertical face below TOB will remain intact and undisturbed to potential cultural resource impacts.

Revegetation

Following completion of final grading and work on the lower and upper channel bank, riparian areas within the limit of grading will be seeded and replanted with native woody and herbaceous vegetation to replace removed riparian vegetation. Replanting includes three distinct native riparian planting areas and schedules. The lowest portion of the crib wall will be planted with arroyo willow (*Salix lasiolepis*) and sandbar willow (*Salix exigua*) stakes placed within the lower crib wall cavities. The remaining slopes above will be planted with native riparian shrub and tree species and hydroseeded with a native riparian seed mix.

2.4 Avoidance, Minimization, and Conservation Measures

The proposed Project will include measures to avoid or minimize effects to listed species, sensitive habitats, and the surrounding environment. Measures below which include numbers prior to text correspond to the numbered measures within the USFWS Programmatic Biological Opinion for Small Projects that may affect CRLF (USFWS 2014) and have been included for ease of cross referencing.

2.4.1 General Avoidance and Minimization Measures

The following general conservation measures will be implemented during the Project to avoid and minimize adverse effects on sensitive species and habitats. Any conservation measures specific to individual species addressed in this BA are presented in the next section. All permit conditions, legal requirements, and appropriate excavation and engineering practices shall be followed to avoid and minimize environmental impacts associated with the proposed Action. Best Management Practices (BMPs), as identified by the San Francisco Regional Water Quality Control Board and in the Stormwater Pollution Prevention Plan (SWPPP) (14), will be implemented to control water erosion during the Action.

- (11) The Project will be timed to occur during the dry season (May 1 to October 30).

- (9) Construction disturbance or removal of vegetation will be restricted to the minimum footprint necessary to complete the work. The work area will be delineated with high visibility fencing, markers, or silt fencing to minimize impacts to habitat beyond the work limit. Fencing will be maintained throughout Project construction and removed upon completion.
- (20) Any disturbed areas shall be restored with a combination of native seed mix, or appropriate plantings at the conclusion of the Project.
- (14, 29) Dust control will be used as needed to minimize airborne dust.
- (14) Staging, maintenance, and parking areas shall be located outside of stream channel banks. Any petroleum or similar substances shall be staged outside of the channel within a contained area.
- (14) Prior to the start of construction, the contractor shall prepare a hazardous materials management/fuel spill containment plan. This plan should include procedures to be used in the event of spills as well as information regarding the disposal of any spilled materials.
- (14) Refueling or maintenance of equipment (stationary or otherwise) within the TOB shall only occur when secondary containment sufficient to eliminate escape of all potential fluids is in place.
- (14) Stationary equipment such as motors, pumps, and generators, located adjacent to aquatic features will be positioned over drip pans.
- (14) All activities performed near aquatic features will have spill kits available for use in the case of an accidental spill.
- Vehicles will be decontaminated before and after working on the Project (e.g. all soils and petroleum fluids shall be cleaned from the equipment).
- (16) Any equipment or vehicles operated adjacent to aquatic features will be checked and maintained daily to prevent leaks.
- Appropriate BMPs will be installed around any stockpiles of soil or other materials which could be mobilized to prevent runoff from entering aquatic habitats.
- (14) No construction debris or wastes will be placed where they may be washed into any aquatic features. All such debris and waste will be picked-up regularly and will be disposed of at an appropriate facility.
- (18) Any food waste that may attract scavengers shall be deposited in closed containers and removed from the work area daily.
- Upon completion of work, all temporary construction materials will be removed from the Project Area including any temporary ramps or temporary access points.

2.4.2 Avoidance and Minimization Measures for Federal-listed Species

Fish rescue or additional avoidance measures for steelhead are required beyond the general measures listed above only if water is present at the time work is initiated. Flow in San Francisquito Creek is anticipated to be low, or entirely absent in the dry season when the proposed Project will occur. If the Project Area is naturally dry, as is typical for the proposed work window, then no dewatering will be required and subsequent fish specific measures would not be applicable.

Any general measures stated above will be followed throughout the Project. For the protection of Federal-listed species and their critical habitat the following additional measures will be implemented if water is present to minimize impacts to Federal-listed species and critical habitats.

- (5) The qualifications of any biologists who will lead the fish rescue and relocation or who

will survey for and relocate CRLF will be submitted to the NMFS or USFWS (respectively) for review and written approval at least thirty (30) calendar days prior to initiation of the Project (Service-approved Biologist). A Service-approved Biologist will be onsite during all activities that may result in take of steelhead or CRLF.

- (8) All construction personnel will participate in a worker environmental awareness program. Under this program, a Service-approved Biologist (either in person or via a pre-recorded presentation) will instruct all construction personnel about (1) the description and status of the species found on-site; (2) the importance of their associated habitats; (3) a list of measures being taken to reduce impacts on these species during work, and (4) procedures to follow if a protected species is encountered. Once completed workers shall sign a list verifying the completion of training. The list of trained personnel shall be available on-site until completion of the Project.
- (3) The contact information for a Designated Representative who will assure compliance with any measures implemented for the Project will be submitted to the USFWS and NMFS at least 30 days prior to the start of work.
- (4) CDFW, USFWS or NMFS shall be allowed to inspect the site at any point during the Project with a request for access.
- (31) Non-native predators (e.g. bullfrogs) will not be relocated.

Measures specific to steelhead (Applicable if water is present at the time of construction)

- A fish rescue plan is attached in Appendix G for NMFS review, and outlines the methods to be used (e.g., types of cofferdam to be deployed, method of fish collection such as electrofishing, seining, etc.), criteria for relocation site selection, data to be collected, decontamination procedures, and reporting procedures that will be followed.
- If habitat is available, any captured steelhead will be relocated immediately downstream of the Project Area. If suitable habitat is not available, any steelhead will be released at the perennial pool below Searsville Dam.
- If a fish rescue is required, a Service-approved biologist will lead the fish rescue to capture and relocate any steelhead from within the Project Area prior to the start of work.
- A bypass will be installed to route flows around the work area either via diversion into another portion of the extant channel which is outside of the Project Area footprint, or via a pipe, hose or similar structure.
- (15) Any pumps used for the Project shall be screened according to NMFS criteria for salmonid streams until the area has been cleared by a Service-approved biologist.
- Any water actively pumped out of the Project Area (e.g. removal of groundwater seepage) will (at minimum) pass through a gravel bucket or filter sock to lower turbidity before waters are allowed to reenter the live stream.
- Any pumps used in areas not cleared of fish shall be screened according the NMFS Screening Criteria for waters containing salmonids (NMFS 1997). Once an area has been cleared, no additional screening shall be required.

Measures specific to CRLF

One Federal-listed species, CRLF, was determined have potential to disperse through the Project Area. Because of the timing, and limited duration of the Project, take of CRLF is not readily expected to occur. To further ensure take is minimized, additional measures are proposed below to specifically minimize adverse effects to individual CRLF. The measures have been guided off a review of the conservation measures presented in the USFWS Programmatic Biological Opinion for Small Projects that may affect CRLF (USFWS 2014). As with the recommendations of the

Programmatic Biological Opinion, the only monitoring recommended is during initial vegetation removal. No other biological monitoring is recommended as it is unlikely that a CRLF would move during the time of year when the Project is scheduled.

- (6) Within 24 hours prior to the start of construction, a Service-approved Biologist will conduct a preconstruction survey for CRLF within the bounds of the Project Area.
- (7) The Service-approved Biologist will have stop work authority for all Project activities to protect CRLF and shall be given the authority to communicate with the USFWS if they exercise such authority.
- (6, 17) If CRLF are detected during preconstruction surveys, or during the course of work, any work in the vicinity that may threaten CRLF will stop. The Service-approved Biologist will then determine the best course of action based on the situation at hand. If possible, the CRLF will be monitored and allowed to leave the area of its own volition. However, if the CRLF is unlikely to fully relocate out of the Project Area on their own in a reasonable timeframe, or if they cannot leave the area without exposure to other risks (e.g. predation); the individual(s) will be captured and relocated in accordance with the process outlined below.
    - Before beginning a relocation, the Service-approved Biologist will assure any equipment used for the relocation has been properly cleaned and decontaminated. If using their hands to capture CRLF, they will either don sterile gloves, or assure their hands are free from toxic substances such as insect repellant, sunscreen or other chemicals.
    - Using a dip net, wetted, or gloved hands, the Service-approved Biologist will catch the CRLF and place it into a clean container (e.g. bucket with a lid).
    - If multiple frogs of similar age class are captured, they may be put into the same container. However, frogs of varying age class will be segregated into separate containers to avoid predation.
    - Once all CRLF have been captured, the Service-approved Biologist will relocate the animals to the nearest suitable habitat. Release locations will be at least 100-feet from the Project Area.
    - After relocation, all equipment will be sterilized according to the industry standards to prevent the spread of disease.
    - (32) The Service-approved Biologist will contact the USFWS within 24 hours following any relocation to report the relocation of CRLF.
- Any vegetation that could conceal CRLF shall be removed under the supervision of a Service-approved Biologist. If vegetation is too dense to be adequately surveyed (e.g. tall grasses, or blackberry), the Service-approved Biologist may request that vegetation is cut to a height of 6-12 inches (and cut vegetation removed) prior to conducting a survey. If no CRLF are found, the vegetation shall be cut to ground level before work with tracked or wheeled equipment is initiated.
- (12) Project-related vehicles will observe a 20-mile per hour speed limit within the Project Area. All construction activities will cease one half hour before sunset and shall not begin prior to one half hour after sunrise.
- (26) Construction activities shall not occur during rain events or within 24 hours of events which have delivered >0.25 inches of rain, until a Service-approved biologist resurveys and clears the work site.
- (21, 28) Erosion control structures shall not include monofilament netting or similar materials that may entangle CRLF.
- (30) Any open holes or trenches shall be covered or have escape ramps installed to prevent CRLF from becoming entrapped.

- (27) Work shall be restricted to daylight hours only (sunrise to sunset).
- (23) No pets will be permitted during Project construction.
- (25) Any pipes or similar materials required for the Project will be stored in upland areas, and elevated or covered to prevent entrance by CRLF.

The following measures from the USFWS programmatic biological opinion will not be utilized. An explanation as to why they are not applicable is included.

Measure 1 - Habitat Compensation. The Project Area is composed entirely of developed uplands associated with a school and creek channel. Any work within the uplands will not impact potential CRLF habitat due to its developed nature and all work within the channel will be fully restored or enhanced following completion of the Project through riparian planting, or increased habitat complexity following construction of the crib wall.

Measure 2 - Passage for Road Improvements. The Project is not conducting any permanent roads or improvements and will not create any barriers to movement within the creek upon completion.

Measure 13 - Bio Swales. No permanent roadways are being constructed, therefore no bio swales are required.

Measure 19 - Concrete and Asphalt. Any concrete, or other non-natural materials encountered during the Project will be hauled offsite and disposed. Neither material will be used as part of the general Project.

Measure 22 - Pesticide, Herbicide, Insecticide. None of these substances are proposed for use on the Project.

Measure 24 - Firearms. The Project is located on a school ground, firearms are already prohibited or anyone other than law enforcement personnel.

2.5 Project Schedule

The Project is anticipated to be permitted in 2020, with the intent to begin construction in the dry season of 2021. The Project is anticipated to be completed within a single dry season.

3.0 STATUS OF THE SPECIES AND CRITICAL HABITAT IN THE ACTION AREA

A list of Federal endangered, threatened, and candidate species that have been documented in the vicinity of the Project Area is provided in Appendix B. This list was generated from a review of the California Natural Diversity Database (CNDDB; CDFW 2019) and the NMFS California Species List Tool (NMFS 2019, Appendix H). The results of the CNDDB query are shown in Figure 4a and 4b (Appendix A). Biological studies and related observations previously conducted in the Project Area are described in Section 3.1.

3.1 Surveys and Resources Consulted for Federal Listed Species and Habitat

In addition to CDFW (2019) and NMFS (2019), WRA searched publicly available sources for information pertaining to federal-listed species and habitats within the Project Area. The list below outlines additional documents that have been consulted to help determine the presence of Federal-listed species.

- Historical Distribution and Current Status of Steelhead/Rainbow Trout (*Oncorhynchus mykiss*) in Streams of the San Francisco Estuary, California (Leidy 2005).
- Endangered and Threatened Species; Designation of Critical Habitat for Seven Evolutionarily Significant Units of Pacific Salmon and Steelhead in California; Final Rule (70 FR 52488 - 52627)

3.2 CCC DPS Steelhead - Federal-Threatened

The CCC DPS steelhead includes all naturally spawned populations of steelhead (and their progeny) in California streams from the Russian River to Aptos Creek, and the drainages of San Francisco and San Pablo Bays eastward to the Napa River (inclusive), excluding the Sacramento-San Joaquin River Basin. Two artificial propagation programs are considered to be part of the CCC DPS: the Kingfisher Flat Hatchery/Scott Creek, and the Don Clausen Fish Hatchery (NMFS 2007).

3.2.1 Life History and Habitat Requirements

The life history patterns for steelhead are both highly variable and flexible (Moyle 2002). While similar to most Pacific salmonids (*Oncorhynchus* sp.) in their anadromous life history, steelhead exhibit a greater variation in timing for each component of their life history (NMFS 2007). Steelhead typically migrate to marine waters after spending two years in freshwater, though they may stay up to seven. They then reside in marine waters for two or three years prior to returning to their natal stream to spawn as four or five year-olds. In addition to the anadromous life history, a resident freshwater life history known as rainbow trout exists for the species. Both of these life history types often exist in the same populations, and genetically these types are indistinct from each other with resident rainbow trout capable of producing steelhead and steelhead progeny sometimes becoming resident rainbow trout (Moyle 2002).

Steelhead are generally classified into two groups based on their timing in returning from the ocean to freshwater systems and their state of sexual maturity at that time (NMFS 2007). “Summer-run” steelhead are sexually immature when they enter freshwater in the spring and early summer. They then hold in suitable freshwater habitat, preferring deep (three meters or more) cold (10 to 15° Celsius) pools, for several months while they sexually mature. “Winter-run” steelhead enter freshwater systems during late fall or early winter and are either at or near sexual maturity.

Steelhead adults typically return to their natal streams to spawn between December and June. Unlike other Pacific salmonids, steelhead are iteoparous, meaning adults do not always die after spawning (NMFS 2007).

Juvenile steelhead prefer to rear in eddies and along velocity breaks where they can exert minimal energy holding in one position while being in close proximity to forage on terrestrial and aquatic invertebrates washed downstream. Instream cover such as large woody debris and undercut banks in deep pools, along with sufficient riparian cover form important rearing habitat (USFWS 1986). Growth rate varies based on temperature, with optimal growth thought to occur between 15 and 19 degrees Celsius (Hayes et al. 2008). Ephemeral floodplain habitat has been shown to be particularly important foraging and refuge for juvenile salmonids (Jeffres et al. 2008). Sommer et al. (2001) found significantly higher growth rates for salmonids rearing in floodplain habitat then with those rearing in adjacent stream habitat. Survival rates for juveniles and smolts is higher for

larger and older steelhead, which demonstrates the importance of productive juvenile rearing habitat for the survival of the species (USFWS 1986).

Smolting occurs when juvenile steelhead outmigrate to the ocean. A process of morphological, behavioral, and biochemical changes occur that prepares the individual for a pelagic life in the ocean (USFW 1986). While in the ocean, a rapid growth phase occurs where individuals feed on the nutrient rich marine ecosystem and become much larger then resident Rainbow Trout.

3.2.2 Habitat Assessment and Survey Results

Surveys within San Francisquito Creek have noted steelhead presence since 1905. Electrofishing surveys throughout reaches above and below the Project Area in the 1990's documented numerous fish holding in features primarily consisting of small seasonal pools (Leidy et al 2005). Surveys conducted between 1999 and 2001 also identified steelhead juveniles throughout San Francisquito Creek from Highway 101 to the Searsville Dam (Leidy et al 2005). In 2013, photographs were taken of two adult steelhead in San Francisquito Creek near the Searsville Dam, indicating passage from San Francisco Bay to the dam is fully possible, and confirming that anadromous fish do return to the creek (American River 2014). A migration barrier study also reported Searsville Dam as the only complete barrier to migration on the mainstem of San Francisquito Creek which runs through the Project Area (Leidy et al 2005, CDFW 2018). Because the only barrier to migration is located above the Project Area, and recent accounts have shown that the species is present, steelhead are considered at least seasonally present within the Project Area.

3.2.3 Current Threats

The primary driving factor identified in the decline of CCC steelhead is the loss and degradation of natural habitat and flow conditions (NMFS 2007). Factors contributing to this include urbanization, changes in watershed drainage, agriculture, forestry, channel realignment, water withdrawal, diversions, and fish passage barriers.

3.3 CCC DPS Steelhead Critical Habitat

Critical Habitat is designated for CCC DPS steelhead (70 FR 52488 - 52627).

3.3.1 Critical Habitat Requirements

The definition of critical habitat includes "space for individual and population growth, and for normal behavior; food, water, air, light, minerals, or other nutritional or physiological requirements; cover or shelter; sites for breeding, reproduction, or rearing offspring; and, generally, habitats that are protected from disturbance or are representative of the historic geographical and ecological distributions of this species." For steelhead, the Primary Constituent Elements (PCE) or physical and biological features defined by the final critical habitat designation (70 FR 52488 - 52627) include: spawning sites, food resources, water quality and quantity, riparian vegetation, migration corridors, estuarine areas, nearshore marine areas, and offshore marine areas. The lateral extent of critical habitat is also defined by 70 FR 52487 as: "…the width of the stream channel defined by the ordinary high-water line as defined by the COE in 33 CFR 329.11." Areas identified in Figure 3 as "Perennial Stream" are those which meet this definition and are considered critical habitat. In total 0.14 acres of critical habitat are present within the Project Area.

3.3.2 Habitat Assessment and Survey Results

The critical habitat designation for CCC DPS steelhead specifically identifies San Francisquito Creek as being critical habitat (70 FR 52488 - 52627).

The two specific PCE descriptions for habitats that occur within the Project Area, or in close proximity include:

- Freshwater rearing sites with water quantity and floodplain connectivity to form and maintain physical habitat conditions and support juvenile growth and mobility; water quality and forage supporting juvenile development; and natural cover such as shade, submerged and overhanging large wood, log jams and beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks. These features are essential to conservation because without them, juveniles cannot access and use the areas needed to forage, grow, and develop behaviors (e.g., predator avoidance, competition) that help ensure their survival.

- Freshwater migration corridors free of obstruction with water quantity and quality conditions and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels, and undercut banks supporting juvenile and adult mobility and survival. These features are essential to conservation because without them juveniles cannot use the variety of habitats that allow them to avoid high flows, avoid predators, successfully compete, begin the behavioral and physiological changes needed for life in the ocean, and reach the ocean in a timely manner. Similarly, these features are essential for adults because they allow fish in a non-feeding condition to successfully swim upstream, avoid predators, and reach spawning areas on limited energy stores.

Spawning is not known to occur within this portion of San Francisquito Creek, but has been observed higher in the watershed near the Searsville Dam, therefore spawning habitat is not present. The Project Area is also outside of tidal influence from San Francisco Bay and as such does not contain estuarine, nearshore, or offshore marine habitats. While the Project Area typically goes dry, small perennial flows in the area, and small pools within the Project Area may continue to support rearing late into the year when water conditions are sufficient. Therefore freshwater rearing and migratory corridors are considered present.

3.3.3 Current Threats

The primary driving factors identified in the decline of CCC steelhead habitat are the loss or degradation of natural habitat (NMFS 2007). Factors contributing to this include urbanization, water diversions, modification of natural flow regimes, fish passage barriers (e.g., dams and road crossings) as well as surrounding land use activities and loss of supporting habitats (i.e., wetlands and riparian forest).

3.4 California Red-legged Frog – Federal-Threatened

California red-legged frog was listed as Federally Threatened on May 23, 1996 (61 FR 25813-25833). Critical Habitat for the CRLF was designated on April 13, 2006 (71 FR 19243-19346), and the revised designation was finalized on March 17, 2010 (75 FR 12815-12959). A Recovery Plan for the CRLF was published by the USFWS on May 28, 2002.

3.4.1 *Life History and Habitat Requirements*

The historical range of the CRLF extended along the coast from the vicinity of Point Reyes National Seashore, Marin County, California and inland from Redding, Shasta County southward to northwestern Baja California, Mexico (Jennings and Hayes 1985). The current distribution of this species includes only isolated localities in the Sierra Nevada, northern Coast, and Northern Traverse Ranges. It is still common in the San Francisco Bay area and along the central coast. It is now believed to be extirpated from the southern Transverse and Peninsular Ranges (USFWS 2002).

There are four physical and biological characteristics that are essential for the conservation or survival of a species. These characteristics for the CRLF include: aquatic breeding habitat; non-breeding aquatic habitat; upland habitat; and dispersal habitat (USFWS 2010).

Aquatic breeding habitat consists of low-gradient fresh water bodies, including natural and manmade (e.g., stock) ponds, backwaters within streams and creeks, marshes, lagoons, and dune ponds. It does not include deep-water habitat, such as lakes and reservoirs. Aquatic breeding habitat must hold water for a minimum of 20 weeks in most years. This is the average amount of time needed for egg and larval development and metamorphosis so that juveniles can become capable of surviving in upland habitats (USFWS 2010).

Aquatic non-breeding habitat may or may not hold water long enough for this species to hatch and complete its aquatic life cycle, but it provides shelter, foraging, predator avoidance, and aquatic dispersal for juvenile and adult CRLF. These waterbodies include plunge pools within intermittent creeks; seeps; quiet water refugia during high water flows; and springs of sufficient flow to withstand the summer dry period. CRLF can use large cracks in the bottom of dried ponds as refugia to maintain moisture and avoid heat and solar exposure (Alvarez 2004). Non-breeding aquatic features enable CRLF to survive drought periods and disperse to other aquatic breeding habitat (USFWS 2010).

Upland habitats typically include areas within 300 feet of aquatic and riparian habitat and are comprised of grasslands, woodlands, and/or vegetation that provide shelter, forage, and predator avoidance. These upland features provide breeding, non-breeding, feeding, and sheltering habitat for juvenile and adult frogs (e.g., shelter, shade, moisture, cooler temperatures, a prey base, foraging opportunities, and areas for predator avoidance). Upland habitat can include structural features such as boulders, rocks and organic debris (e.g. downed trees, logs), as well as small mammal burrows and moist leaf litter (USFWS 2010).

Dispersal Habitat includes accessible upland or riparian habitats between occupied locations within 0.7 mile of each other that allow for movement between these sites. Dispersal habitat includes various natural and altered habitats such as agricultural fields, which do not contain barriers to dispersal. Moderate- to high-density urban or industrial developments, large reservoirs, and heavily traveled roads without bridges or culverts are considered barriers to dispersal (USFWS 2010). Although CRLF is highly aquatic, this species has been documented to make overland movements of several hundred meters and up to one mile during a winter-spring wet season in Northern California (Bulger et al. 2003, Fellers and Kleeman 2007) and 2,860 meters (1.8 miles) in the central California coast (Rathbun and Schneider 2001). Frogs traveling along water courses can exceeded these distances.

3.4.2 Habitat Assessment and Survey Results

A review of CNDDB records shows a record of CRLF from 2016 occurring in the Atherton Channel, approximately 2.3 miles from the Project Area. This site is close to the known dispersal distance for this species, however the occurrence is isolated from the Project Area by urban development. CNDDB states that CRLF is likely extirpated from an area of suitable breeding habitat in Lake Lagunita at Stanford University, approximately 1.3 miles from the Project Area. This site has been well monitored, and no CRLF have been encountered here since the last occurrence in 1956 (CNDDB 2019). There is an additional CRLF occurrence upstream on San Francisquito Creek, approximately 3.1 miles from the Project Area (CNDDB 2019). This occurrence is listed as possibly extirpated. While the majority of these sites are presumed extirpated, the dense urban development surrounding San Francisquito Creek leave only one dispersal corridor for individuals that may persist in these areas. If there are CRLF present at these previously recorded sites, CRLF would have only one route to disperse, through San Francisquito Creek, potentially passing through the Project Area.

The Project Area does not contain suitable CRLF breeding habitat. The proposed Project will occur during the dry season, and the anticipated lack of depth of any remaining pools within the Project Area is anticipated to prevent CRLF from using water depth to evade predation, which is a requirement of aquatic non-breeding habitat. Therefore, the Project Area does not contain the physical or biological features necessary to be considered aquatic nonbreeding habitat. No suitable small mammal burrows or other such structural features are present; therefore, the Project Area is unsuitable for long-term upland occupancy for CRLF. The Project Area would only be useful for CRLF as a temporary stopover habitat during migration or dispersal events and as such, the Project Area is best described as dispersal habitat for CRLF.

3.4.3 Current Threats

CRLF populations are threatened by numerous human activities that often act synergistically and cumulatively with natural disturbances (i.e. droughts or floods) (USFWS 2002). Human activities that negatively affect CRLF include agriculture, urbanization, mining, overgrazing, recreation, timber harvesting, nonnative plants, impoundments, water diversions, degraded water quality, and introduced predators.

More than 90 percent of the historic wetlands in the Central Valley have been lost due to conversion for agriculture or urban development (USFWS 1978, Dahl 1990). This has resulted in a significant loss of frog habitat throughout the species' range (USFWS 2002). Habitat along many stream courses has also been isolated and fragmented, resulting in reduced connectivity between populations and lowered dispersal opportunities.

Isolated populations are now more vulnerable to extinction through stochastic environmental events (i.e., drought, floods) and human-caused impacts (i.e., grazing disturbance, contaminant spills) (Soulé 1999). Isolated populations suffer from increased predation by nonnative predators, changes in hydroperiod due to variable wastewater outflows, and increased potential for toxic runoff.

4.0 EFFECTS ANALYSIS

The sections below discuss direct, indirect, interrelated/interdependent, and cumulative effects from the proposed Project on steelhead and steelhead critical habitat.

4.1 CCC DPS Steelhead

Steelhead presence in San Francisquito Creek has been documented since the early 1900's (Leidy et al 2005). While steelhead have been documented spawning in reaches just below Searsville Dam, this feature represents a total barrier to upstream migration above the dam. However, juvenile steelhead persist in areas downstream of the dam as far as Highway 101 (Leidy et al 2005). While the Project Area goes seasonally dry, steelhead are assumed present during migratory periods or when foraging and rearing when waters are present. Steelhead may also be present if pools within the Project Area have been recently isolated due to natural drying, essentially stranding steelhead within the Project Area naturally.

4.1.1 Direct Effects

Direct or immediate effects are defined as those which occur on the species or its habitat at the time the Project is implemented.

If water is not present, then no direct effects are anticipated to steelhead as the species will be absent from the Project Area at the time work occurs.

If water is present at the time the Project begins, the proposed Project may have direct effects to steelhead. If water is flowing, or pools have only recently become isolated due to the natural drying cycle, steelhead juveniles may be present in several pools that occur within the Project Area. Dewatering would cause a direct effect by drying out these habitat features, stranding any steelhead that may be present. To minimize this effect, a Service-approved Biologist will lead a fish rescue to capture and relocate any steelhead that may be holding within the Project Area. Rescuing steelhead also poses a risk to fish which will be exposed to stress during capture as well as effects specific to the capture methods (e.g. seining and electrofishing). In addition relocation poses some risk of predation following relocation, and crowding at relocation sites. The methods used for capture and relocation are detailed in a relocation plan (Appendix G), and the effort would be led by a Service-approved Biologist who is knowledgeable in capture methods, and techniques to minimize stress on captured steelhead, thereby making the relocation process as minimally stressful to steelhead as possible, while fulfilling the benefit of relocating fish to other sections of creek which are not subject to construction related dewatering effects.

The Project is scheduled to occur during the dry season when flows are at their lowest, and when the local area is naturally dry. As such it is not expected that fish will be able to pass the area due to the natural drying cycle of the creek. If flows are present, they will either be diverted to the opposite side of the creek channel outside of the Project Area, or a gravity fed bypass system will be installed to allow the free flow of water downstream for as long as water is naturally present. The bypass will be suitably sized to carry the dry season flow of the stream in order to keep water flowing as long as it is naturally available. If any water is pumped or drained from the Project Area (i.e. remnant water or groundwater seepage) it would pass through a filtration system before re-entering the creek channel to minimize any potential effects of turbidity or water quality on fish downstream. By conducting work when it is proposed, it is likely that water will be naturally absent avoiding any impacts to steelhead or their localized movement. However, if flows are present, then they will be re-routed and bypassed in order to avoid water quality impacts that might otherwise limit or cause direct harm to steelhead individuals.

4.1.2 Indirect Effects

Indirect effects are those effects that are caused by or will result from the proposed Project and are later in time, but still reasonably certain to occur.

The design of the Project is likely to have several beneficial indirect effects to steelhead. First, steelhead are anticipated to benefit from increased habitat complexity within the Project Area following completion of the Project. Currently the banks are composed of largely unvegetated sandstone which lacks structure to support cover or foraging resources for steelhead. The overall structure will be composed of root wads, topped by a timber or log crib wall which will increase habitat complexity and diversity. Steelhead individuals would likely benefit from interstitial spaces for cover, potentially decreasing predation risk. Steelhead may also use those spaces as velocity refugia in high flows, keeping individuals from washing out to the Bay before acclimation to saltwater could occur. Natural elements such as stone and timber are also better for supporting invertebrates or other similar food sources which benefit steelhead by increasing size of fish before migrating out. Additionally, riparian tree plantings will increase woody debris and detritus in the local system, further increasing the available foraging materials and potentially the growth and survival rate for individuals. The bank within the crib wall will be planted with numerous willow stakes while the higher elevations of the bank are planted with oaks and buckeye trees. Once mature, these trees will provide shade to waters beneath, decreasing thermal exposure, reducing heat stress on steelhead that can hold within the crib wall while migrating.

If any toxic substances remained in the creek after the completion of the Project, they could potentially impact fish when flows return to the channel. Items such as treated lumber, and spills from equipment into the creek have potential to indirectly effect steelhead following completion of the Project. These effects will be negated by using only non-treated lumber, and by the implementation of a spill prevention plan during Project work. Additionally, any concrete, or other non-natural materials encountered during excavation will be hauled offsite and replaced with suitable fill, furthering the beneficial effect of the Project. Given the design of the Project and implementation of measures, no negative indirect effects are anticipated as a result of the Project.

4.1.3 Analysis of Interrelated/Interdependent Effects

Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration.

Once completed, the Project is anticipated to be free of the need for maintenance. While the timber crib wall may disintegrate over 75 to 100 years, the root structure of the planted vegetation within the Project Area will stabilize the bank by holding gravels and generally slowing flow of water along the bank, negating the need to refurbish the crib wall. As such, no additional phases to this Project are anticipated. Because this Project represents the end of the foreseeable work, no interrelated or interdependent effects are anticipated.

4.1.4 Cumulative Effects

Cumulative effects are those effects of future State, Tribal, local or private actions that are reasonably certain to occur within and in the vicinity of the Project Area.

No additional phases of this Project are anticipated once construction is complete. Maintenance of the structure is not anticipated within the foreseeable future as the structures are designed to

either survive a 100 year flood, or to be replaced by a natural growth of vegetation planted within the Project Area.

The only future Projects known for the San Francisquito Creek drainage are a proposed project by the San Francisquito Creek Joint Powers Authority which would seek to construct flood reduction features, as well as enhance the environment and recreational opportunities, along a stretch of San Francisquito Creek from the upstream side of West Bayshore Road to the area immediately upstream of the Pope-Chaucer Bridge (SFCJPA 2019). In addition, Stanford has announced plans to either open up, or remove the Searsville Dam which currently represents the upstream end of anadromy for San Francisquito Creek (BSD 2019, Mercury News 2015). No specific date or timeline could be found during investigation for this report to say when Stanford expects to accomplish, removal or breaching of the dam. When viewed in combination with these proposed flood control and dam removal projects, this Project is expected to provide a beneficial cumulative effect for the species by enhancing habitat complexity and resiliency for steelhead during high flows.

4.2 CCC DPS Steelhead Critical Habitat

The critical habitat designation for CCC DPS steelhead specifically identifies San Francisquito Creek as being critical habitat (70 FR 52488 - 52627).

The Project Area is located within the lower half of the watershed, and does not support perennial flows or gravel beds required for spawning. However, the location within the watershed means that the Project Area does function as a freshwater migration corridor and potentially as rearing habitat for some part of the year when water is present.

4.2.1 Direct Effects

Direct or immediate effects are defined as those which occur on the species or its habitat at the time the Project is implemented.

If water is not present at the time the Project is initiated, no direct effects are anticipated to steelhead critical habitat as it will not currently be serving as habitat.

The Project Area contains mapped critical habitat and functions primarily as a migratory corridor, and at times as rearing habitat. The Project is scheduled to occur during the dry season (May 1 to October 31), after outmigrating smolts have exited the stream, and ending before adults return to streams. Therefore, there is not likely to be any direct effect to the Project Area functioning as a migratory corridor. If flows are present at the time of construction, the Project Area or downstream reaches may also serve as rearing habitat. By diverting flows into the opposite side of the extant channel, or using a bypass pipe, hydrologic connectivity will be maintained for critical habitat, thus minimizing any direct effects to rearing habitat. By the design and timing of the Project, any negative effects to critical habitat will either be temporary and minimized or fully avoided , which will in turn result in numerous beneficial indirect effects.

4.2.2 Indirect Effects

Indirect effects are those effects that are caused by or will result from the proposed action and are later in time, but still reasonably certain to occur.

The design of the Project is likely to have several beneficial indirect effects to steelhead critical habitat. The structure is composed of root wads, topped by a timber or log crib wall, which will be interspersed with plantings and gravels to secure the bank. Currently the banks are composed of exposed sandstone which lacks structure to support cover (interstitial spaces), velocity refugia, or surfaces that might support invertebrate prey. The structure (including the crib wall) will increase habitat complexity and diversity along this bank of the creek, providing interstitial spaces for velocity refugia, as well as cover for rearing and migrating salmonids. The bank within the crib wall will be planted with numerous willow stakes while the higher elevations of the bank are planted with oaks and buckeye trees. Once mature vegetation is present it will provide shade to waters beneath, decreasing thermal exposure. The mature vegetation is also expected to contribute woody debris to the stream, adding to downstream habitat complexity. This additional habitat complexity is expected to increase overall habitat suitability and function for migration and rearing. Lastly, the Project Area is located in a sinuous portion of San Francisquito Creek just upstream of a small oxbow. The Project is expected to help maintain sinuosity by allowing flows to continue around the curve and into the oxbow, thereby maintaining lower flow velocities, and increased habitat complexity within this portion of the creek.

4.2.3 Analysis of Interrelated/Interdependent Effects

Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration.

Once completed the Project is anticipated to be free of the need for maintenance. While the timber crib wall may disintegrate over 75 to 100 years, the root structure of planted vegetation within the Project Area will stabilize the bank, negating the need to refurbish the crib wall. As such, no additional phases to this Project are anticipated. Because this Project represents the end of the foreseeable work, no interrelated or interdependent effects are anticipated.

4.2.4 Cumulative Effects

Cumulative effects are those effects of future State, Tribal, local or private actions that are reasonably certain to occur within and in the vicinity of the Project Area.

The only future Projects known for the San Francisquito Creek drainage are a proposed project by the San Francisquito Creek Joint Powers Authority which would seek to construct flood reduction features, as well as enhance the environment and recreational opportunities, along a stretch of San Francisquito Creek from the upstream side of West Bayshore Road to the area immediately upstream of the Pope-Chaucer Bridge (SFCJPA 2019). In addition, Stanford has announced plans to either open up, or remove the Searsville Dam which currently represents the upstream end of anadromy for San Francisquito Creek (BSD 2019, Mercury News 2015). No specific date or timeline could be found during investigation for this report to say when Stanford expects to accomplish removal or breaching of the dam. When viewed in combination with these proposed flood control and dam removal projects, this Project would likely provide a beneficial cumulative effect for critical habitat by enhancing habitat complexity and resiliency during high flows.

As this Project is anticipated to provide a long term beneficial effect (as described under Section 4.2.2) no negative cumulative effects are anticipated if either of these projects mentioned above evolve further.

4.3 California Red-legged Frog

During a site visit conducted by WRA, Inc. on February 6, 2018, no CRLF of any life stage was observed within the Project Area. There are several occurrences of this species within 3 miles of the Project Area, though some are isolated by urban development, and others are considered extirpated. However, given nearby occurrences, and the lack of other dispersal areas due to urban development, it is possible that CRLF from those areas upstream, may disperse, or be washed downstream during high flows, and could subsequently end up within the Project Area. Given the distances, there is a low potential for the species to be present. However, the species presence cannot be fully ruled out. Therefore, impacts are being assessed assuming that a very low number of individuals may have either been washed downstream or migrated downstream and could interact with Project activities.

4.3.1 Direct Effects

Direct or immediate effects are defined as those which occur on the species or its habitat at the time the Project is implemented.

Direct effects to CRLF resulting from the proposed Project include take by injury or harassment associated with vegetation removal, or observation and relocation. Once initial surveys are complete, vegetation is removed and any initial grading is complete, all potential refugia for CRLF will have been removed, leaving no place for CRLF to hide and eliminating any future potential to be impacted by Project activities. The Project will occur during the dry season when rains are not likely to prompt CRLF to disperse into the Project Area, eliminating potential for further interaction with CRLF that may be in the vicinity. Through the limited scope and duration of Project activities as well as implementation of the aforementioned conservation measures, including biological monitoring for vegetation clearing, the likelihood for injury or death of CRLF is very low. However, take in the form of injury or harassment may occur if CRLF are in the vicinity of Project activities and encountered by work or are observed and relocated during Project activities.

4.3.2 Indirect Effects

Indirect effects are those effects that are caused by or will result from the proposed action and are later in time, but still reasonably certain to occur.

Following completion of the Project no further maintenance is anticipated that could impact CRLF in the future.

Implementation of the Project is not likely to modify CRLF dispersal patterns, habitat type or habitat connectivity in the area. Given the natural drying cycle of this section of San Francisquito Creek, the Project Area is not likely to support water of suitable depth or duration to be used as any form of aquatic habitat. Overall potential use of the Project Area is not expected to change.

The primary indirect effect may be in a localized increase in structural complexity that CRLF may use the structure as cover during dispersal events. Currently the banks are composed of unvegetated sandstone which lacks structure to support refugia for dispersing CRLF. The crib wall structure will increase complexity which may aid CRLF in dispersal by providing interstitial spaces for cover. Additionally, increasing natural elements (woody debris, detritus and live vegetation) may also support invertebrate or other food sources for CRLF that disperse through the area.

Items such as treated lumber, and spills of toxic substances have potential to indirectly effect CRLF following completion of the Project. However, these effects will be avoided by using only non-treated lumber, and by the implementation of a spill prevention plan during Project work. Given these Project design elements and measures, no significant indirect effects (positive or negative) are anticipated as a result of the Project.

4.3.3 Analysis of Interrelated/Interdependent Effects

Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration.

Once completed, the Project is anticipated to be free of the need for maintenance. While the timber crib wall may disintegrate over 75 to 100 years, the trees planted within the Project Area will stabilize the bank by holding gravels and generally slowing flow of water along the bank, negating the need to refurbish the crib wall. As such, no additional phases to this Project are anticipated. Because this Project represents the end of the foreseeable work, no interrelated or interdependent effects are anticipated.

4.3.4 Cumulative Effects

Cumulative effects are those effects of future State, Tribal, local or private actions that are reasonably certain to occur within and in the vicinity of the Project Area.

The only future Projects known for the San Francisquito Creek drainage are a proposed project by the San Francisquito Creek Joint Powers Authority which would seek to construct flood reduction features, as well as enhance the environment and recreational opportunities, along a stretch of San Francisquito Creek from the upstream side of West Bayshore Road to the area immediately upstream of the Pope-Chaucer Bridge (SFCJPA 2019). In addition, Stanford has announced plans to either open up, or remove the Searsville Dam which currently represents the upstream end of anadromy for San Francisquito Creek (BSD 2019, Mercury News 2015). No specific date or timeline could be found during investigation for this report to say when Stanford expects to accomplish, removal or breaching of the dam. When viewed in combination with these proposed flood control and dam removal projects no cumulative updates are anticipated to CRLF. Due to the Project Area location within the watershed and distance from any current populations of CRLF, it is unlikely that the Project would influence cumulative effects for CRLF in the San Francisquito Creek drainage.

5.0 DETERMINATION OF EFFECT

CCC DPS steelhead, and their designated critical habitat are known to occur within San Francisquito Creek. Though the Project is scheduled to occur during the dry season, if water is present at the time of initiation, steelhead may be present, and the Project Area will still be functional as either a migratory corridor or foraging and rearing habitat.

The conclusions of this Biological Assessment for Federal-listed species with potential to occur and critical habitat within the Project Area are as follows:

- CCC DPS Steelhead – *May affect, Likely to adversely affect*
- CCC DPS Steelhead Critical Habitat – *Not Likely to adversely Modify or Destroy*
- California red-legged frog – *May Affect, Likely to Adversely Affect*

5.1 CCC DPS Steelhead

A run of steelhead is known to occur on San Francisquito Creek. The Project may have direct effects to steelhead if water is present when the Project breaks ground. Steelhead juveniles and smolts could be stranded during dewatering, but with the implementation of a fish relocation plan, it is anticipated that the risk could be minimized. Effects to steelhead downstream would be avoided by the routing of flows around the Project Area within the stream channel or using a gravity fed bypass system that will allow water to continue flowing, to maintain downstream fish health. All indirect effects of the Project are anticipated to be beneficial. These effects primarily include benefits from increased habitat complexity which will improve migratory conditions for steelhead allowing for higher survival rates, due to better cover and increased foraging success. The Project is not anticipated to have any interrelated or interdependent effects, since the Project represents the end of any foreseeable work. No additional phases of this Project are anticipated once construction is complete, and there will be no foreseeable maintenance required, thus no cumulative effects are anticipated. There are yet to be determined projects pending a Corps flood control feasibility study on San Francisquito Creek, and Stanford has announced plans to open or remove the Searsville Dam, although no specific timeline could be found for this potential project. Based on these factors, the primary opportunity for take of steelhead would be during dewatering and the subsequent fish relocation. This would only occur if water is present when work occurs, even if all minimization measures are employed there is still a risk to steelhead during the relocation therefore the Project ***may affect, and is likely to adversely affect*** steelhead.

5.2 CCC DPS Steelhead Critical Habitat

The Project Area has been designated as critical habitat for CCC steelhead. The Project will be initiated in the dry season when flows are most likely to be naturally discontinuous through the Project Area, thereby limiting the potential for any direct effects to migratory and rearing habitat. If water is present when construction begins a bypass will maintain flows in order to maintain downstream connectivity and minimize temporary effects to rearing habitat. The Project has been designed to provide beneficial indirect effects to rearing and migratory habitat as well as fulfilling the role of stabilizing the bank and protecting the Applicant's facility. The indirect benefits to critical habitat will include increasing available high flow refugia and habitat complexity that may serve to limit predation, minimizing thermal exposure by planting a variety of native riparian trees, adding structures which will diversify substrates to increase foraging opportunities through the use of natural and diverse materials, as well as with additions of detritus and woody debris. While the Project may temporarily impact a small amount of critical habitat during construction, those effects are minimized by the Project design and timing, but in turn will result in indirect benefits to steelhead critical habitat. As such the Project is ***not likely to adversely modify or destroy s***teelhead critical habitat.

5.3 California Red-legged Frog

The proposed Project will have no effect on CRLF eggs or larvae, because CRLF breeding habitat is not present in the Project Area. The Project may have direct effects to adult CRLF that have dispersed into the area, but suitable non-breeding aquatic habitat is not present to support CRLF for prolonged periods over the summer. Therefore any individuals encountered are expected to be limited in number and consist of holdovers from earlier migratory events. The construction window for the Project is during the dry season which would also preclude CRLF from dispersing into the Project Area during work as suitable moist conditions would not be present. Therefore the only potential time when CRLF may be affected would be during initial preconstruction surveys

or during monitoring for vegetation clearing which would result in take in the form of injury and harassment associated with these activities. The chance of CRLF presence in the Project Area is very low, and while risks are minimized by the design of the Project as well as the use of minimization measures, the potential for take is not eliminated. Assuming these factors, the Project ***may affect, and is likely to adversely affect*** CRLF.

6.0 LIST OF CONTACTS, CONTRIBUTORS, PREPARERS

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Terry Boyle
tboyle@chconline.org
650-688-3602

This biological assessment was prepared by WRA with supplemental information provided by the Applicant. The addresses and telephone numbers are:

WRA, Inc.
2169-G East Francisco Blvd.
San Rafael, California 94901

Contact:
Bianca Clarke
(415) 524-7255
clarke@wra-ca.com

7.0 REFERENCES

American Rivers. 2014. America's Most Endangered Rivers, San Francisquito Creek. https://www.americanrivers.org/river/san-francisquito-creek/. Most Recently Accessed: March 2019.

Alvarez, J. A. 2004. Rana aurora draytonii (California red-legged frog) Microhabitat. Herpetological Review 35:162-163.

Bulger, J.B., Scott, N.J., and Seymour, R.B. 2003. Terrestrial activity and conservation of adult California red-legged frogs Rana aurora draytonii in coastal forests and grasslands. Biological Conservation 110:85–95.

[BSD]. Beyond Searsville Dam. 2019. Beyond Searsville Dam Organization Website. http://www.beyondsearsvilledam.org/Beyond_Searsville_Dam/Home.html. Most Recently Accessed: March 2019.

[CDFW] California Department of Fish and Wildlife. 2019. California Natural Diversity Data Base (CNDDB). RareFind 5. Natural Heritage Division, California Department of Fish and Game. Sacramento, California.

CDFW. 2018. California Department of Fish and Wildlife. BIOS. California Passage Assessment Database. California Department of Fish and Game. Sacramento, California.

Dahl, T. E. 1990. Wetland losses in the United States, 1978s to 1980s. U.S. Fish and Wildlife Service, Washington, DC.

Fellers, G. and P.M. Kleeman. 2007. California red-legged frog (Rana draytonii) movement and habitat use: Implications for conservation. Journal of Herpetology 41(2): 276-286.

Hayes, S., M. Bond, C. Hanson, E. Freund, J. Smith, E. Anderson, A. Ammann, and R. MacFarlane. 2008. Steelhead Growth in a Small Central California Watershed: Upstream and Estuarine Rearing Patterns. *Transactions of the American Fisheries Society* 137:114-128.

Hayes, M. P. and D. M. Krempels. 1986. Vocal sac variation among frogs of the genus Rana from western North America. Copeia 1986(4):927-936.

Jeffres C., J. Opperman, and P. Moyle. 2008. Ephemeral floodplain habitats provide best growth conditions for juvenile Chinook salmon in a California river. *Environmental Biology of Fishes* (2008) 83:449–458

Jennings, M. R. and M. P. Hayes. 1985. Pre- 1900 overharvest of California red-legged frogs (Rana aurora draytonii): The inducement for bullfrog (*Rana catesbeiana*) introduction. Herpetological Review 32(1):94-103.

Leidy, R.A., G.S. Becker, B.N. Harvey. 2005. Historical distribution and current status of steelhead/rainbow trout (Oncorhynchus mykiss) in streams of the San Francisco Estuary, California. Center for Ecosystem Management and Restoration, Oakland, CA.

Mercury News. 2015. Stanford announces future of Searsville Dam. Publish Date: May 1, 2015.

Moyle, P. 2002. Inland Fishes of California Revised and Expanded. University of California Press. Berkeley, California.

[NMFS] National Marine Fisheries Service. 1997. Fish Screening Criteria for Anadromous Salmonids. National Marine Fisheries Service Southwest Region.

NMFS. 2007. Federal Recovery Outline for the Distinct Population Segment of Central California Coast Steelhead. Prepared by NMFS Southwest Regional Office. Long Beach, California.

NMFS. 2019. California Species List Tool. Maps and Data. Available Online at: http://www.westcoast.fisheries.noaa.gov/maps_data/california_species_list_tools.html. Accessed February 2018.

Rathbun, Galen B., and Julie Schneider. 2001. “Translocation of California Red-Legged Frogs (Rana Aurora Draytonii).” Wildlife Society Bulletin (1973-2006), vol. 29, no. 4, pp. 1300–1303.

[SFCJPA]. San Francisquito Creek Joint Powers Authority. 2019. Environmental Impact Report, San Francisquito Creek Flood Protection, Ecosystem Restoration, and Recreation Project Upstream of Highway 101. Priority Projects List March 2020. Available Online at: http://www.sfcjpa.org. Most Recently Accessed: March 2019.

Sommer, T., M. Nobriga, W. Harrell, W. Batham, and W. Kimmerer. 2001. Floodplain rearing of juvenile chinook salmon: evidence of enhanced growth and survival. Canadian Journal of Fisheries and Aquatic Sciences 58: 325-333.

Soulé, M.E. and J. Terbough. 1999. Conserving nature at regional and continental scales - a scientific program for North America. Bioscience 49:809-817.

[USFWS] U.S. Fish and Wildlife Service. 1978. Concept plan for waterfowl wintering habitat preservation, Central Valley, California. Region 1, Portland, OR.

USFWS. 1986. Species Profile: Life Histories and Environmental Requirements of Coastal Fishes and Invertebrates (Pacific Northwest) Steelhead Trout. Biological Report 82 (11.82).

USFWS. 2002. Recovery plan for the California red-legged frog (*Rana aurora draytonii*). U.S. Fish and Wildlife Service, Portland, OR.

USFWS. 2010. Endangered and Threatened Wildlife and Plants: Revised Designation of Critical Habitat for California Red-legged Frog; Final Rule. Federal Register, Vol. 75, No. 51. 12815-12959.

USFWS. 2014. Programmatic Biological Opinion for Issuance of Permits under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act, including Authorizations Under 22 Nationwide Permits, for Projects that May Affect the Threatened California Red- Legged Frog in Nine San Francisco Bay Area Counties, California

Appendix A

Figures

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Path: L:\Acad 2000 Files\27000\27109\GIS\ArcMap\2019\Fig1_Location.mxd

Sources: National Geographic, WRA | Prepared By: njander, 2/5/2020

Figure 1. Action Area Map

Children's Health Council
Creek Bank Restoration
Palo Alto, California

0 0.5 1 Miles

N

wra ENVIRONMENTAL CONSULTANTS

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Sources: Esri Streaming - NAIP 2016 | Prepared By: njander, 2/10/2020

Figure 2. Action Area, Project Area and Design Elements

Children's Health Council
Creek Bank Restoration
Palo Alto, California

0 50 100 Feet

N

wra
ENVIRONMENTAL CONSULTANTS

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Sources: Esri Streaming - NAIP 2016 | Prepared By: SGillespie, 1/13/2020

Figure 3. Biological Communities within the Project Area

Children's Health Council
Creek Bank Restoration
Palo Alto, California

0 50 100 Feet N

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Path: L:\Acad 2000 Files\27000\27109\GIS\ArcMap\2019\FigX_BioComm.mxd

Sources: Esri Streaming - NAIP 2016 | Prepared By: SGillespie, 3/9/2020

Figure 3. Biological Communities within the Project Area

Children's Health Council
Creek Bank Restoration
Palo Alto, California

0 50 100 Feet

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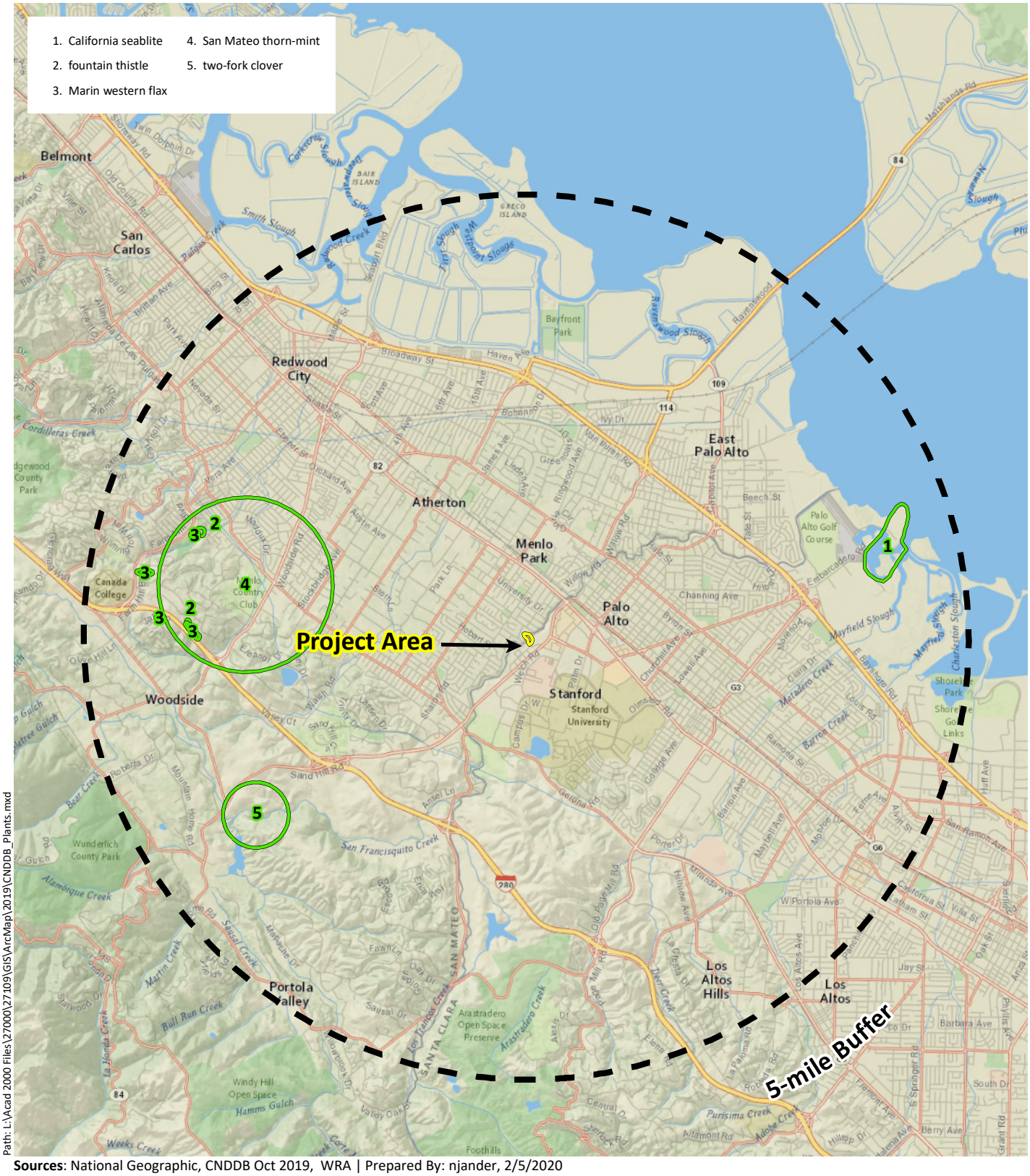
ENVIRONMENTAL CONSULTANTS



Sources: National Geographic, CNDDB Oct 2019, WRA | Prepared By: njander, 2/5/2020

Figure 4a. Federal-listed Plant Species within 5-miles of the Project Area

Children's Health Council
Creek Bank Restoration
Palo Alto, California

0 1 2 Miles

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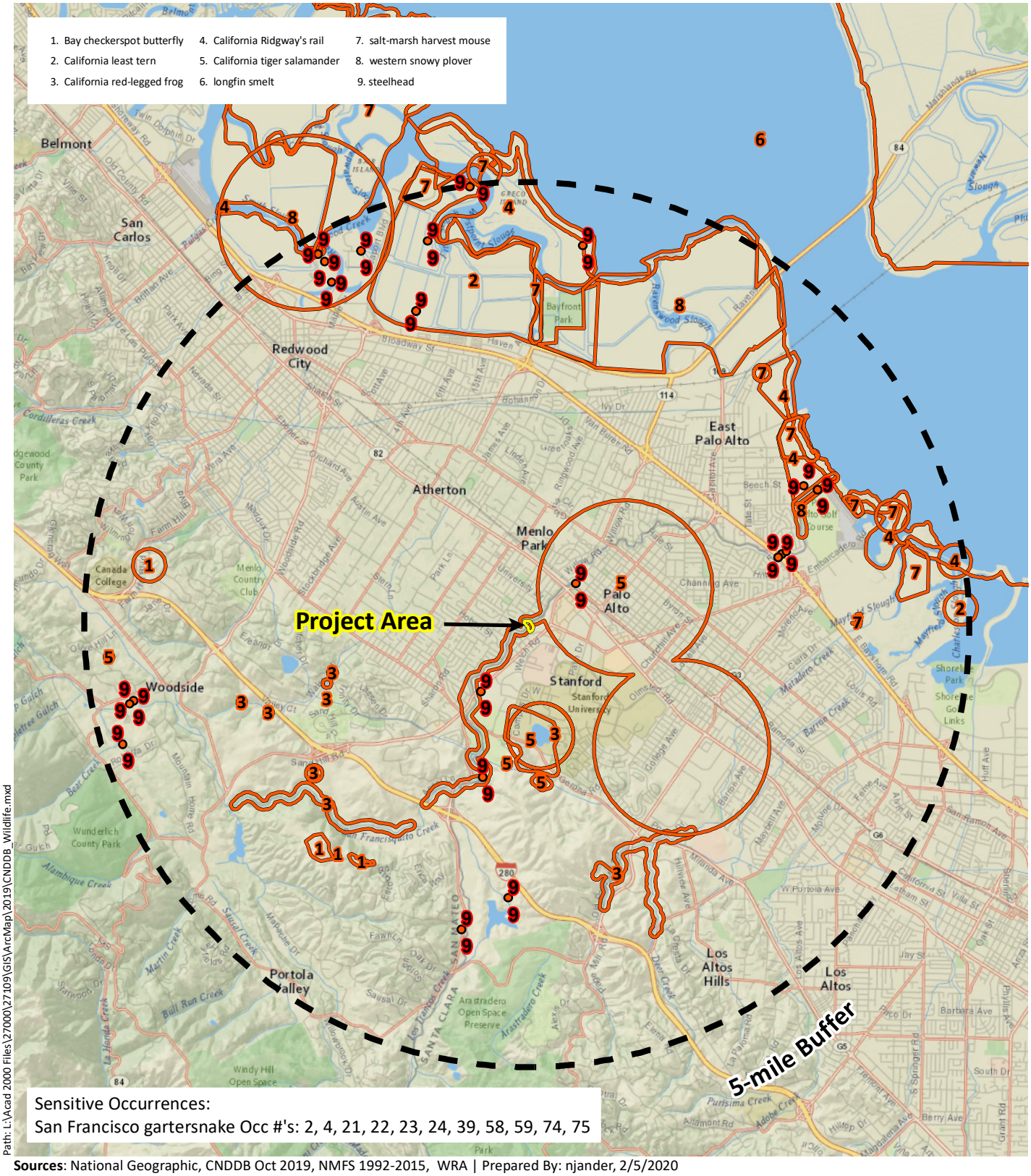
ENVIRONMENTAL CONSULTANTS



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Sources: National Geographic, CNDDB Oct 2019, NMFS 1992-2015, WRA | Prepared By: njander, 2/5/2020

Figure 4b. Federal-listed Wildlife Species within 5-miles of the Project Area

Children's Health Council
Creek Bank Restoration
Palo Alto, California

0 1 2 Miles

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ENVIRONMENTAL CONSULTANTS

Appendix B

Potential Federal Listed, Proposed, and Candidate Species

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Appendix B. Potential for special-status plant and wildlife species to occur in the Action Area. List compiled from the California Natural Diversity Database (CDFW 2019), and National Marine Fisheries Service Species Lists (2019) database searches for the Palo Alto USGS 7.5-minute quadrangle.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
Wildlife			
Mammals			
salt-marsh harvest mouse *Reithrodontomys raviventris*	FE	Found only in the saline emergent wetlands of San Francisco Bay and its tributaries. Pickleweed is primary habitat. Do not burrow, build loosely organized nests. Require higher areas for flood escape.	**Not Present.** No tidal marsh, pickleweed or suitable undeveloped grasslands are present to support this species.
Birds			
yellow-billed cuckoo *Coccyzus americanus occidentalis*	FT	Summer resident, breeding in dense riparian forests and jungles, typically with early successional vegetation present. Utilizes densely-foliaged deciduous trees and shrubs. Eats mostly caterpillars. Current breeding distribution within California very restricted.	**Not Present.** The Action Area is outside the known distribution for this species.
marbled murrelet *Brachyramphus marmoratus*	FT	Predominantly coastal marine. Nests in old-growth coniferous forests up to 30 miles inland along the Pacific coast, from Eureka to Oregon border, and in Santa Cruz/San Mateo Counties. Nests are highly cryptic, and typically located on platform-like branches of mature redwoods and Douglas firs. Forages on marine invertebrates and small fishes.	**Not Present.** Suitable mature redwoods and Douglas firs are not present within the Action Area or surrounds to support nesting by this species.
bald eagle *Haliaeetus leucocephalus*	FD	Occurs year-round in California, but primarily a winter visitor. Nests in large trees in the vicinity of larger lakes, reservoirs and rivers. Wintering habitat somewhat more variable but usually features large concentrations of waterfowl or fish.	**Not Present.** No suitable large trees are present within the Action Area or surrounds to support nesting by this species.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
California least tern *Sterna antillarum browni*	FE	Nests along the coast from San Francisco bay south to northern Baja California. Colonial breeder on bare or sparsely vegetated, flat substrates: sand beaches, alkali flats, landfills, or paved areas.	**Not Present.** No suitable sand or gravel bars are present to support nesting by this species.
Ridgeway's clapper rail *Rallus longirostris obsoletus*	FE	Associated with tidal salt marsh and brackish marshes supporting emergent vegetation, upland refugia, and incised tidal channels.	**Not Present.** No suitable saltmarsh or tidal marsh habitat is present to support nesting by the species.
western snowy plover *Charadrius nivosus (alexandrines) nivosus*	FT	Federal listing applies only to the Pacific coastal population. Year-round resident and winter visitor. Occurs on sandy beaches, salt pond levees, and the shores of large alkali lakes. Nests on the ground, requiring sandy, gravelly or friable soils.	**Not Present.** No suitable beach or shoreline habitat is present to support nesting by this species.
Reptiles and Amphibians			
California red-legged frog *Rana aurora draytonii*	FT	Associated with quiet perennial to intermittent ponds, stream pools, and wetlands. Prefers shorelines with extensive vegetation. Documented to disperse through upland habitats after rains.	**Present.** No suitable freshwater marsh, ponds, or other such features are present within the local area to support breeding by this species. The Action Area is however within two miles of known breeding occurrences (CNDDB 2019). Due to dense urban development on both sides of the creek, dispersing CRLF may be funneled through the Action Area as no other corridors or potential habitats are present between the Action Area and previously documented occurrences.
California tiger salamander *Ambystoma californiense*	FT	Populations in Santa Barbara and Sonoma counties currently listed as endangered; threatened in remainder of range. Inhabits grassland, oak woodland, ruderal and seasonal pool habitats. Adults are fossorial and utilize mammal burrows and other subterranean refugia. Breeding occurs primarily in vernal pools and other seasonal water features.	**Not Present.** No suitable vernal pools, stock ponds, or other such features are present within the local area to support breeding by this species. Undeveloped uplands with burrows or other suitable aestivation habitat, which is also connected to breeding habitat, is not present. The Action Area is over 1 mile from recent occurrences, and is isolated from those occurrences by dense urban development (CNDDB 2019).

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
San Francisco gartersnake *Thamnophis sirtalis tetrataenia*	FE	Vicinity of freshwater marshes, ponds and slow moving streams in San Mateo County and extreme northern Santa Cruz County. Prefers dense cover and water depths of at least one foot. Upland areas near water are also very important.	**Not Present.** This species is known only for San Mateo and Santa Cruz Counties, and is not considered present within Santa Clara County, and thus the Action Area.
Fish			
delta smelt *Hypomesus transpacificus*	FT	Lives in the Sacramento-San Joaquin estuary in areas where salt and freshwater systems meet. Occurs seasonally in Suisun Bay, Carquinez Strait and San Pablo Bay. Seldom found at salinities > 10 ppt; most often at salinities < 2 ppt.	**Not Present.** No suitable estuarine habitat that would support this species is present within the Action Area.
green sturgeon *Acipenser medirostris*	FT	Anadromous. Spawns in the Sacramento and Klamath River systems. Lingering transients may be found throughout the San Francisco Bay Estuary, particularly juveniles.	**Not Present.** No suitable estuarine or marine habitat exists within the Action Area to support this species.
longfin smelt *Spirinchus thaleichthys*	FC	Found in open waters of estuaries, mostly in the middle or bottom of the water column. This species prefers salinities of 15 to 30 ppt, but can be found in completely freshwater to almost pure seawater.	**Not Present.** No suitable estuarine habitat that would support this species is present within the Action Area.
steelhead - central CA coast DPS *Oncorhynchus mykiss irideus*	FT	Occurs from the Russian River south to Soquel Creek and Pajaro River. Also in San Francisco and San Pablo Bay Basins. Adults migrate upstream to spawn in cool, clear, well-oxygenated streams. Juveniles remain in fresh water for 1 or more years before migrating downstream to the ocean.	**Present.** This species is known to occur in waters surrounding the Action Area. Waters of the Action Area are within the species designated critical habitat.
Invertebrates			

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
San Bruno elfin butterfly *Callophrys mossii bayensis*	FE	Limited to the vicinity of San Bruno Mountain, San Mateo County. Colonies are located on in rocky outcrops and cliffs in coastal scrub habitat on steep, north-facing slopes within the fog belt. Species range is tied to the distribution of the larval host plant, Sedum spathulifolium.	**Not Present.** No host plants or suitable grassland habitats are present to support the species.
bay checkerspot butterfly *Euphydryas editha bayensis*	FT	Restricted to native grasslands on outcrops of serpentine soil in the vicinity of San Francisco Bay. *Plantago erecta* is the primary host plant; *Castilleja densiflorus* and *C. exserta* subsp. *exserta* are the secondary host plants.	**Not Present.** No host plants or suitable grassland habitats are present to support the species.
Plants			
San Mateo thorn-mint	FE		**Not Present.** The Action Area is highly developed and lacks expansive clays and serpentine substrates associated with this species. No suitable habitat is present for this species.
Crystal Springs fountain thistle	FE		**Not Present**. The Action Area lacks serpentine substrates necessary to support this species. No suitable habitat is present for this species.
Marin western flax	FT		**Not Present**. The Action Area lacks chaparral and grassland habitat underlain by serpentine substrates associated with this species. No suitable habitat is present for this species.
two-fork clover	FE		**Not Present**. The Action Area is highly developed and contains exposed or disturbed ground and bank. There are no scrub or serpentine substrates associated with this species present in the Action Area. No suitable habitat is present for this species.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**

*** Key to status codes:**

FE	Federal Endangered
FT	Federal Threatened
FC	Federal Candidate
FD	Federal Delisted
NMFS	National Marine Fisheries Service - Species of Concern

****Potential species occurrence definitions:**

Present: Species is observed on the site or has been recorded (i.e., CNDDB, other reports) on the site recently.

Not Present. Habitat on and adjacent to the site is clearly unsuitable for the species requirements (foraging, breeding, cover, substrate, elevation, hydrology, plant community, site history, disturbance regime).

Unlikely. Few of the habitat components meeting the species requirements are present, and/or the majority of habitat on and adjacent to the site is unsuitable or of very poor quality. The species has a low probability of being found on the site.

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Appendix C

Essential Fish Habitat Assessment

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Appendix C: Supplemental Essential Fish Habitat Information

The proposed Action is located within an area designated as Essential Fish Habitat (EFH) for Pacific Salmonids. Several other EFH areas occur outside of the Action Area, within adjacent marine habitats, however, no work will occur in these habitats. Work associated with the Action Area is anticipated to directly benefit salmonid EFH. Details of the location, purpose, and description of the proposed Action, along with minimization and avoidance measures, are discussed in the Biological Assessment. A table of EFH within the Action Area is provided below.

Essential Fish Habitat	Effect Determination
Pacific Salmon	**Not Likely to Destroy or Adversely Modify**

Background

The Magnuson-Stevens Act (as amended by the Sustainable Fisheries Act) requires FMPs to "describe and identify essential fish habitat…, minimize to the extent practicable adverse effects on such habitat caused by fishing, and identify other actions to encourage the conservation and enhancement of such habitat" (§303(a)(7)). The Magnuson-Stevens Act defines EFH as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." NMFS interpreted this definition in its regulations as follows: "waters" include aquatic areas and their associated physical, chemical, and biological properties that are used by fish, and may include areas historically used by fish where appropriate; "substrate" includes sediment, hard bottom, structures underlying the waters, and associated biological communities; "necessary" means "the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem"; and "spawning, breeding, feeding, or growth to maturity" covers the full life cycle of a species (§303(a)(7)). A brief description of each FMP for the Action Area is provided below.

The Pacific salmon FMP covers two species in California; Chinook salmon (*Oncorhynchus tshawytscha*) and coho salmon (*O. kisutch*). EFH for Pacific salmon means those waters and substrates necessary for production needed for a healthy ecosystem and to support a sustainable fishery. Central California Coast Distinct Population Segment steelhead are found within San Francisquito Creek, however neither Chinook nor Coho salmon are currently found within San Francisquito Creek.

Analysis of Effects to EFH

Direct Effects

If water is not present at the time the Project is initiated, no direct effects are anticipated to EFH as it will not currently be serving as habitat.

If water is present, the Action may result in temporary loss of function of the Action Area as a migratory corridor or as foraging habitat. To minimize temporary effects to EFH, the Project is scheduled to begin no earlier than May 1 to coincide with the period of time when San Francisquito Creek typically goes dry naturally. This timing allows outmigrating fish a chance to freely leave the system while water is present, eliminating any effects to migratory corridors and giving the stream time to naturally dry down, avoiding impacts to potential rearing habitat. If water is present

and flowing, it will be bypassed in order to maintain habitat suitability downstream, also mitigating any effect to habitat suitability.

Indirect Effect

The Action will potentially affect salmonid EFH by enhancing habitat suitability through installing woody debris and increasing habitat complexity through the Project Area. Installation of a timber or log cribwall that will be interspersed with plantings and gravels will add habitat structure to an area currently devoid of cover and is likely to increase high flow refugia for salmonids in the creek.

The enhancement of habitat within the creek will directly benefit EFH. Improvements proposed above address habitat suitability in San Francisquito Creek. Because the Action will increase habitat function, it is likely to have a small beneficial effect on Salmonid EFH.

Interrelated and Interdependent Effects

Once completed, the Project is anticipated to be free of the need for maintenance. While the timber crib wall may disintegrate over 75 to 100 years, the trees planted within the Project Area will stabilize the bank by holding gravels and generally slowing flow of water along the bank, negating the need to refurbish the cribwall. As such, no additional phases to this Project are anticipated. Because this Project represents the end of the foreseeable work, no interrelated or interdependent effects are anticipated.

Cumulative Effects

No additional phases of this Project are anticipated once construction is complete. Maintenance of the structure is not anticipated within the foreseeable future as the structures are designed to either survive a 100 year flood, or to be replaced by a natural growth of trees planted within the Project Area. The only future Projects potentially known for the San Francisquito Creek drainage are yet to be determined following a flood control feasibility investigation lead by the Corps (SFBJV 2019). As only the feasibility study has been released, no specific projects are known to be scheduled. In addition, Stanford has announced plans to either open up, or remove the Searsville Dam which currently represents the upstream end of anadromy for San Francisquito Creek (BSD 2019, Mercury News 2015). No specific date or timeline could be found during investigation for this report to say when Stanford expects to accomplish, removal or breaching of the dam.

Conclusion

The Project is designed to avoid adverse direct effects to EFH and would result in a small indirect benefit to habitat complexity, therefore EFH would either not be affected, or would have a slight positive effect at the conclusion of the Project.

Appendix D

Site Photos

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Photograph 1. Photo depicts the approximately 30-foot tall near vertical bank failure along San Francisquito Creek. Evidence of slumped debris and matted or destroyed vegetation can be seen on the east bank. The crib wall will be installed along the east bank to protect against future erosion and provide long-term stabilization. Photograph taken February 22, 2019.

Photograph 2. Photo depicts flow of stream immediately downstream of Project Area. Photograph taken March 21, 2019.

Photograph 3. View looking northwest along top of bank of creek. Photo depicts installation of concrete shear pin wall and set back from the top of bank. Cribwall work would occur along the lower sections of bank depicted here. Photograph taken March 21, 2019.

Photograph 4. View looking southeast along top of bank of the creek within the Project Area. Photo depicts completed Phase I sheer pin wall construction. Photograph taken May 13, 2019.

Photograph 5. Photo depicting point bar stream feature immediately downstream of bank failure. Photograph taken February 22, 2019.

Photograph 6. Photograph looking downstream depicting acceleration of bank failure during 2016-2017 rainy season. Photograph taken March 23, 2017.

Photograph 7. Photograph of overhanging woody vegetation downstram of the Project Area. Photograph taken March 21, 2019.

Photograph 8. View of approximate location of temporary access route. Photo located upstream of erosion area. Photograph taken March 21, 2018.

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Appendix E

Plan Set

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CHILDREN'S HEALTH COUNCIL

CREEK BANK STABILIZATION PROJECT: PHASE II

PALO ALTO, CALIFORNIA

STATEMENT OF PURPOSE

THIS PROJECT WILL PROVIDE 275 LINEAR FEET OF BANK STABILIZATION ALONG SAN FRANCSQUITO CREEK THROUGH LOG CRIB WALL AND RIPARIAN PLANTINGS. IT WILL BENEFIT THE CREEK BY PROVIDING SLOPE STABILITY AND SALMONID HABITAT.

REGULATORY CONTEXT

PROJECT GOALS AND THE DESIGN OF THE PROJECT HAVE BEEN DEVELOPED UNDER THE GUIDANCE OF THE FOLLOWING:

- SAN FRANCISQUITO CREEK JOINT POWERS AUTHORITY
- STANFORD UNIVERISTY
- US ARMY CORPS OF ENGINEERS
- US FISH AND WILDLIFE SERVICE
- CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE
- CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
- SANTA CLARA VALLEY WATER DISTRICT

AS SUCH THE PROJECT IS SUBJECT TO CONDITIONS OF APPROVAL AND RESTRICTIONS THAT WERE PUT IN PLACE TO PROTECT SENSITIVE HABITAT TYPES AND SPECIAL STATUS SPECIES.

THE PROJECT WILL BE PERFORMED WITH PERMITS AND/OR CONSULTATIONS FROM THE FOLLOWING AGENCIES:

- US ARMY CORPS OF ENGINEERS
- US FISH AND WILDLIFE SERVICE
- CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE
- CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
- CITY OF PALO ALTO

CHARACTERIZATION OF THE PROJECT

1. TOE STABILIZATION - THE CHANNEL TOE WILL BE PROTECTED BY LARGE ALLUVIUM COBBLES AND BOULDERS BURIED UNDERNEATH THE CREEK BED. THIS MATERIAL WILL BE THE FOUNDATION OF THE CRIB WALL.

2. ROOTWADS - THE CHANNEL TOE WILL INCLUDE ROOTWADS ALONG THE EXISTING POOL OF THE CREEK IN ORDER TO REDUCE WATER VELOCITIES AND PROVIDE FISH HABITAT.

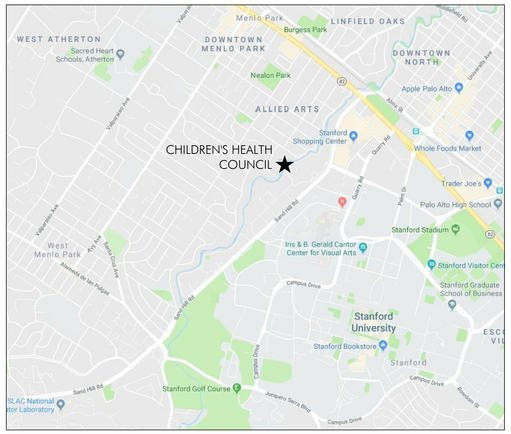
3. LOWER CHANNEL BANK - A NEW CHANNEL BANK WILL BE INSTALLED CONSISTING OF A CRIB WALL WITH A SLOPE OF 1:1 AND STABILIZED BY THREADED REBAR PINS. A MIXTURE OF COARSE ALLUVIUM (GRAVEL TO COBBLE SIZED MATERIAL) WILL BE PLACED BEHIND THE CRIB WALL AND WITHIN THE CRIB WALL CAVITIES. THE CRIB WALL WILL BE ANCHORED TO THE EXISTING CREEK BANK WITH HELICAL ANCHORS.

4. UPPER CHANNEL BANK - ABOVE THE CRIB WALL, THE CHANNEL BANK WILL BE GRADED TO A MAXIMUM SLOPE OF 2:1 (H:V) AND PLANTED WITH NATIVE TREES, SHRUBS, AND GRASSES.

EARTHWORK QUANTITIES

THE PROJECT INVOLVES THE EXCAVATION OF LANDSLIDE DEPOSITION OF ARTIFICIAL FILL MATERIAL, ALLUVIUM SILTY SAND, AND ALLUVIUM GRAVELLY SAND WHICH WILL BE HAULED OFF THE PROJECT SITE. LARGER ALLUVIUM ROCK SUCH AS BOULDERS AND COBBLES SHALL BE PURCHASED AND DELIVERED TO THE PROJECT SITE. ENGINEERED FILL MATERIAL SHALL CONSIST OF ALLUVIUM COBBLE AND GRAVEL AND SHALL BE PURCHASED AND DELIVERED TO THE SITE.

- CUT = 1370 CU. YDS. (HAUL OFF SITE)
- IMPORT BOULDERS = 330 CU. YDS.
- IMPORT COBBLES = 220 CU. YDS.
- IMPORT ENGINEERED FILL = 1780 CU. YDS.

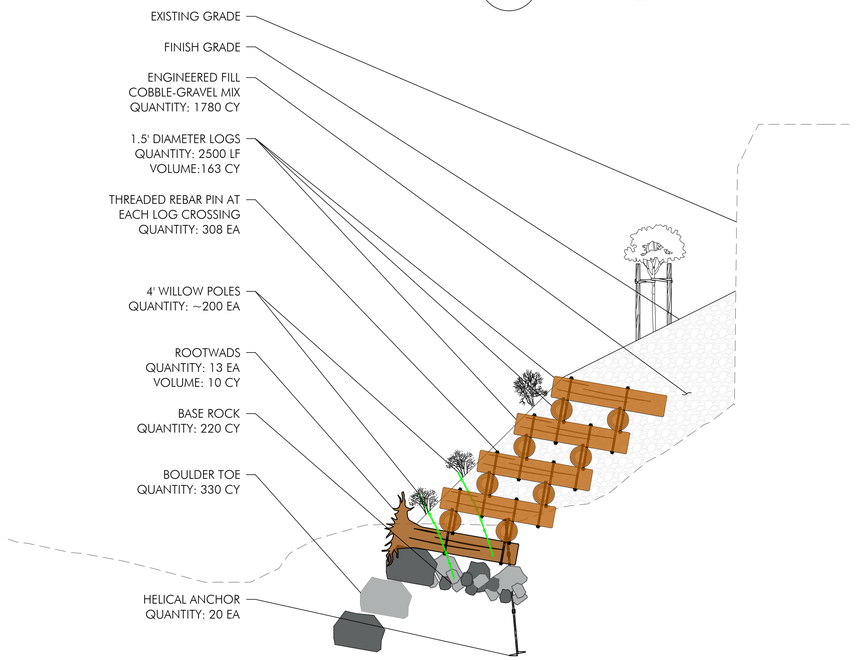


1 VICINITY MAP

NOT TO SCALE

2 LOCATION PLAN

NOT TO SCALE



3 TYPICAL SECTION

SCALE: 1 " = 5'

PROJECT SCHEDULE

THIS DESIGN IS INTENDED TO BE CONSTRUCTED DURING ONE SUMMER CONSTRUCTION SEASON (MAY 1 THROUGH OCTOBER 15TH).

UTILITIES

THERE MAY BE UNKNOWN UNDERGROUND ELECTRICAL AND WATER LINES LOCATED WITHIN THE PROJECT BOUNDARY. THE CONTRACTOR WILL CONTACT A UTILITY COMPANY TO MARK UNDERGROUND UTILITIES AND/OR CONFIRM THAT THERE ARE NO ADDITIONAL UNDERGROUND UTILITIES.

FEMA FLOODPLAIN NOTES

- THIS PROJECT IS LOCATED WITHIN A FEMA DESIGNATED FLOODWAY.
- WORK WITHIN THE 100-YEAR FLOODPLAIN WILL NOT INCREASE RISK OF FLOODING.
- WATER SURFACE PROFILES NOTED WITH "FEMA" ARE FROM THE 2014 FLOOD INSURANCE STUDY

LOCATION DESCRIPTION

THE PROPERTY IS LOCATED AT 650 CLARK WAY, PALO ALTO, CALIFORNIA 94304

SURVEY CONTROL

HORIZONTAL DATUM: NAD83, CALIFORNIA STATE PLANE ZONE III, U.S. SURVEY FEET
VERTICAL DATUM: NAVD88, U.S. SURVEY FEET

CONTROL POINTS

POINT #	ELEVATION	NORTHING	EASTING	DESCRIPTION
1268	91.70	1987341.30	6074099.86	CP 1
1930	89.75	1987221.26	6074226.76	CP 2
1969	76.77	1987174.17	6075603.01	BM 458
1972	86.02	1986864.21	6074480.60	CP 3

DESIGNED FOR

CHILDREN'S HEALTH COUNCIL
650 CLARK WAY
PALO ALTO, CALIFORNIA 94304
CONTACT: TERRY BOYLE

LEAD CONSULTANT

WRA, INC.
2169-G E. FRANCISCO BLVD.
SAN RAFAEL, CA 94901
CONTACT: BRIAN BARTELL
(415) 424-7588
BARTELL@WRA-CA.COM

SHEET INDEX

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2169-G East Francisco Blvd.
San Rafael, CA 94901
(415) 454-8868 Phone
info@wra-ca.com

CREEK BANK STABILIZATION PROJECT - PHASE II
CHILDREN'S HEALTH COUNCIL
PALO ALTO, CALIFORNIA

NOT FOR CONSTRUCTION

Date	Issues And Revisions	No.
03/27/19	CONCEPT	
08/19/19	30% DESIGN	

PROJECT #27109
DRAWN BY: ACS
CHECKED BY: BSS, RBB
ORIGINAL DRAWING SIZE: 24 X 36

TITLE

Sheet

G-1.0

Path: L:\Acad 2000 Files\27000\27109\CAD\dwg\30% Design\27109 G-1 Title.dwg

SITE PLAN LEGEND

SYMBOL	DESCRIPTION
	PROPERTY LINE
(100)	(E) CONTOUR (2 FT)
100	PROPOSED CONTOUR (2 FT)
	STAGING AREA
	FLOW
LOG	LIMIT OF GRADING
LOD	LIMIT OF DISTURBANCE
	EXISTING TREE
	EXISTING TREE TO BE REMOVED
	TEMPORARY ACCESS ROUTE

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PROJECT #27109
DRAWN BY: ACS
CHECKED BY: BSS, RBB
ORIGINAL DRAWING SIZE: 24 X 36

N
0 20
SCALE: 1 " = 20 '

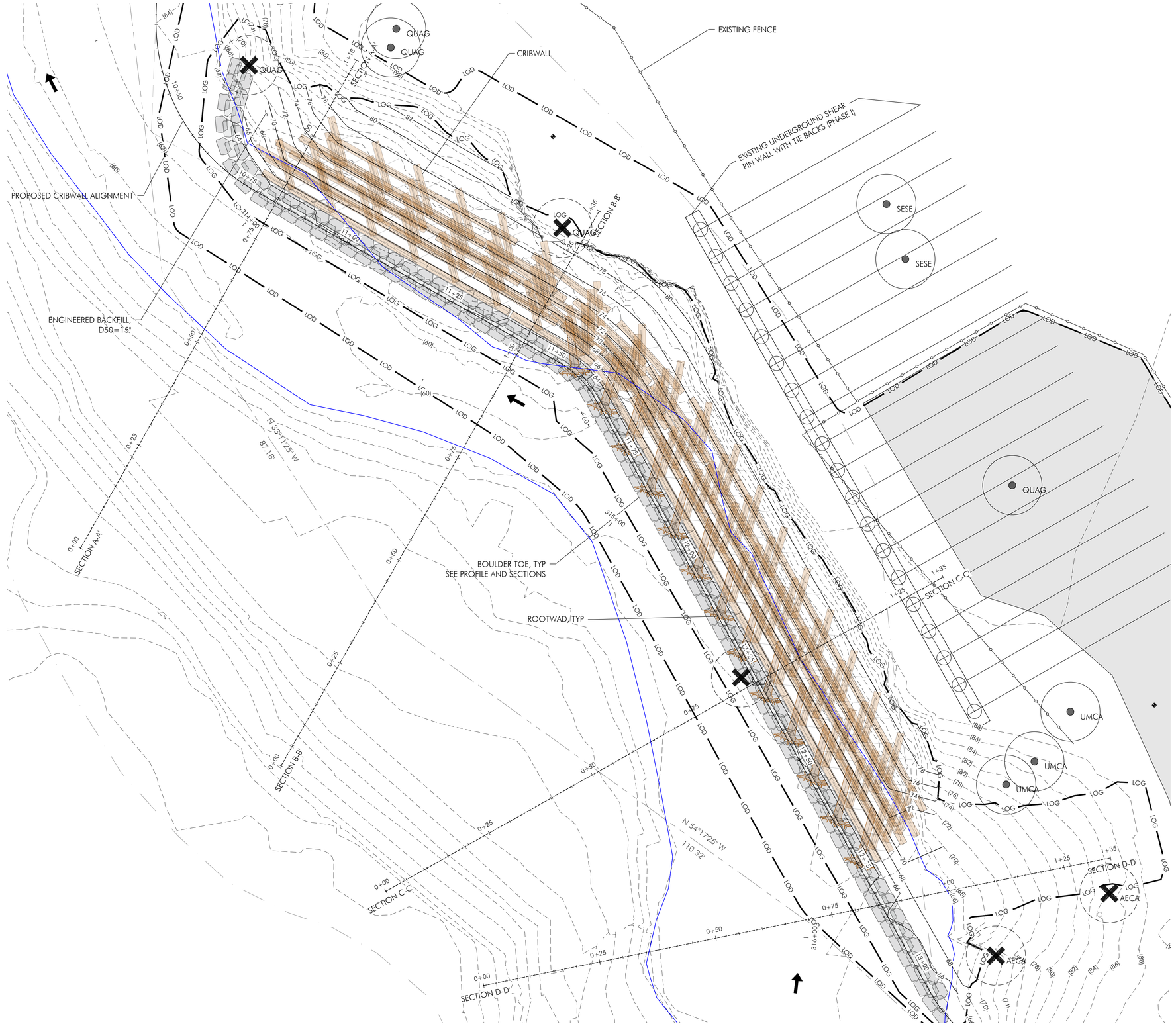
SITE PLAN

Sheet

C-2.0

GRADING LEGEND

SYMBOL	DESCRIPTION
	PROPERTY LINE
(100)	(E) CONTOUR (2 FT)
100	PROPOSED CONTOUR (2 FT)
	STAGING AREA
	FLOW
LOG	LIMIT OF GRADING
LOD	LIMIT OF DISTURBANCE
	ORDINARY HIGH WATER
	EXISTING TREE
	EXISTING TREE TO BE REMOVED



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CREEK BANK STABILIZATION PROJECT - PHASE II

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08/19/19	30% DESIGN	

PROJECT #27109
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CHECKED BY: BSS, RBB
ORIGINAL DRAWING SIZE: 24 X 36

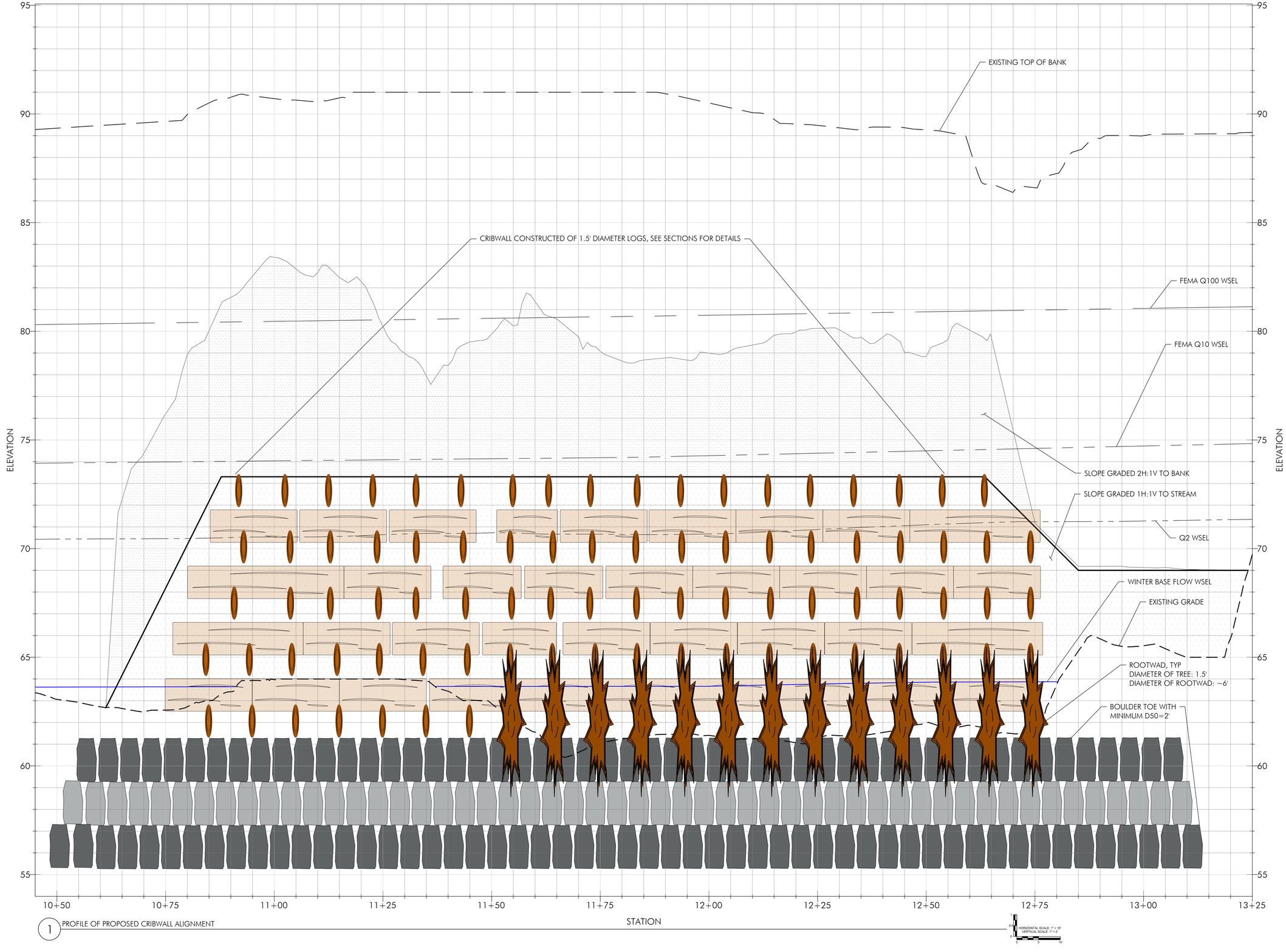
N

0 10
SCALE: 1 " = 10 '

GRADING PLAN

Sheet

C-2.1



1 PROFILE OF PROPOSED CRIBWALL ALIGNMENT

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PALO ALTO, CALIFORNIA

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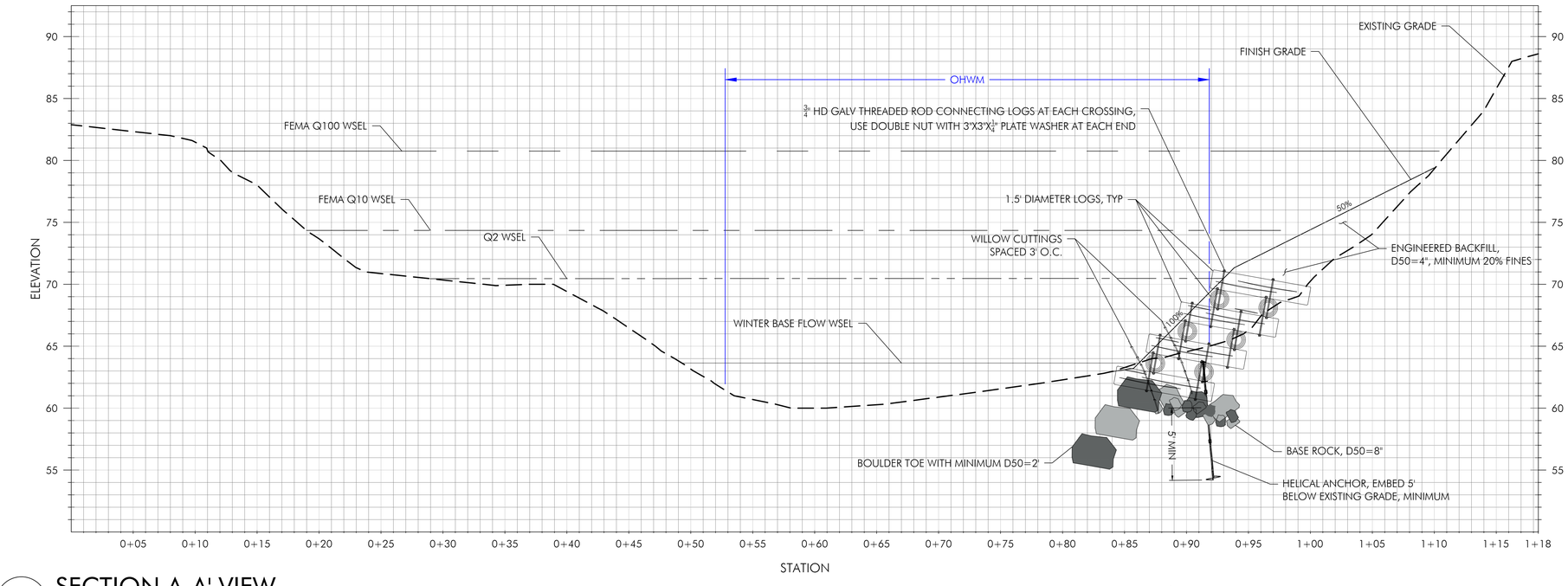
PROJECT #27109
DRAWN BY: ACS
CHECKED BY: BSS, RBB
ORIGINAL DRAWING SIZE: 24 X 36

PROFILE

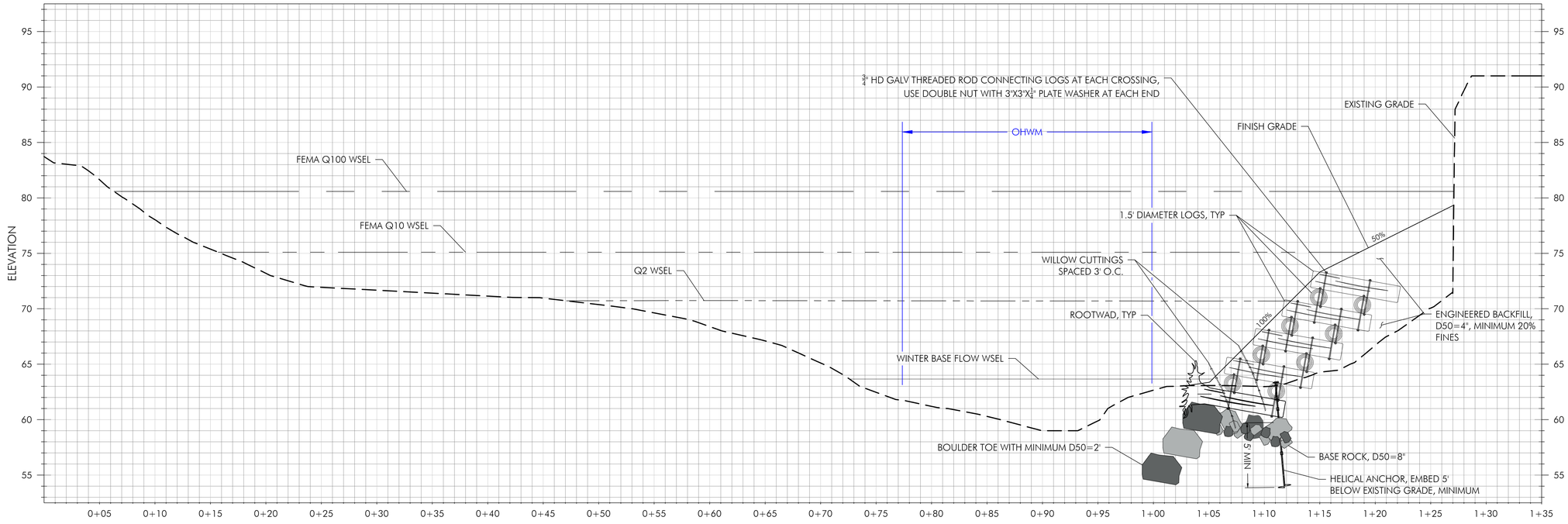
Sheet

C-3.0



1 SECTION A-A' VIEW

HORIZONTAL SCALE: 1" = 5'
VERTICAL SCALE: 1" = 5'



2 SECTION B-B' VIEW

HORIZONTAL SCALE: 1" = 5'
VERTICAL SCALE: 1" = 5'

NOTE: CONNECTIONS SHOWN ARE NOT IN THE SAME VERTICAL PLANE

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CREEK BANK STABILIZATION PROJECT - PHASE II

CHILDREN'S HEALTH COUNCIL
PALO ALTO, CALIFORNIA

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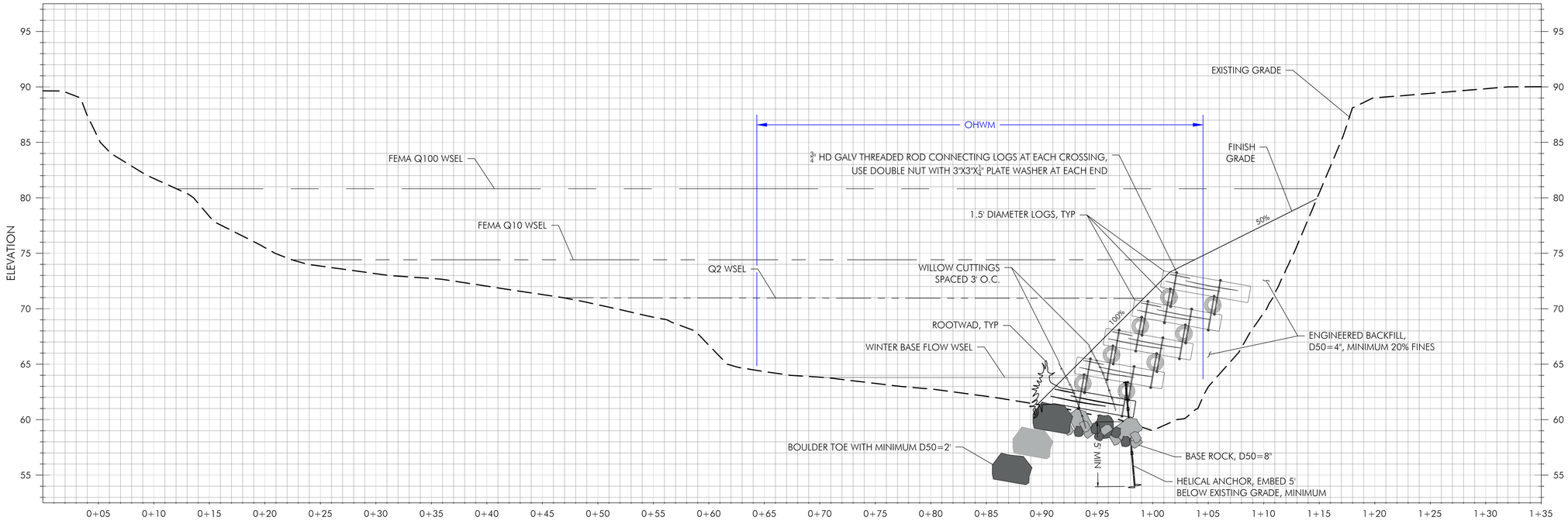
PROJECT #27109
DRAWN BY: ACS
CHECKED BY: BSS, RBB
ORIGINAL DRAWING SIZE: 24 X 36

SECTIONS

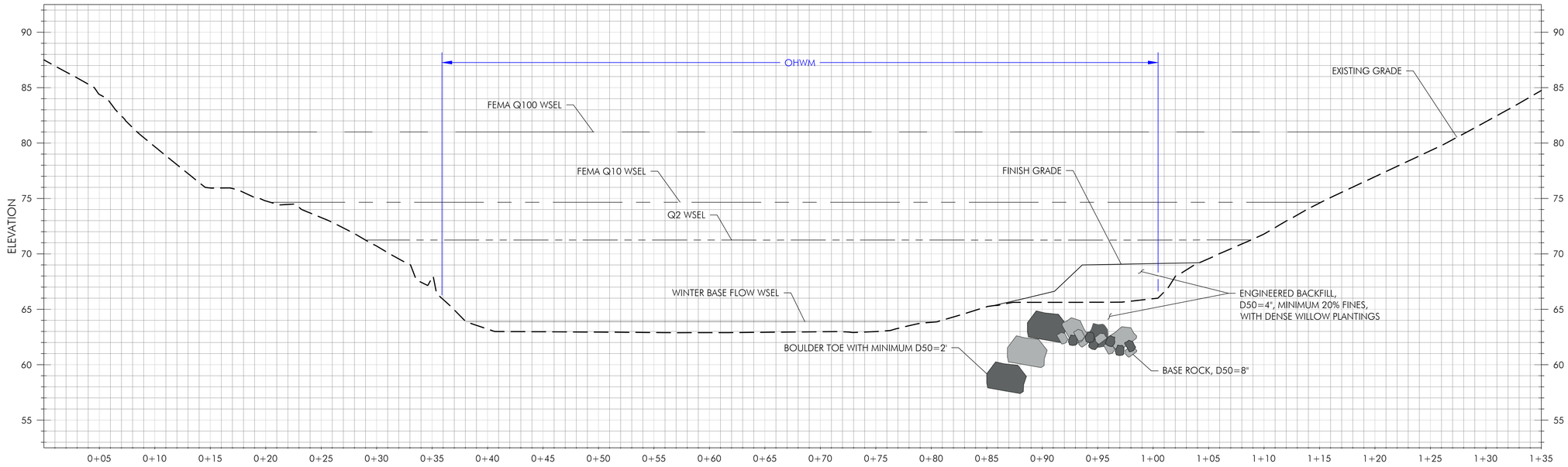
Sheet

C-3.1



C SECTION C-C' VIEW

HORIZONTAL SCALE: 1" = 5'
VERTICAL SCALE: 1" = 5'



D SECTION D-D' VIEW

HORIZONTAL SCALE: 1" = 5'
VERTICAL SCALE: 1" = 5'

NOTE: CONNECTIONS SHOWN ARE NOT IN THE SAME VERTICAL PLANE

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CREEK BANK STABILIZATION PROJECT - PHASE II

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PALO ALTO, CALIFORNIA

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PROJECT #27109
DRAWN BY: ACS
CHECKED BY: BSS, RBB
ORIGINAL DRAWING SIZE: 24 X 36

SECTIONS

Sheet

C-3.2

PLANTING LEGEND

SYMBOL	DESCRIPTION
	PROPERTY LINE
(100)	(E) CONTOUR (2 FT)
100	PROPOSED CONTOUR (2 FT)
LOG	LIMIT OF GRADING
	CHANNEL ALIGNMENT
	TREE PROTECTION FENCING
TREE TAG NUMBER / TREE IDENTIFIER	EXISTING TREE
	EXISTING TREE TO BE REMOVED
	PROPOSED RIPARIAN PLANTING AREA 1 (CRIB WALL WITH LIVE WILLOW CUTTINGS)
	PROPOSED RIPARIAN PLANTING AREA 2 (UP TO Q10) — HYDROSEED
	PROPOSED RIPARIAN PLANTING AREA 3 (Q10 TO Q100) — HYDROSEED

TREE IDENTIFIER	BOTANICAL NAME	COMMON NAME
ACDE	ACACIA DEALBATA	SILVER WATTLE
ACMA	ACER MACROPHYLLUM	BIGLEAF MAPLE
AECA	AESCULUS CALIFORNICA	CALIFORNIA BUCKEYE
AIAL	AILANTHUS ALTISSIMA	TREE OF HEAVEN
EUGL	EUCALYPTUS GLOBULUS	BLUE GUM EUCALYPTUS
QUAG	QUERCUS AGRIFOLIA	COAST LIVE OAK
SALA	SALIX LAEVIGATA	RED WILLOW
SANI	SAMBUCUS NIGRA SSP. CAERULEA	BLUE ELDERBERRY
SESE	SEQUOIA SEMPERVIRENS	COAST REDWOOD
UMCA	UMBELLULARIA CALIFORNICA	CALIFORNIA BAY

PLANTING LIST

RIPARIAN AREA 1 (0.02 ACRES)

BOTANICAL NAME	COMMON NAME	SIZE	SPACING (OC FEET)	QUANTITY
SALIX LASIOLEPIS	ARROYO WILLOW	4' POLE CUTTINGS	3	95
SALIX EXIGUA	SANDBAR WILLOW	4' POLE CUTTINGS	3	95

RIPARIAN AREA 2 (0.056 ACRES)

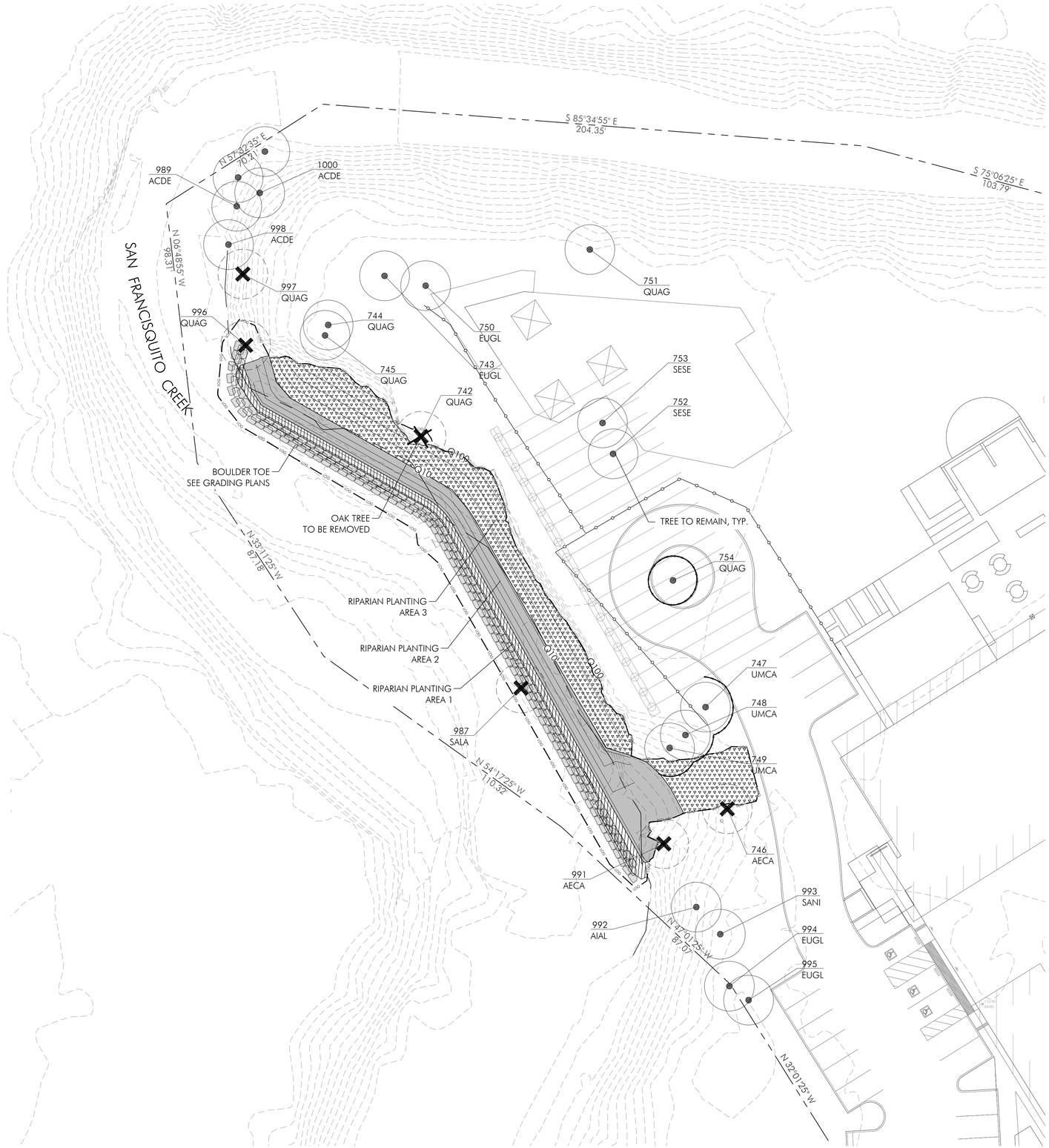
BOTANICAL NAME	COMMON NAME	SIZE	SPACING (OC FEET)	QUANTITY
ALNUS RHOMBIFOLIA	WHITE ALDER	5 GAL	10	8
SALIX LAEVIGATA	RED WILLOW	4' POLE CUTTINGS	3	95
SALIX LASIOLEPIS	ARROY WILLOW	4' POLE CUTTINGS	3	95
SAMBUCUS NIGRA SPP. CAERULIA	BLUE ELDERBERRY	16" DEEPOT	6	16

RIPARIAN AREA 3 (0.07 ACRES)

BOTANICAL NAME	COMMON NAME	SIZE	SPACING (OC FEET)	QUANTITY
AESCULUS CALIFORNICA	CALIFORNIA BUCKEYE	15 GAL	12	5
QUERCUS AGRIFOLIA	COAST LIVE OAK	15 GAL	12	4
ROSA CALIFORNICA	CALIFORNIA WILD ROSE	1 GAL	6	9
RUBUS URSINUS	CALIFORNIA BLACKBERRY	1 GAL	6	11
SYMPHORICARPUS ALBUS	COMMON SNOWBERRY	1 GAL	4	11

HYDROSEED MIX

BOTANICAL NAME	COMMON NAME
ACHELLIA MILLEFOLIUM	YARROW
BROMUS CARINATUS	CALIFORNIA BROME
ELYMUS GLAUCUS	BLUE WILDRYE
FESTUCA CALIFORNICA	CALIFORNIA FESCUE
HORDEUM BRACHYANTHERUM	MEADOW BARLEY
LEYMUS TRITICOIDES	CREEPING WILD RYE
POA SECUNDA	NATIVE PINE BLUEGRASS



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CREEK BANK STABILIZATION PROJECT - PHASE II

CHILDREN'S HEALTH COUNCIL
PALO ALTO, CALIFORNIA

NOT FOR CONSTRUCTION

Date	Issues And Revisions	No.
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PROJECT #27109
DRAWN BY:RFP, ACS
CHECKED BY: BSS, RBB
ORIGINAL DRAWING SIZE: 24 X 36

N
0 20
SCALE: 1 " = 20 '

PLANTING PLAN

Sheet

C-4.0

EROSION CONTROL LEGEND

SYMBOL	DESCRIPTION
	PROPERTY LINE
(100)	(E) CONTOUR (2 FT)
100	PROPOSED CONTOUR (2 FT)
	STAGING AREA
	FLOW
LOG	LIMIT OF GRADING
LOD	LIMIT OF DISTURBANCE
	EXISTING TREE
	EXISTING TREE TO BE REMOVED
SW	STRAW WATTLE
	COIR FIBER MATTING
	EXISTING CURB

NOTES:

1. CONTRACTOR SHALL COMPLY WITH NPDES CONSTRUCTION GENERAL PERMIT.
2. CONTRACTOR SHALL COMPLY WITH CAL TRANS FIBER ROLL (TYPE 2) STANDARDS. SEE SHEET C-6.1.
3. CONTRACTOR SHALL COMPLY WITH CAL TRANS ROLLED EROSION CONTROL PRODUCTS MODIFIED TO USE WOOD STAKES. SEE SHEET C-6.2.
4. ALL MATERIALS SHALL BE BIODEGRADABLE

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N
0 20
SCALE: 1 " = 20 '

EROSION CONTROL PLAN

Sheet

C-5.0

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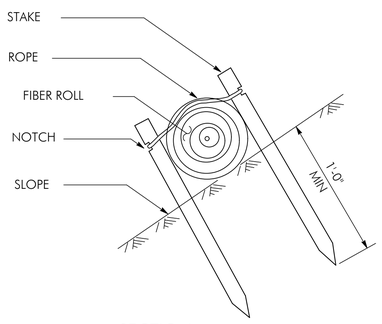
CREEK BANK STABILIZATION PROJECT - PHASE II

CHILDREN'S HEALTH COUNCIL
PALO ALTO, CALIFORNIA



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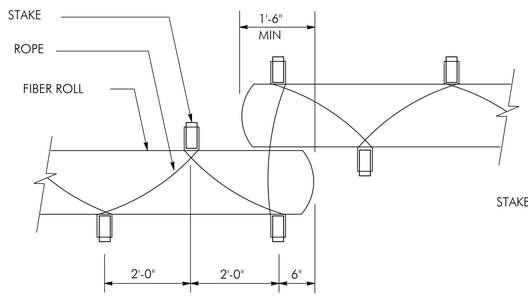
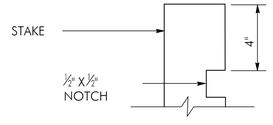


PLAN

FIBER ROLL
(TYPE 2)

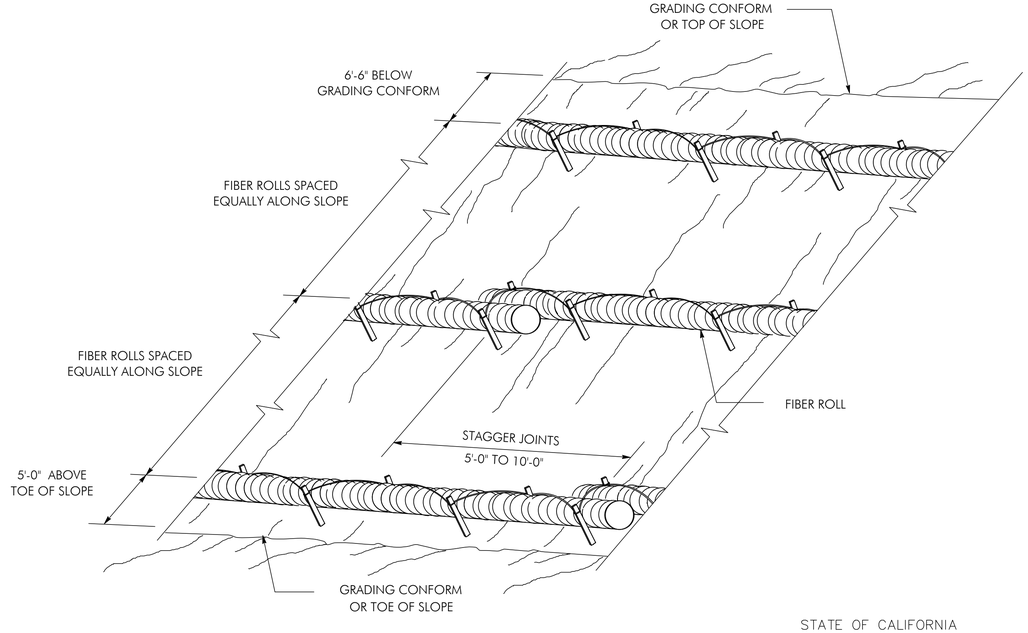


ELEVATION

STAKE NOTCH DETAIL

NOTES:

1. FIBER ROLL SPACING VARIES DEPENDING UPON SLOPE INCLINATION.
2. INSTALLATIONS SHOWN IN THE PERSPECTIVES ARE FOR SLOPE INCLINATION OF 10:1 AND STEEPER.



PERSPECTIVE

FIBER ROLL (TYPE 2)

NOT FOR CONSTRUCTION

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

EROSION CONTROL DETAILS (FIBER ROLL)

NO SCALE

RNSP H51 DATED APRIL 3, 2009 SUPERSEDES NSP H51 DATED DECEMBER 1, 2006
THAT SUPPLEMENTS THE STANDARD PLANS BOOK DATED MAY 2006.

REVISED NEW STANDARD PLAN RNSP H51

EROSION CONTROL DETAILS

Sheet

C-5.1

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CREEK BANK STABILIZATION PROJECT - PHASE II

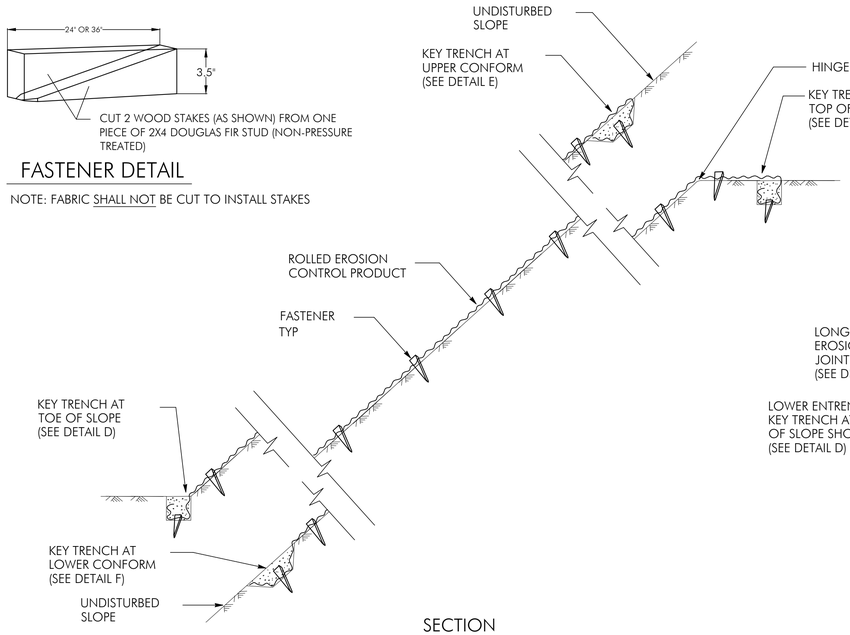
CHILDREN'S HEALTH COUNCIL
PALO ALTO, CALIFORNIA

NOT FOR CONSTRUCTION

CUT 2 WOOD STAKES (AS SHOWN) FROM ONE PIECE OF 2X4 DOUGLAS FIR STUD (NON-PRESSURE TREATED)

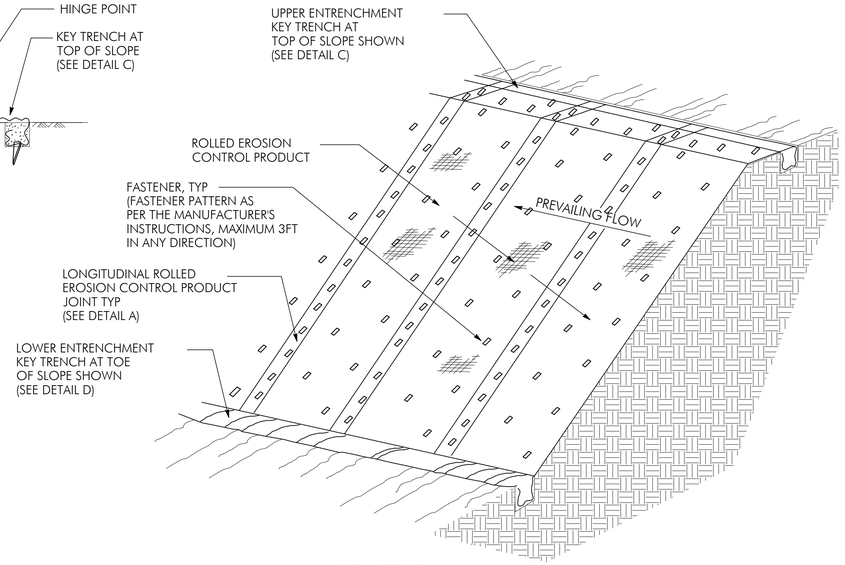
FASTENER DETAIL

NOTE: FABRIC SHALL NOT BE CUT TO INSTALL STAKES



SECTION

ROLLED EROSION CONTROL PRODUCT ON SLOPE WITH VARIOUS KEY ENTRENCHMENTS

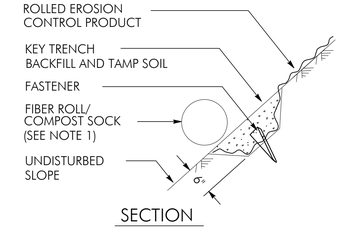


ISOMETRIC

ROLLED EROSION CONTROL PRODUCT ON SLOPE

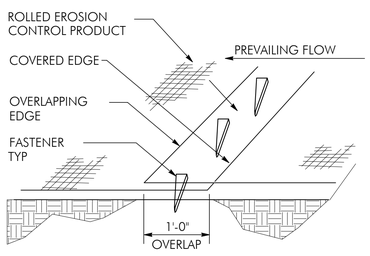
NOTE:

1. FIBER ROLL/COMPOST SOCK SHOWN FOR REFERENCE PURPOSES ONLY.
2. IF TRANSVERSE ROLLED EROSION CONTROL PRODUCT JOINTS ARE REQUIRED ON SLOPES, SEE DETAIL B.



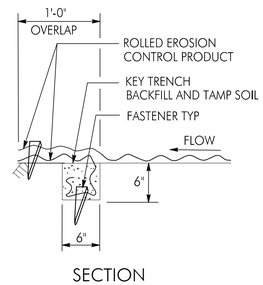
SECTION

DETAIL F
KEY TRENCH AT LOWER CONFORM



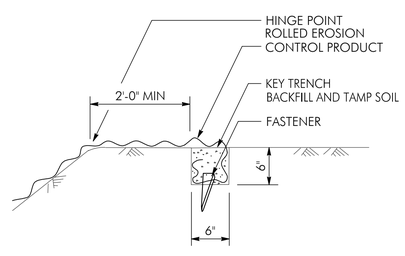
PERSPECTIVE

DETAIL A
LONGITUDINAL ROLLED EROSION CONTROL PRODUCT JOINT



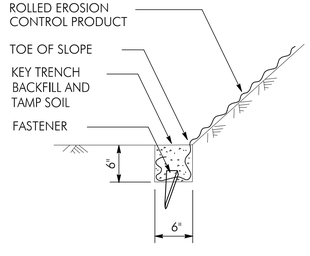
SECTION

DETAIL B
TRANSVERSE ROLLED EROSION CONTROL PRODUCT JOINT



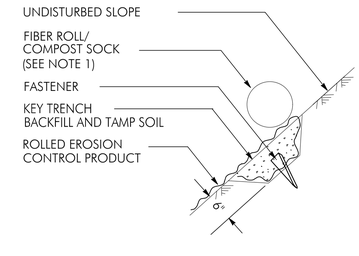
SECTION

DETAIL C
KEY TRENCH AT TOP OF SLOPE



SECTION

DETAIL D
KEY TRENCH AT TOE OF SLOPE



SECTION

DETAIL E
KEY TRENCH AT UPPER CONFORM

NOTE: THIS DRAWING SHEET IS A CAL TRANS DETAIL FOR ROLLED EROSION CONTROL PRODUCT MODIFIED TO USE WOOD STAKE FASTENERS.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

ROLLED EROSION CONTROL PRODUCT

NO SCALE

NSP H53 DATED JUNE 5, 2009 SUPPLEMENTS
THE STANDARD PLANS BOOK DATED MAY 2006.

NEW STANDARD PLAN NSP H53

Date	Issues And Revisions	No.
03/27/19	CONCEPT	
08/19/19	30% DESIGN	

PROJECT #27109
DRAWN BY: ACS
CHECKED BY: BSS, RBB
ORIGINAL DRAWING SIZE: 24 X 36

EROSION CONTROL DETAILS

Sheet

C-5.2

Appendix F

Dewatering Plan

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Memorandum

To: Terry Boyle
Children's Health Council
650 Clark Way
Palo Alto, CA 94304

From: Andrew Smith, Ben Snyder, and Bianca Clarke

Date: December 18, 2019

Subject: Dewatering Plan, San Francisquito Creek Bank Stabilization Project, Palo Alto, California

The primary responsibilities of the dewatering plan are to (1) Provide a safe working area for construction crews and equipment; (2) minimize impacts to the environment such as turbidity for aquatic species and noise for local community; (3) Restore the creek to its original condition prior to de-watering.

WRA, Inc. is proposing a temporary creek bypass/dewatering plan for construction access for the bank stabilization efforts for the Children's Health Center. Prior to the construction of any dewatering structures, fish screens would be installed above the proposed upstream dam location as well as below the downstream dam location. WRA, Inc. would coordinate with the qualified fisheries biologist during the fish relocation activities to avoid conflicts as well as to ensure all fish have been relocated.

A gravity system is proposed to divert the water in the creek by using sandbags, plastic sheeting, and re-usable pipes. A sandbag dam would be placed at the upstream end of the project site approximately around station 316+50. A similar sandbag dam would be placed at the lower end of the Creek, approximately around station 312+00 to prevent any water from re-entering the work area. Plastic sheeting would be used to prevent seepage through the sandbags. The re-usable pipes would be used to drain water from the upstream sandbag dam to the downstream sandbag dam. The pipe size would be appropriate to capture the creek flow rate. We intend to use twelve (12) inch diameter pipes but could potentially reduce that size if the flows decrease at the time of construction. The conceptual layout of the dewatering plan is shown in Figure 1.

Any nuisance water within the site, between the upper dam and lower dam, would be pumped with a submersible pump and hoses into a filtration bag to clean the water. The nuisance water would be pumped up into the brush area so it can dissipate into the ground. Please refer to the attached diagrams for locations of sandbag dams and pipes. All water would be clean and filtered prior to being released back into the creek system. The contractor would dewater the site prior to the start of any construction within the creek.

All pumps would be placed in a containment tray and be fueled away from the creek channel. The pumps would be tied to a tree or stake to avoid movement caused by the vibration.

All dewatering measures and dams shall be removed at the end of the project and the creek shall be restored to its original conditions at the dam locations. The dams would be removed slowly to avoid any erosion or turbidity.

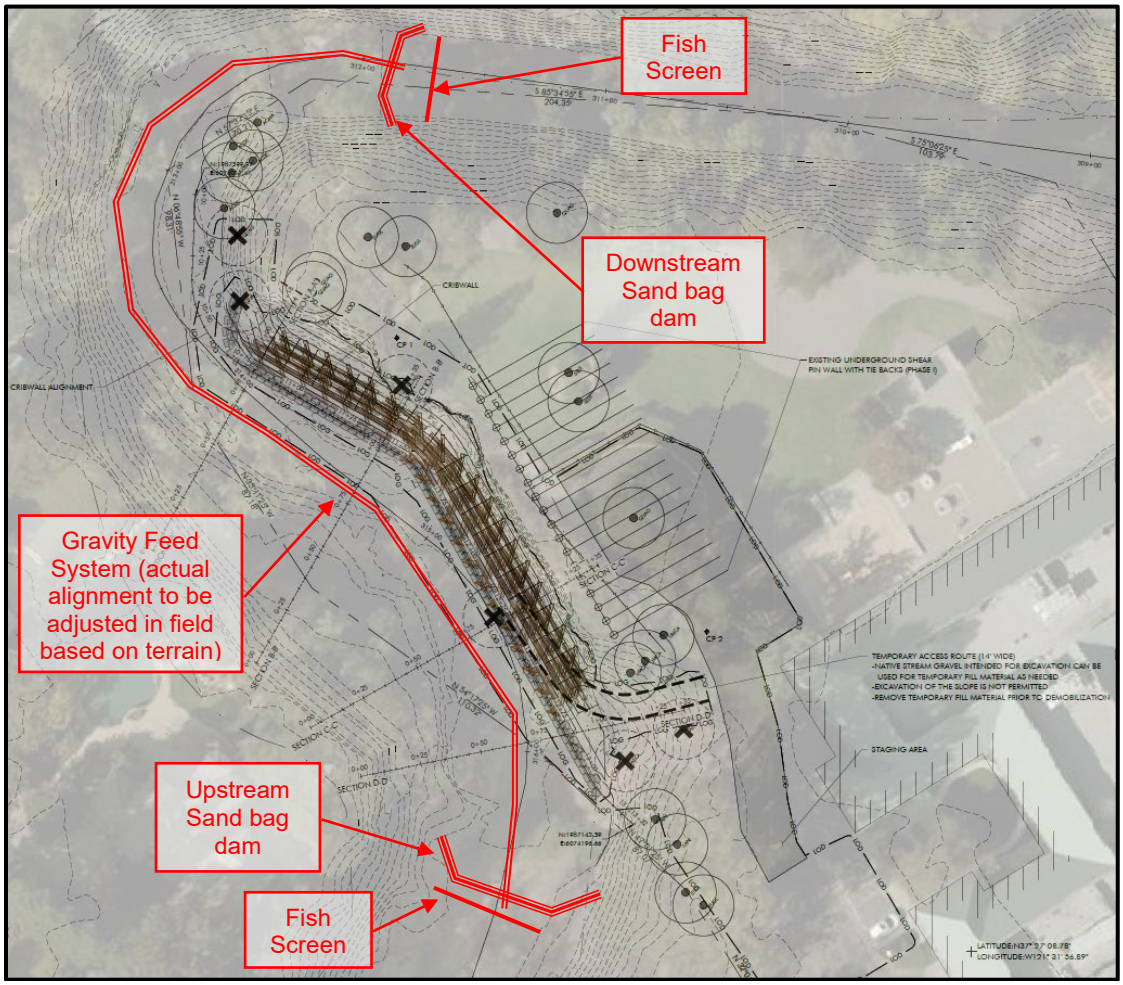

Figure 1: Dewatering Plan

Appendix G

Fish Rescue Plan

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Fish Rescue and Relocation Plan

The purpose of this letter is to outline the procedures and equipment that will be used in the event that fish rescue and relocation operations are required during the dewatering of San Francisquito Creek as part of the CHC Project (Project). The Project will occur on an approximately 275 linear foot section of San Francisquito Creek, located on the border of San Mateo and Santa Clara Counties, California (Project Area). Fish capture and relocation is anticipated to be authorized for federal listed species including steelhead (*Oncorhynchus mykiss*), by the National Marine Fisheries Service (NMFS) Biological Opinion (BO) for the Project. The resumes for Nick Brinton and Stewart DesMeules, the fisheries biologists responsible for leading the capture and relocation effort, are attached with this document (Attachment A). Additional qualified biologists may assist with the capture and relocation effort.

Additional details provided by the contractor on the approach for dewatering have been reviewed prior to drafting this document. Based on the draft dewatering plan, the primary responsibilities of WRA during fish rescue and relocation are to (1) ensure that the Project Area is sufficiently isolated to prevent fish from entering the Project Area before dewatering is initiated (install exclusion nets); (2) complete with the capture and relocation of fish within the Project Area prior to pumping of remnant water; and (3) report the results of the rescue and relocation.

Minimization and Avoidance Measures

Any measures specified in the NMFS BO will be adhered to, the measures below are those from the NMFS Programmatic Biological Opinion for Restoration Projects (WCR-2015-3755) and will be used to guide the methods stated in this plan.

1) The work area boundaries, including access routes, shall be the clearly marked in the field before any work begins and shall be the minimum size required to complete the project.

2) All work will occur between May 1 and October 15 to avoid impacts to migrating salmonids. The seventy-two hour weather forecasts from the National Weather Service shall be consulted prior to starting any phase of the project that may result in sediment run-off to the stream. All associated erosion control measures must be kept on-site and be in place prior to the onset of precipitation.

3) Any work using equipment located within the stream channel shall be performed in isolation from the flowing stream. Cofferdams used to divert water shall be constructed with clean materials that will not themselves cause turbidity. If a work site is to be temporarily dewatered by pumping, intakes shall be completely screened with wire mesh not larger than ¼ inch to prevent fish and amphibians from entering the pump system. Note that this size mesh is specified in the NMFS 1997 criteria for screening when waters do not contain fry life stages.

4) Fish relocation shall be performed by a qualified fisheries biologist. Rescued fish shall be moved to the nearest appropriate site outside of the Project Area with favorable habitat conditions. A record shall be maintained of all fish rescued and moved. The record shall include the date of capture and relocation, the method of capture, the location of the relocation site in relation to the project site, and the number and species of fish captured and relocated.

5) No debris, soil, silt, sand, cement, concrete, or washings thereof, or other construction related materials or wastes, oil or petroleum products or other organic or earthen material shall be allowed to enter into or be placed where it may be washed by rainfall or runoff into waters of the State. When operations are completed, any excess material shall be removed from the work area where such material may be washed into waters of the State.

6) Appropriate BMPs shall be incorporated into the project to minimize the re-suspension and discharge of sediments and other pollutants downstream and to prevent channel or streambank erosion or destabilization once the project has been completed.

Methodology

The following section outlines the methodology that will be employed by the Project during fish rescue and relocation activities. The methodology incorporates the anticipated dewatering approach, WRA's previous experience conducting fish rescue and relocation activities, and input from Project Permits. Any fish rescue shall occur in advance of dewatering in case multiple days are required for the relocation effort.

Relocation Sites

Prior to the start of dewatering and fish salvage operations; the qualified biologist will identify a suitable downstream relocation site within the same stream as the Project Area to release collected fish. The relocation site will have suitable flow, depth, and cover to allow fish relocated to the area to recover and freely move away as desired. The relocation site will be far enough away from the Project Area to limit the potential for additional disturbance to the individuals associated with restoration activities. More than one relocation site may be used if a large number of fish are collected within the Project Area, in order to reduce disturbance and crowding of fish currently occupying the selected habitat. The site selection and distance from the Project Area will be based on professional judgment of the fisheries biologists, site conditions and access at the time of the relocation.

If a relocation site is not available immediately downstream of the Project Area either due to dry conditions or private property restrictions, steelhead will be relocated to the perennial pool just below the Searsville Dam. The Searsville Dam and property immediately downstream is owned by Stanford (who also owns the property where the Project is located) and would provide a suitable relocation site for steelhead if none are available downstream.

Fish Exclusion

Once a suitable relocation site has been determined, the process of installing the block nets or screens will commence. Block nets or screens with 1/8 to 1/4 inch mesh will be deployed across the creek as the upstream and downstream fish exclusion barriers. Any nets or screens shall

span both the width of the wetted channel as well as the entire depth of the water column. Additionally, nets or screens will stand at least 1 foot above the water, and will be secured at the bottom (e.g. cobble may be added to the lower edge to prevent passage beneath). This will prevent fish from being able to jump over, or pass beneath the exclusion barriers. Nets or screens will most likely be supported by t-posts driven by hand into the bed of the creek. Any exclusion materials will be removed at the end of the Project.

General Equipment and Procedure for Capture

Following the placement of the block nets, fish capture and relocation shall begin. Due to the variety of habitat features within the Project Area it is anticipated that electrofishing will be the main method of collection. Electrofishing parameters will follow the NOAA Guidelines for Electrofishing Waters Containing Salmonids Listed under the Endangered Species Act. At least one netter or fish transfer personnel will accompany the biologist running the elctrofisher to capture fish and transfer/monitor captured fish recovery. Equipment used by the crew would likely include one electrofisher, long handled dip nets with soft nylon mesh, as well as aquarium nets. If seining is used at any time, seine nets will be made of similar 1/8 to 1/4 inch soft knotless nylon mesh and will range in size from 4 feet to 20 feet in length, by 4 feet tall.

Collected fish will be temporarily held in buckets before being placed in specially designed relocation coolers. This will allow any excess sediment to be washed off the fish before placing them in the coolers and it will allow biologists to monitor recovery of each fish before being placed in the cooler. Relocation coolers are designed to hold and transport special-status species that require maintained cool and well-oxygenated water; and have been used to safely hold various salmonids including steelhead as well as other native species such as Sacramento splittail (*Pogonichthys macrolepidotus*), and tidewater goby (*Eucyclogobius newberryi*). Water temperature within the coolers will be monitored, and two aerators capable of aerating 10-15 gallons of water each will be used per cooler (each cooler has a capacity of approximately 10 gallons).

If water temperature within coolers exceeds a 2 °C change over the ambient stream temperature, all fish will be released and relocation activities will halt for the day. Because work is scheduled to occur during the summer and fall, relocation activities will be scheduled to occur in the early morning when temperatures are most favorable and stress on fish is minimized.

Dewatering

Once all fish have been collected or when collection efforts are no longer effective, the biologist may declare the Project Area sufficiently cleared to begin the dewatering process. Dewatering will follow the contractor provided dewatering plan, but is generally anticipated to begin with installation of the upstream cofferdam, and bypass pipe(s), followed by the downstream cofferdam. Once the upstream cofferdam is in place, it is anticipated that the site will almost entirely dewater naturally, as pools in the Project Area are limited. However, it is likely that some small pools of water may remain within the Project Area and would require further dewatering. During this process, the biologist will monitor the dewatering and will collect any fish which may have been hidden under cover but are now exposed. If any remaining pools need to be dewatered with the aid of pumps, small portable pumps may be used (size estimate for pumps would be ¾ - 1 ½ inches diameter). Any pumps used in-channel for this phase of dewatering will be sufficiently screened to prevent entrainment of fish. When the biologist is confident that no special-status fish remain within the Project Area, the remaining water will be allowed to be pumped from the

site and the rescue will be considered complete.

Processing

Holding time will be minimized, and releases will be conducted as necessary to limit unnecessary stress from overcrowding or temperature fluctuations in the coolers. Any steelhead encountered will be placed in separate coolers, and segregated by size to minimize opportunities for predation. Water temperature, dissolved oxygen, and salinity will be taken at the predetermined release locations, and compared to conditions within the coolers. Fish will be suitably acclimated during the release procedure to limit shock. Data on species encountered, relative size will be estimated by age class, total number, and release times will be collected.

Decontamination

Prior to any work on the Project, and following completion, all equipment used within the Project Area will be sufficiently cleaned and decontaminated to prevent the spread of invasive species. WRA uses HDQ Neutral, a generic formulation of Quat-256 for decontamination to minimize the potential for spread of disease or invasive species. After decontamination, all equipment will be allowed to air dry prior to use elsewhere.

Mortality Procedures

In the event that a dead or fatally wounded steelhead is encountered, it will be collected in a zip-lock bag, and will be frozen as soon as possible. Alternatively, the carcass may be preserved in 200 proof ethanol. Any carcasses will be retained by the biologist and made available to NMFS upon completion of the relocation.

Reporting

After completing the fish rescue and relocation, a brief summary report will be prepared and submitted to NMFS. The report will, at minimum contain the following information:

- dates when the relocation occurred,
- personnel conducting the relocation,
- methods used including electrofisher settings,
- location of the relocation site(s),
- ambient conditions at the time in the Project Area, at the relocation sites, and in coolers during holding,
- number of each species collected as well as approximate age class, and
- an estimate of survival and mortality.
- Photographs of the work area and operations will also be included.

ENVIRONMENTAL CONSULTANTS

Attachment A: Fisheries Biologist Resumes

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Nicholas Brinton
Associate &
Fisheries Biologist
brinton@wra-ca.com
o: 415.524.7248
c: 909.275.2358
Years of Experience: 7

Education
BS Wildlife, Fish and Conservation Biology, UC Davis, 2012

Technical Training:
Cal-Nevada AFS Fish Passage and Screening Criteria Workshop Sacramento, California, 2015.

BCM Bat Survey Techniques. Portal Arizona. 2016

Smith-Root Electrofishing Principals and Safety Certification 2019

Mine Safety and Health Administration Part 46 Certified Surface Miner

Professional Affiliations/ Certifications

Member: American Fisheries Society

Nick earned his undergraduate degree in Wildlife, Fish and Conservation Biology from the University of California, Davis. Prior to coming to work with WRA, Nick worked in a variety of locations from the Sierra Nevada Mountains and the Central Valley of California gaining an array of experience with various California fish and amphibian species.

With WRA, Nick performs a variety of specialized permitting tasks leading Section 7 and Section 10 consultation with federal agencies, as well as Section 2081 and 1602 permitting with the state. He also performs protocol level surveys, fish passage assessments, as well as habitat and water quality assessments. He has specialized in fisheries related issues and has performed fish rescues on numerous state and federal listed species including steelhead and Coho salmon. He is certified to operate electrofishing equipment, and leads electrofishing efforts for WRAs fisheries projects. In addition, Nick has gained a wide array of experience with California tiger salamander and California red-legged frog. He acts as a project manager for numerous projects with special-status amphibians and has lead relocation efforts as well as trained staff to perform species specific procedures for surveys and relocation.

Representative Projects

Fisheries

Mare Island Ship Yard Dry Dock Fish Salvage, Vallejo, California, 2014-Present
Both government and private ships needing repair are brought to the dry docks at the former Mare Island Naval Shipyard. In accordance with permit requirements by the USFWS, NMFS, and CDFW, biologists are required to be present during final stages of dewatering to salvage (rescue) stranded fish from the dry dock. Captured fish are placed in aerated holding coolers, identified to species, enumerated and measured before being returned to the Mare Island Channel of the Napa River. Nick is the lead fisheries biologist for this operation. His primary responsibility for this project is in leading and overseeing field crews that conduct the salvage operations. He also coordinates with resource agency personnel ensuring permit compliance, and writes technical reports following each salvage event. He is authorized to handle and relocate longfin smelt, Delta smelt, steelhead, winter and spring-run Chinook salmon as well as green sturgeon at this site. To date he has performed more than 125 salvages at this site. This project is ongoing.

East Russian Gulch Fish Passage Restoration Project, Sonoma County, California, 2019
WRA worked with The Wildlands Conservancy to help implement a fish rescue and relocation prior to the start of restoration work to remove two fish passage barriers on East Russian Gulch Creek, which prevented the upstream migration of returning adult steelhead. In a remote setting, WRA lead the two-day operation to rescue steelhead from approximately 300 feet of stream before the start of restoration work. During the two-day effort, WRA biologists relocated nearly 50 steelhead and more than 30 California giant salamanders. Nick acted as both the project manager, and lead biologist for

a team of biologists to conduct the work. Due to the extreme habitat complexity, methods primarily relied on electrofishing. The project was completed on time, and within all stated parameters of the biological opinion.

National Park Service Electrofishing Surveys, Muir Woods, Mill Valley California, 2019
As part of the monitoring efforts within the National Park system, NPS fisheries crews annually sample Redwood Creek within Muir Woods in order to monitor the population of Central California Coast steelhead and Central California Coast Coho salmon which occur in the creek. Nick assisted with the electrofishing survey in 2019 which resulted in the capture and handling of both Coho and steelhead.

Olema-Bolinas Road Flood Control Project, Marin County, California, 2017 - 2019
WRA works with Marin County to help implement various projects when projects are likely to encounter protected species and special approval is needed to help relocate or capture those species. At mile marker 0.18 a box culvert funnels Lewis Gulch beneath Olema-Bolinas Road and out to Bolinas Lagoon. In 2017, and 2019 storms caused severe flooding of the area and plugged the culvert with sediment. Prior to the rainy season in 2018 and 2020, the County sought to perform maintenance to remedy flooding issues. Nick was approved by NMFS to perform the fish relocation activities, and by the USFWS to perform California red-legged frog preconstruction surveys and relocations as outlined in the project Biological Opinions. Using seine and dip nets, Nick, with the assistance of Kallie Kull from Marin County, captured and successfully relocated nearly 30 steelhead between these two efforts, as well as numerous California red-legged frogs. All of the captured fish and amphibians were successfully relocated. No mortality was observed and the project finished on schedule.

Lower Miller Creek Channel Maintenance, San Rafael, California, 2016-2019
The Las Gallinas Valley Sanitary district regularly removes accumulated sediments from the channel within Lower Miller Creek. As part of the project mitigation efforts, a fish salvage is required in order to salvage and relocate any native fish in the proposed work area which stretches approximately ½ mile in length. Nick was approved as the lead fisheries biologist for the project and has organized, executed and reported all of the associated salvage work on Lower Miller Creek for the last three years. All work was conducted in accordance with project permits and the project is now completed.

San Geronimo Creek Flood Control and Habitat Restoration Project, Marin County, California, 2019
WRA worked with The Marin resource Conservation District (MRCD) to help implement a fish rescue and relocation prior to the start of restoration work. The goal of the Project was to enhance fish cover through a reach of San Geronimo Creek with the addition of large woody debris. WRA lead the three-day operation to rescue steelhead and Coho salmon from approximately 400 feet of stream before the start of restoration work. During the effort, WRA biologists relocated approximately 350 steelhead and 50 Coho salmon, primarily through electrofishing. Nick acted as both the project manager, and oversaw the project while biologist Stewart DesMeules was charged with conducting the rescue work. The project was completed on time, and within all stated parameters of the biological opinion.

Napa County Resource Conservation District, Rotary Screw Trap, Napa County, California, 2018-2019
The Napa County Resource Conservation District (NRCD) is an organization that promotes watershed-based stewardship of natural resources throughout the greater Napa County area. NRCD monitors Central California Coast Distinct Population Segment steelhead and fall-run Chinook salmon populations by collecting data on the number of fish migrating to the ocean each year through the operation of a rotary screw trap on the Napa River. The trap is typically operated February through May, and WRA involvement with the trap involves identifying the species and numerating the captured fish. For target species, such as lamprey and salmonids, additional biological information is collected which involves measuring the species length, weigh, and collecting genetic samples through fin clips. In addition, steelhead are pit-tagged to track the potential return of adult animals. Nick was approved by

NMFS and CDFW to act as a lead biologist on the project. Over the course of this project Nick handled several dozen steelhead, hundreds of Chinook salmon, and several thousand lamprey.

Novato Creek Maintenance and Sediment Removal, San Rafael, California, 2014 - Present
The Marin County Flood Control District conducts regular maintenance within the lower portions of Novato Creek as well as within Warner and Arroyo Avichi Creeks. Before work can begin a fisheries biologist must clear each reach to assure that steelhead are not present. Nick lead a team of volunteers who systematically cleared and relocated any native or special-status fish encountered in the creeks. During the salvage work, multiple *Oncorhynchus mykiss* were encountered and successfully relocated without injury.

Lucas Valley Bridge Emergency Repair, San Rafael, California, 2018
Following winter storms in November 2017, erosion at the Lucas Valley Road Bridge required emergency repairs in order to maintain functionality of the bridge. WRA was contracted to salvage and relocate steelhead from Miller Creek before emergency repair operations could begin. Nick led the team of fisheries biologists and county volunteers for this project, successfully relocating 47 steelhead. No mortality was documented among steelhead and the project was completed on time. Methodology used for this project relied primarily on electrofishing.

Westside Basin, Santa Clara, California, 2017
The City of Santa Clara sought to dredge a stormwater retention basin within city limits to bring it back to full operational capacity. A streambed alteration agreement was required for the project and as part of the measures stipulated in the SAA, a fish rescue plan and field effort was required. Nick wrote the fish rescue plan, as well as the invasive species removal plan for the project, both of which were approved by CDFW. During the field effort Nick led the weeklong effort and designed a special fyke trap to catch fish within the basin when traditional means were not feasible. Nearly 1,000 fish composed of common carp, bluegill, largemouth bass and goldfish were encountered. No native fish were encountered during the fish salvage and all non-native fish were euthanized and disposed of in accordance with CDFW's permit requirements. This project has been completed.

San Geronimo Creek Fish Passage and Habitat Improvement Project, San Rafael, California, 2016
As part of a fisheries restoration grant, this project sought to eliminate a major fish passage barrier and enhance fish habitat by using large woody debris. As part of the restoration effort, a fish rescue and relocation was required in order to capture and relocate Coho salmon and steelhead within or immediately downstream of the work area. Under the supervision of a CDFW biologist, Nick assisted with the fish rescue effort which successfully relocated over 400 Coho salmon and steelhead. Methods for rescue and relocation primarily relied upon electroshocking.

Napa Dry Bypass, Napa, California, 2014
The Napa Dry Bypass is part of a series of flood control projects headed by the Army corps of Engineers designed to divert 100 year flows around the oxbow reach of the Napa River to avoid flooding the Soscol Gateway area in downtown Napa. Nick was approved as a lead fisheries biologist on this project and conducted multiple fish salvage operations for longfin smelt, and steelhead. Nick also assisted in otter trawl surveys and fish exclusion work which were required during pile driving operations. He has also been involved with this project by monitoring compliance and construction activities including monitoring during the use of an impact hammer for pile driving. In addition, he assisted in the design and implementation of the environmental awareness training program to comply with various permit conditions.

Healdsburg Veterans Memorial Dam Spillway Repair, Healdsburg, California, 2014
The Healdsburg Veterans Memorial Dam is a flashboard dam located within the city of Healdsburg on the Russian River. The dam is installed seasonally to create a temporary recreational lake. For this project, Nick was approved as the lead fisheries biologist, and biological monitor. He conducted pre-construction surveys for breeding birds as well as Pacific pond turtle. Turtles were identified near to the project area. As the lead fisheries biologist he lead

a team of biologists who performed multiple fish salvages within the project area following de-watering events. All steelhead encountered during the salvages were successfully relocated. He conducted pre-construction checks, environmental trainings, and water quality monitoring throughout the course of the project. The project was completed in compliance with permits conditions.

US Forest Service, Tahoe National Forest, 2013
The Tahoe National Forest covers over one million acres and is home to 23 species of fish. Nick worked as a fisheries technician performing more than 200 hours of electrofishing and seine surveys throughout the forest for both population trend analysis, and range expansion surveys. He has handled several thousand fish during this project including: Lahontan cutthroat trout, rainbow trout, and brown trout. As part of this project he performed surveys on two watersheds to using the US Forest Service Basinwide Survey protocol to map, classify and measure current habitat conditions. He also performed habitat assessment surveys in those same watersheds for Sierra mountain yellow-legged frog and successfully identified adults, sub-adults and larval forms of the species.

Slinkard Creek, Walker, California, 2012
Slinkard Creek is a tributary of the West Walker River and is located within the state wildlife refuge of Slinkard Valley. It contains one of the few remaining populations of federally threatened Lahontan cutthroat trout (LCT) as well as a large population of non-native brook trout. In cooperation with CDFW, Nick was contracted by California Trout to facilitate the removal of brook trout from Slinkard Creek to enhance conditions for LCT. Nick designed a series of portable Alaskan weirs to divide Slinkard Creek into reaches which were then systematically cleared of all fish using a backpack electrofisher. LCT were retained in the creek, and allowed to repopulate reaches once all brook trout were removed. Nick logged approximately 80 hours of time using a backpack electrofisher on this project while electroshocking, and capturing over 300 LCT. Mortality among LCT was exceptionally low (<1 percent) and approximately 1 kilometer of creek was restored during the season which he worked on this project.

UC Davis, Fangue Laboratory, Davis California, 2011-2012
Research in the Fangue lab focused on understanding the physiological specializations that allow animals to survive in complex environments. As part of his work with the laboratory, Nick conducted experiments to assess the physiological responses to conditions such as critical thermal, stimuli aversion and entrainment of native fishes. The fish used in such experiments were cared for in a hatchery that he helped to maintain and construct additions to. Species cared for included: northern DPS green sturgeon, fall-run Chinook salmon, hardhead and Sacramento splittail.

Fisheries (Observation/Monitoring)

Bon Air Bridge Rehabilitation, Larkspur, California
Bon Air Bridge spans Corte Madera Creek, providing an important link between Magnolia Avenue, Larkspur's main street, and the northeast side of the city. The bridge will be replaced by a new bridge, correcting structural deficiencies to provide a stable and safe structure. Nick was approved by NMFS to act as the lead biologist for fish exclusion operations. Additionally he has lead the fisheries observation compliance monitoring during pile driving operations. As part of his duties he has trained and overseen numerous observers on marine mammal and fisheries observing practices. This project is ongoing.

Frenchman's Creek Water District, San Mateo County
Frenchman's Creek Water District (FCWD) is a small water service provider located north of Half Moon Bay along coastal San Mateo County. A CDFW 1602 permit allows for the temporary installation of a flashboard dam and water withdrawal from the system for agricultural purposes. Nick serves as a fisheries biologist for this project, which involves monitoring flow, water quality sampling, as well as habitat connectivity and condition for steelhead

during the diversion period. He also assists with permit compliance, and annual reporting. This project is currently ongoing.

Red Rocks Warehouse Creosote Removal and Pacific Herring Habitat Restoration Project, Richmond, California

WRA helped to prepare plans for monitoring light availability and turbidity to protect local eelgrass beds during the removal of creosote pilings and other anthropomorphic materials from the dilapidated Red Rocks Warehouse facility. Nick assisted in conducting a light and turbidity monitoring studies following National Marine Fisheries Service (NMFS) protocols. The project used a WRA vessel to deploy light monitoring loggers and collect turbidity samples during work to assure that pile removal operations were not impacting nearby eelgrass beds. Nick was also and approved to monitor for Pacific herring, and performed surveys in compliance with construction permits.

Port of Oakland Maintenance Dredging, Oakland, California

Maintenance dredging of the Port of Oakland Inner and Outer Harbor Channels was necessary to maintain passageways for the active port. Pacific herring is a protected commercial fishery, and dredging operations within the Pacific herring spawning season were unavoidable and required observers to assure operations did not occur during spawning events. Nick was a CDFW approved observer for the Project. No spawn events or Pacific herring activity was noted during dredge activities. All Project activities were completed in compliance with the Project's Pacific Herring Work Window Waiver.

Port of Richmond Inner Harbor Maintenance Dredging, Richmond, California

Maintenance dredging for the Port of Richmond was conducted in the winter of 2014 to maintain passageways for heavy ships entering and exiting the port. Pacific herring is a protected fishery, and dredging operations within the harbor overlapped with the Pacific herring spawning season. Nick acted as an approved CDFW observer for the Project. During operations, two spawning events occurred within or adjacent to the Project Area. Nick observed the spawning events aided crews with required procedures to maintain compliance and avoid impacts to the spawn. All Project activities were completed in compliance with the Project's Pacific Herring Work Window Waiver.

STEWART DESMEULES
Fisheries Biologist
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o: 415.454.8868 x2040
c: 207.380.6138

Years of Experience: 7

Education
B.A. Biology, Wheaton College, 2010

Professional Affiliations/ Certifications
Commercial Unmanned Aerial Vehicle (UAV) Pilot with Part 107 License

American Fisheries Society

NMFS Certified Commercial Fisheries/ Marine Mammal Observer

Specialized Training
Cal-Neva AFS / TWS: Tidewater Goby Management & Ecology Workshop

TWS Environmental DNA: A Practical Workshop

TWS Drone Regulation and Technology: A Workshop for Biologists

NMFS Northeast Fisheries Observer Program Trained

Special Recognitions/ Publications
Poster Presentation: Fisheries Observer Retention Strategies presented at the International Fisheries Observing and Monitoring Conference 2016

Co-author: American Eel potting presentation: American Fisheries Society Conference 2014

Stewart DesMeules holds a B.A. in Biology from Wheaton College in Massachusetts. Prior to joining WRA, Stewart worked with the National Oceanic and Atmospheric Administration (NOAA) Fisheries Observer Program on the East Coast. During his time with WRA, Stewart has managed and worked on a diversity of fisheries and wildlife related projects including permitting, endangered species consultation, protected species surveys, mitigation and conservation banking, habitat evaluation, assessments, and species sampling.

Stewart has experience with environmental permitting including Endangered Species Act Section 7 and Essential Fish Habitat consultation, California Department of Fish and Wildlife (CDFW) Streambed Alteration Agreements, CDFW Incidental Take Permits (2081), and biological resource assessments prepared for the California Environmental Quality Act (CEQA). Stewart performs a variety of specialized tasks, including biological monitoring, amphibian surveys, fish relocation, electrofishing, fish passage evaluation, construction monitoring, and redd and carcass spawner surveys. He holds a FAA Remote Pilot License, and has logged over 70 hours in flights. In addition, he has experience monitoring for Pacific herring spawning activity, and marine mammal observing.

Representative Projects

Napa County Resource Conservation District, Rotary Screw Trap, Napa County, California

The Napa County Resource Conservation District (NRCD) is an organization that promotes watershed-based stewardship of natural resources throughout the greater Napa County area. NRCD monitors Central California Coast Distinct Population Segment steelhead and fall-run Chinook salmon populations by collecting data on the number of fish migrating to the ocean each year through the operation of a rotary screw trap on the Napa River. The trap is typically operated February through May, and WRA involvement with the trap involves identifying the species and numerating the captured fish. For target species, such as lamprey and salmonids, additional biological information is collected which involves measuring the species length, weigh, and collecting genetic samples through fin clips. In addition, steelhead are pit-tagged to track the potential return of adult animals. Stewart was approved by NMFS and CDFW to act as a lead biologist on the project. Over the course of this project Stewart handled dozens of steelhead, hundreds of Chinook salmon, and several thousand lamprey in addition to many other native and non-native species.

Redd and Carcass Spawning Survey Work, Pt. Reyes Station, California

Stewart worked with the National Park Service staff to complete redd and carcass spawning surveys for Coho salmon in Pt. Reyes National Seashore. Work involved traversing sections of creek monitoring for Coho salmon and other salmonids. Encountered reds were measured and marked with GPS after being evaluated for condition. Encountered Coho salmon carcasses were sampled for otoliths and DNA. Live fish had their locations marked with GPS and were visually measured. In addition, water quality measurements and depths were taken incrementally over the survey area. Survey work is ongoing.

Mare Island Ship Yard Dry Dock Fish Salvage, Vallejo, California
Government, commercial, and private ships needing repair are brought to the dry docks at the former Mare Island Naval Shipyard. In accordance with permit requirements of USFWS, National Marine Fisheries Service (NMFS), and CDFW, biologists are required to be present during final stages of dewatering to rescue stranded fish from the dry dock. Captured fish are placed in aerated holding coolers, identified to species, counted, and measured before being returned to the Mare Island Channel of the Napa River. Stewart leads this operation, compiles data from fish salvages and writes technical reports following each salvage event. He is authorized to handle and relocate longfin smelt, Delta smelt, steelhead, fall, late-fall, winter and spring-run Chinook salmon as well as green sturgeon at this site. He is also assisting with preparation of renewal of NMFS and USFWS permits for the project. This project is ongoing.

Butte Sink Mitigation Bank, Colusa County, California, 2019
The Butte Sink Mitigation Bank is an approximately 350-acre mix of agriculture and riparian habitat in Colusa County, California. The site is located along the western bank of Butte Creek and at the terminus of the Colusa Bypass, which diverts high flows from the Sacramento River into the site. The project is designed to create, restore, and preserve a mix of riparian, wetland, and off channel floodplain habitat. Target species for the bank include a mix of protected salmonid species that occur in Sacramento River and Butte Creek, including protected spring and winter-run Chinook salmon, and steelhead. WRA is leading the effort to develop the conservation bank, which includes concept design, baseline biological surveys, habitat evaluation, prospectus development, and permitting. Stewart has assisted in biological surveys on the site, installation of hydrological data loggers, as well as providing technical fisheries support for various aspects of the permitting and habitat evaluation process. He has also conducted drone flights of the property to aid in hydrological analysis.

Santa Clara River Habitat Restoration, Los Angeles County, California
Stewart assisted with a fisheries restoration project including a feasibility study and conceptual design development for the restoration of fish habitat at a confidential location along the Santa Clara River. Habitat for Santa Ana sucker, unarmored threespine stickleback, and Arroyo chub were assessed as part of this project, and Stewart worked with hydrologists to recommend habitat restoration measures. His work included a habitat assessment, and report preparation. This project is ongoing.

Refinery Marine Terminal Ridgway's Rail Surveys, Martinez, California
Stewart has performed biological monitoring for a well installation project at a refinery marine terminal on Suisun Bay. The primary special-status species of concern for the project are the federal endangered California Ridgway's Rail and Salt-marsh Harvest Mouse. Stewart conducted protocol level surveys for California clapper rails as part of ongoing remediation at this project under the supervision of federal recovery permit holder Jason Yakich (TE-58760A-0). This project is ongoing.

Union City Sanitary District Outfall Improvements California Ridgway's Rail Survey
Stewart conducted passive surveys for California clapper rails as part of an emergency outfall improvements project under the supervision of federal recovery permit holder Jason Yakich (TE-58760A-0). The survey effort was undertaken to determine the presence of breeding rails in the vicinity of the proposed project. Stewart has positively identified multiple CRR during this project.

Burrow Exclusion and Burrowing Owl Surveys, Newark, California
The project is at a remediation property in Alameda County, California, where burrowing owl is known to occur in the vicinity of the Project Area, and take avoidance surveys are required year-round by project permits and

California Department of Fish and Wildlife (CDFW). Stewart surveyed the area and collapsed burrows that weren't being used by burrowing owl to prevent colonization on the site. Stewart assisted in the installation of one-way exclusion doors on site. He positively identified two burrowing owls as part of the project.

Small Mammal Trapping Study, Mare Island, Vallejo, California
A study was conducted to investigate the presence of salt marsh harvest mice at a remediated Marine Corps firing range on Mare Island in Solano County, California, and to collect genetic samples of any captured harvest mice for ongoing population genetics research. Stewart assisted Wildlife Biologist Katie Smith with the checking, setting and baiting of over 150 Sherman live traps. Species encountered included house mice, California voles, western harvest mice, and salt marsh harvest mice.

Treasure Island/Yerba Buena Island Redevelopment, San Francisco, California
The Treasure Island and Yerba Buena Island Redevelopment Project involves the conversion of 460 acres of the former Naval Base Treasure Island to mixed-use development, parks, and open space sponsored by the City of San Francisco and a consortium of private developers. It is one of the largest and most visible projects in the San Francisco Bay Area in the last 30 years. The project requires shoreline improvements and construction of a new ferry terminal located within an existing Anchorage Zone designated by the U.S. Coast Guard. In accordance with project permits, Stewart conducted over 60 hours of nesting bird surveys on both Treasure Island and Yerba Buena Island, successfully identifying numerous active nests. In addition to nesting bird surveys, Stewart has conducted pre-demolition bat inspections of buildings on the site. He also assists with post survey reporting. This project is ongoing.

McClellan Ranch West Parking Area Project. Cupertino, California
As part of a project for the City of Cupertino, Stewart conducted pre-construction surveys for California red-legged frog, western pond turtle, San Francisco dusky-footed woodrat, Santa Cruz black salamander, California Giant Salamander, pallid bat, long-eared owl, and Nicklin's Peninsula Snail. Work for this project was authorized through a California Department of Fish and Wildlife 1600 Stream Bed Alteration Agreement (SAA), and Stewart worked as a CDFW approved biological monitor and assisted with compliance of the SAA. As part of pre-construction activities, Stewart guided and monitored the installation of an amphibian exclusion fence along the riparian edge of the project site, and performed construction monitoring. He also completed post monitoring reports. This project is ongoing.

Bon Air Bridge Replacement Dewatering and Fish Salvage, Larkspur, California
Bon Air Bridge spans Corte Madera Creek, providing an important link between Magnolia Avenue, Larkspur's main street, and the northeast side of the city. The bridge is scheduled to be replaced by a new bridge, correcting structural deficiencies to provide a stable and safe structure. Stewart was an approved biologist to monitor dewatering of coffer dams on Corte Madera creek during the beginning phases of the Bon Air Bridge Replacement Project. He was present during the final stages of dewatering and removed stranded fish from the coffer dam with an elongated dip net, identified them, and released them back into the creek. Additionally, Stewart has performed exclusion fence monitoring and pre-work inspections of salt marsh vegetation within the project area for Salt Marsh Harvest Mouse presence.

Cargill Salt, Newark, Redwood City, California
One of two sea salt works left in the United States, Cargill contains approximately 8,000 acres of evaporation ponds devoted to salt production in South San Francisco Bay, California. Stewart is a USFWS approved biologist, assisting Cargill with compliance monitoring, including Western Snowy Plover, Salt-marsh Harvest

Mouse, California Clapper Rail, and Least Tern surveys, as well as intermittent vegetation monitoring. As part of compliance monitoring, Stewart has positively identified over 15 Western Snowy Plovers, including two chicks. Additionally, Stewart is assisting Cargill with permitting efforts as they relate to protected fish species, including Longfin Smelt, Green Sturgeon, Steelhead and other wildlife. This project is ongoing.

Marin County Flood Control and Water Conservation District, Marshall-Petaluma Bridge Repair, Point Reyes Station, California
In summer of 2018, WRA was contracted to capture and relocate native fish species from Nicasio Creek. This work took place prior to dewatering a portion of the creek for maintenance. During the two day effort, over 1,500 native fish were encountered and relocated out of the work area. Stewart's primary role in this project was to conduct the fish rescue, utilizing primarily electrofishing and block nets to capture fish. Prior to release, fish were held in aerated coolers and monitored for water quality. All electrofishing was conducted following National Marine Fisheries Service guidelines for e-fishing.

Eelgrass Surveys in Tomales Bay, California
Stewart has conducted numerous eelgrass surveys in Tomales Bay, California in support of commercial development projects in the area. Stewart has assisted with the preparation of documentation to fulfill the requirements of CEQA review for potential impacts to eelgrass and other Essential Fish Habitat (EFH). He continues to perform monitoring services to meet mitigation requirements.

Pier 70 Redevelopment, South San Francisco, California
The Pier 70 redevelopment project lies on the San Francisco waterfront. A 28-acre portion of the Pier 70 Project is planned for demolition and surveys are required in the spring and summer of 2018, prior to build-out of the Project. Currently, the site is developed with numerous buildings which are scheduled for demolition so that reconstruction of the site can occur. Stewart served as Biologist, conducting surveys for both nesting birds and bat roosts throughout the site. Overall surveys covered approximately 12 buildings of various construction, and stages of decay, as well as adjacent undeveloped habitats. This project is ongoing.

Facebook Campus Expansion, Menlo Park, California
As Facebook continues to expand, the corporation's need for new office space adjacent to its Menlo Park headquarters is insatiable. WRA continues to provide biological services, including planning, nesting bird surveys and pre-demolition surveys to support the expanding campus. Stewart conducted pre-construction nesting bird surveys in 2018

Foothill Yellow-legged Frog Surveys, Multiple Counties, California
In spring of 2018 and 2019, Stewart assisted WRA Biologist Brian Freiermuth in conducting egg mass surveys for foothill yellow-legged frog (FYLF) in Sonoma, Mendocino and Lake Counties, CA. Dozens of FYLF in all life stages were detected during the surveys. Habitat assessments and impact analyses for FYLF were also conducted as part of this work. Total duration of these surveys exceeded 100 hours. In addition to spring surveys, Stewart has conducted daytime presence/absence surveys for metamorphosed FYLF in the late summer under an approved CDFW protocol (5 hours).

City of Burlingame Stormwater Drain Maintenance, Burlingame, California
As part of the Burlingame Stormwater Maintenance Project, rehabilitation of concrete lined stormwater channels and installation of flap gates on stormwater outfalls was completed in 2018. Dewatering of the channels was conducted under a CDFW Streambed Alteration Agreement and a Regional Water Quality Control Board permit.

Stewart worked to monitor the channel during the dewatering process for aquatic species, including California red-legged frog, San-Francisco garter snake, and Ridgway's rail. He also performed visual checks on turbidity levels and monitored BMP's.

Ridge Top Ranch Wildlife Conservation Bank, Solano County, California
Ridge Top Ranch, LLC (RTR) is an approved conservation bank on over 280 acres of high quality California red-legged frog and callippe silverspot butterfly mitigation habitat located within Solano County, California. WRA, in consultation with the USFWs and under 10(a)(1)(A) Recovery Permit TE-212445-0, successfully translocated California red-legged frogs to created habitat within the RTR Wildlife Conservation Bank. WRA has been involved throughout the process, from selecting donor sites and planning habitat creation, to translocation of egg masses and monitoring the frogs to ensure that establishment at the receiving site was successful. In the summer of 2018, Stewart assisted WRA Biologist and recovery permit holder Rob Schell in the capture, handling, measurement and pit-tagging of more than 25 adult CRLF. Survey time for the site visit was approximately 5 hours. Stewart also assisted WRA Biologist Brian Freiermuth in counting California red-legged frog egg masses and performed site checks on mesh enclosures containing egg masses. In addition to egg masses, over 20 adult California red-legged frogs were identified over the course of multiple nighttime surveys, with over 15 hours of nighttime surveys logged. Stewart has also performed vegetation control within the site. This project is ongoing.

Marin County Flood Control and Water Conservation District, Lucas Valley Bridge Emergency Repair, San Rafael, California
Following winter storms in November 2017, erosion at the Lucas Valley Road Bridge required emergency repairs in order to maintain functionality of the bridge. WRA was contracted to capture and relocate steelhead from Miller Creek before emergency repair operations could begin. Stewart assisted the team of fisheries biologists and county volunteers for this project, successfully relocating 47 steelhead. No mortality was observed among steelhead and the project was completed on time. Methodology used for this project relied primarily on electrofishing.

Port of Oakland Maintenance Dredging, Oakland, California
Maintenance dredging of the Port of Oakland Inner and Outer Harbor Channels was necessary to maintain passageways for the active port. Pacific herring is a protected commercial fishery, and dredging operations within the Pacific herring spawning season were unavoidable and required observers to assure operations did not occur during spawning events. Stewart was a CDFW approved observer for the Project. This project is ongoing.

Niebaum-Coppola Estate Winery, L.P., Bear Canyon Creek Fish Passage Maintenance Project and Biological Construction Monitoring, Rutherford, California
WRA assisted the Napa Resource Conservation District with biological monitoring during sediment removal activities for a reservoir on Bear Creek, in Napa County. Work for this project was authorized through a California Department of Fish and Wildlife 1600 Stream Bed Alteration Agreement (SAA), and Stewart worked as a biological monitor and assisted with compliance of the SAA. Protected species known for the area included foothill yellow-legged frog, pallid bat, Pacific pond turtle, and steelhead. No protected species were injured during the monitoring. Sediment control measures were monitored to minimize sediment flowing offsite.

Avian Surveys for Confidential Client, Lake County, California
A confidential client contracted WRA to conduct a biological resources assessment of a recently purchased property in Lake County in order to determine the full extent of wildlife that occupied the property. Stewart was part of the wildlife team that was tasked with surveying for and identifying special-status species throughout the

property including golden and bald eagle and special-status amphibians. In total, five eagle nests were located over two months of surveys. Additionally, Stewart assisted in visual encounter amphibian surveys. Other special-status species including foothill yellow-legged frog, western pond turtle, tricolored blackbird, white-tailed kite and yellow-headed blackbird were identified on site.

Young Ranch Bay Checkerspot Butterfly Surveys, Santa Clara County, California
Young Ranch is an approximately 2,100 acre ranch in the Coyote Hills just southeast of San Jose, California. WRA is managing a biological resources assessment of the property, including a butterfly-specific habitat suitability analysis for the federally endangered Bay checkerspot butterfly (BCB), as well as annual surveys for both BCB and burrowing owl. Stewart's chief involvement in this project is to conduct adult BCB surveys in an effort to document on-site habitat use and provide information for the development of a land use plan. During surveys, he has identified many individual BCB, observed behavior and plants if nectaring or resting, and provided GPS locations which are being used in a GIS corridor analysis.

Drone Work

Santa Clara River Habitat Restoration, Los Angeles County, California
Stewart flew UAV missions at this location in support of fisheries restoration efforts that included a feasibility study and conceptual design development for the restoration of fish habitat at a confidential location along the Santa Clara River. Habitat for Santa Ana sucker, unarmored threespine stickleback, and Arroyo chub were assessed as part of this project, and Stewart worked with hydrologists to provide high quality imagery and elevation mapping to support restoration designs. This project is ongoing.

Butte Sink Mitigation Bank UAV Survey, Colusa County, California, 2019
The Butte Sink Mitigation Bank is an approximately 350-acre mix of agriculture and riparian habitat in Colusa County, California. The site is located along the western bank of Butte Creek and at the terminus of the Colusa Bypass, which diverts high flows from the Sacramento River into the site. The project is designed to create, restore, and preserve a mix of riparian, wetland, and off channel floodplain habitat. Target species for the bank include a mix of protected salmonid species that occur in Sacramento River and Butte Creek, including protected spring and winter-run Chinook salmon, and steelhead. WRA is leading the effort to develop the conservation bank, which includes concept design, baseline biological surveys, habitat evaluation, prospectus development, and permitting. Stewart has flown the site using a UAV on multiple occasions, particularly in response to flooding events to document the extent of inundation and provide footage to inform models.

Elsie Gridley Mitigation Bank UAV Survey, Dixon, California 2018
The Elsie Gridley Mitigation Bank is the largest mitigation bank in California at more than 1,800 acres, and is a central component of the largest contiguous vernal pool preserve in the United States. The bank is approved by five different agencies and covers two different Army Corps Districts. In addition, the bank sells both numerous species credits such as California tiger salamander, vernal pool crustaceans, Swainson's hawk, and burrowing owl, as well as wetland credits to offset impacts under the Clean Water Act. Utilizing a UAV (unmanned aerial vehicle) Stewart flies the site on a routine basis in order to acquire aerial imagery which could be used to assess restoration progress.

Confidential Client UAV Survey, Sacramento County, California

A WRA client in Sacramento County required surveys to determine the extent of wetland establishment adjacent to a piece of developed property. Utilizing a UAV (unmanned aerial vehicle) Stewart flew the site in order to acquire aerial imagery which could be used to assess wetland growth.

Antonio Mountain Ranch Mitigation/Conservation Bank UAV Survey, Placer County, California
The Antonio Mountain Ranch Mitigation/Conservation Bank is a proposed approximately 800-acre wetland and protected species mitigation bank in Placer County. The bank serves as offsite mitigation for impacts to wetlands and non-wetland waters, including vernal pool and swale complexes, seasonal and perennial wetlands, and streams, and as a conservation bank, pursuant to federal and California Endangered Species Acts (for special-status vernal pool branchiopods in Placer County and surrounding counties). Swainson's hawk and tricolored blackbird habitat credits are also provided for covered activities under the Placer County Conservation Plan. Utilizing a UAV (unmanned aerial vehicle) Stewart has flown the site multiple times in order to acquire aerial imagery which could be used to assess restoration progress.

Petersen Ranch Mitigation Bank, Leona Valley, California
The Petersen Ranch Mitigation Bank is the largest mitigation bank in California and was approved in May 2016. The bank is approximately 4,000 acres in size and approved by the Los Angeles District of the U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, California Department of Fish and Wildlife, and Lahontan Regional Water Quality Control Board. The bank consists of two different sites located in the Santa Clara River and Antelope Valley watersheds. Stewart has conducted UAV flights on the property for annual monitoring efforts.

Experience Prior to WRA

Massachusetts Division of Marine Fisheries, Lake Sabattia American Eel Mark Recapture Study, Taunton, Massachusetts
For the Massachusetts Division of Marine Fisheries, Stewart coordinated and conducted field work to assess American eel populations in water body prior to a downstream dam removal project. American eels were collected with modified gee traps using herring as bait. Trapping locations were chosen based on a previously completed habitat assessment. Traps were retrieved daily, using a 15 foot trailer launched boat. Water quality measurements were taken at each trapping locations. Once eels were caught, they were sedated, measured, injected with pit tags, and released.

Massachusetts Division of Marine Fisheries, Southeastern Massachusetts River Herring Count, Southeastern Massachusetts
For the Massachusetts Division of Marine Fisheries, Stewart conducted a river herring count during the spring runs, using primarily Smith Root electronic counters and video counters. He made bi-weekly visits to 8 counting stations to offload count data, take water quality measurements, and to maintain the fish counting platforms. Stewart conducted weekly sampling of individual river herring runs, taking 100 fish at a time for processing. Processing involved measuring, sexing, and extracting otoliths. Count data supplemented the Atlantic States Marine Fisheries Commission (ASMFC) river herring population assessment.

Massachusetts Division of Marine Fisheries, American Eel Monitoring, Southeastern Massachusetts

As part of the Massachusetts Division of Marine Fisheries young of year assessments for American eel, Stewart conducted standardized monitoring of glass eels under the coordination of ASMFC. The monitoring of the glass eels contributed to a coast-wide index of eel population relative abundance. Stewart installed eel ramps to aid in upstream migration, and monitored 9 sites, counting and taking length data on the American eels as they passed through. Over a half million eels have passed through the counting stations since they were installed in 2007.

City of New Bedford, Massachusetts, Marine Mammal Observing, New Bedford, Massachusetts
Underwater blasting occurred in New Bedford harbor before dredge work could be done to increase depth outside heavily trafficked fish processing plants. Fathom Resources LLC. was contracted to provide marine mammal observing services under the Marine Mammal Protection Act (MMPA). As a certified marine mammal observer, Stewart surveyed the area in and around the blasting site for any signs of marine mammals, and alerted the barge crew of their presence. Blasting schedules were delayed whenever a marine mammal was observed within the work area. No marine mammals were harmed during the blasting period.

Wells National Estuarine Research Reserve, Piping Plover Monitoring, Wells, Maine
Stewart assisted in Piping Plover nest monitoring along Laudholm Beach. He, along with other monitors identified numerous Piping Plover nests, chicks, and adults, and set up predator exclusion fencing. In total, Stewart identified over 20 Piping Plover nests, and over 100 adults and chicks. In addition, Stewart assisted with the installation and maintenance of symbolic fencing erected to prevent human and vehicle activity from disturbing nesting Piping Plovers.

Wells National Estuarine Research Reserve, Wading Bird Survey, Wells, Maine
Stewart coordinated and conducted a wading bird survey of restored estuary habitat over the course of a summer in Wells, Maine. Survey points were visited bi-weekly along restored sections of salt marsh, and at least one hour was spent as each location per visit. Bird species and numbers were tracked, and used to assess the success of restoration activities. Stewart was trained by Reserve staff on wading bird field identification and logged over 15 hours of surveys. Species encountered included herons, egrets, ibis, and non-wading bird species such as osprey, eagles, and shorebirds.

Wells National Estuarine Research Reserve, Larval Fish Survey, Wells, Maine
Stewart assisted with the implementation of a larval fish monitoring program that was established in 2008. The monitoring program seeks to track abundance and diversity of fish larvae, as well as investigating the seasonal and spatial patterns or larval fish assemblages. Stewart assisted reserve staff with plankton net tows on incoming ties within the Webhannet estuary, as well as processing those samples. Stewart used a microscope to identify and measure larval fish, as well as invertebrates present in the sample.

Lloyd Davis Anadromous Fish Trust, Annual Medomak River Herring Count, Waldoboro, Maine
Stewart managed over 30 volunteers to conduct an annual count of river herring on the Medomak River. He trained volunteers in fish counting procedures, and coordinated their counting schedule. All fish swimming upstream were channeled through a 3 foot wide white ramp using a set of nets. Volunteers then counted fish as they passed from above. Stewart was the point person for the count, and maintained the nets as needed, clearing debris from them daily, and ensuring they were properly anchored to only allow fish to swim through the ramp. He took weekly samples of river herring to collect scale samples from to provide to state fisheries biologists. Upon conclusion of the count, he compiled the count data for submission to the state of Maine.

Presentations

Poster Presentation: Fisheries Observer Retention Strategies presented at the International Fisheries Observing and Monitoring Conference 2016

Appendix H

Official Species Lists

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Species List - Intersection of USGS Topographic Quadrangles with NOAA Fisheries ESA Listed Specie

November 2016

X = Present on the Quadrangle		**ESA ANADROMOUS FISH** (E) = Endangered, (T) = Threatened							**ESA ANADROMOUS FISH CRITI**					
		STEELHEAD					Eulachon (T)	Southern DPS Green Sturgeon (T)	STEELHEAD					Eulachon
Quad Name	Quad Number	NC (T)	CCC (T)	SCCC (T)	SC (E)	CCV (T)			NC	CCC	SCCC	SC	CCV	
Palo Alto	37122-D2		X					X		X				

s, Critical Habitat, Essential Fish Habitat, and MMPA Species Data

ICAL HABITA	ESSENTIAL FISH HABITAT				MMPA SPECIES
Southern DPS Green Sturgeon	SALMON		Groundfish	Coastal Pelagic	MMPA Pinnipeds (see "MMPA Species" tab for list)
	Coho	Chinook			
X	X	X	X	X	X

ENVIRONMENTAL CONSULTANTS

Nicholas Brinton <brinton@wra-ca.com>

NMFS - Children's Health Council, San Francisquito Creek Bank Stabilization – Phase 2

NMFSWCRCA Specieslist - NOAA Service Account Thu, Jan 30, 2020 at 3:31 PM
<nmfswcrca.specieslist+canned.response@noaa.gov>
To: brinton@wra-ca.com

Receipt of this message confirms that NMFS has received your email to nmfswcrca.specieslist@noaa.gov. If you are a federal agency (or representative) and have followed the steps outlined on the California Species List Tools web page (http://www.westcoast.fisheries.noaa.gov/maps_data/california_species_list_tools.html), you have generated an official Endangered Species Act species list.

Messages sent to this email address are not responded to directly. For project specific questions, please contact your local NMFS office.

Northern California/Klamath (Arcata) 707-822-7201

North-Central Coast (Santa Rosa) 707-387-0737

Southern California (Long Beach) 562-980-4000

California Central Valley (Sacramento) 916-930-3600

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish And Wildlife Office
Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846
Phone: (916) 414-6600 Fax: (916) 414-6713

In Reply Refer To: January 30, 2020
Consultation Code: 08ESMF00-2020-SLI-0915
Event Code: 08ESMF00-2020-E-02908
Project Name: CHC

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, under the jurisdiction of the U.S. Fish and Wildlife Service (Service) that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the Service under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

Please follow the link below to see if your proposed project has the potential to affect other species or their habitats under the jurisdiction of the National Marine Fisheries Service:

http://www.nwr.noaa.gov/protected_species/species_list/species_lists.html

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Sacramento Fish And Wildlife Office
Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846
(916) 414-6600

Project Summary

Consultation Code: 08ESMF00-2020-SLI-0915

Event Code: 08ESMF00-2020-E-02908

Project Name: CHC

Project Type: LAND - FLOODING

Project Description: Children’s Health Council, San Francisquito Creek Bank Stabilization - Phase 2.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/37.44174163784042N122.17605555593572W

Counties: San Mateo, CA | Santa Clara, CA

Endangered Species Act Species

There is a total of 17 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

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

Birds

NAME	STATUS
California Clapper Rail *Rallus longirostris obsoletus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4240	Endangered
California Least Tern *Sterna antillarum browni* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/8104	Endangered
Marbled Murrelet *Brachyramphus marmoratus* Population: U.S.A. (CA, OR, WA) There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/4467	Threatened
Western Snowy Plover *Charadrius nivosus nivosus* Population: Pacific Coast population DPS-U.S.A. (CA, OR, WA), Mexico (within 50 miles of Pacific coast) There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/8035	Threatened
Yellow-billed Cuckoo *Coccyzus americanus* Population: Western U.S. DPS There is **proposed** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/3911	Threatened

Reptiles

NAME	STATUS
Green Sea Turtle *Chelonia mydas* Population: East Pacific DPS No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6199	Threatened
San Francisco Garter Snake *Thamnophis sirtalis tetrataenia* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/5956	Endangered

Amphibians

NAME	STATUS
California Red-legged Frog *Rana draytonii* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2891 Species survey guidelines: https://ecos.fws.gov/ipac/guideline/survey/population/205/office/11420.pdf	Threatened
California Tiger Salamander *Ambystoma californiense* Population: U.S.A. (Central CA DPS) There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2076	Threatened

Fishes

NAME	STATUS
Delta Smelt *Hypomesus transpacificus* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/321	Threatened

Insects

NAME	STATUS
Bay Checkerspot Butterfly *Euphydryas editha bayensis* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2320	Threatened
San Bruno Elfin Butterfly *Callophrys mossii bayensis* There is **proposed** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/3394	Endangered

Flowering Plants

NAME	STATUS
Fountain Thistle *Cirsium fontinale var. fontinale* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/7939	Endangered
Marin Dwarf-flax *Hesperolinon congestum* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/5363	Threatened
San Mateo Thornmint *Acanthomintha obovata ssp. duttonii* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/2038	Endangered
Showy Indian Clover *Trifolium amoenum* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6459	Endangered

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

H. T. HARVEY & ASSOCIATES
Ecological Consultants
50 years of field notes, exploration, and excellenc

San Francisquito Creek Bank Stabilization Project Phase II
Biological Resources Peer Review

Project #4472-01

Prepared for:

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October 11, 2020

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List of Preparers

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Section 1. Introduction

1.1 Purpose of This Report

As requested, H. T. Harvey & Associates has conducted a peer review of the biological information prepared by WRA, Inc. for the San Francisquito Creek Bank Stabilization Project Phase II in Palo Alto, California. WRA has prepared that information to support design and resource agency permitting for the project. H. T. Harvey & Associates has reviewed background information as well as the materials prepared by WRA and has prepared this report to document biological resources issues to facilitate the preparation of an Initial Study/Mitigated Negative Declaration (IS/MND) for the project by David J. Powers & Associates, Inc. (DJP&A).

In preparing this peer review report, we have reviewed the following materials:

- Project description information from a May 2020 application to the City of Palo Alto for a Minor Architectural Review
- WRA's Children's Health Council Creek Bank Stabilization Project: Phase II project plans (undated)
- WRA's July 2020 *Sections 404, and 401, and 1602 Regulatory Permit Application Package*, which includes biological resources information in a number of sections

This report addresses all of the information necessary for DJP&A to prepare the biological resources section of the IS/MND for the project. The vast majority of that information already exists, and is well described, in the materials prepared for this project's permitting, and where WRA's existing information adequately addresses specific issues, this report indicates where in WRA's materials that information is provided. In the few areas where additional information is necessary to support the IS/MND, or where our opinion differed slightly from WRA's, this report provides the information that we consider necessary to address biological issues under the California Environmental Quality Act (CEQA).

1.2 Project Description

The Children's Health Council (CHC) operates a facility at 650 Clark Way in Palo Alto, Santa Clara County, California. The banks of San Francisquito Creek at the margins of the CHC site are at high risk for erosion, which accelerated during the 2016–2017 rainy season, resulting in the loss of approximately 50 horizontal feet of the creek bank and 7,500 square feet of the outdoor learning area. Phase I of the stabilization work, completed in February 2019, included emergency installation of a shear pin wall outside of the top of bank of San Francisquito Creek to stabilize the property behind the eroding bank and prevent imminent dangers to the property and human safety. The purpose of Phase II is to complete in-channel creek bank stabilization that would minimize risk of future erosion, exposure of the shear pin wall, and continued bank failure.

The CHC proposes to rebuild and stabilize approximately 275 linear feet of eroding stream bank, and enhance stream and riparian habitat, along San Francisquito Creek. The proposed bioengineered crib wall is positioned at the forefront of ongoing erosion of the eastern creek bank, with a variety of native riparian vegetation plantings planned within and above the crib wall to improve habitat for fish, birds and other species. The project will construct a live log crib wall supported by a geoengineered foundation on the east bank of the creek. The crib wall foundation consists of large boulders, cobble alluvium, and rootwads secured together and embedded within the bank. The crib wall structure consists of wooden logs and will be anchored to the foundation and existing bank with support anchors and rooted vegetation. No bank stabilization work will occur on the west bank. Project work is scheduled to commence in May 1, 2021 and be completed by October 30, 2021, thus minimizing impacts to aquatic species and habitat by avoiding wet-season work.

Section 2. Methods

2.1 Background Review

H. T. Harvey & Associates senior wildlife ecologist Steve Rottenborn, Ph.D. and senior plant/wetlands ecologist Kelly Hardwicke, Ph.D. reviewed the project materials mentioned in Section 1.1 above as well as other background information to identify biological resources potentially present on the project site. Such background information included aerial images (Google Inc. 2020) of the project area; the California Department of Fish and Wildlife's (CDFW's) California Natural Diversity Database (CNDDB 2020); and the Stanford University Habitat Conservation Plan (HCP) (Stanford University 2013). In addition, for plants, we reviewed all species on current California Native Plant Society (CNPS) California Rare Plant Rank (CRPR) 1A, 1B, 2A, and 2B lists occurring in the *Palo Alto, California* 7.5-minute USGS quadrangle and surrounding eight quadrangles (*Woodside, San Mateo, Redwood Point, Newark, Mountain View, Cupertino, Mindego Hill,* and *La Honda*). Quadrangle-level results are not maintained for CRPR 3 and 4 species, so we also conducted a search of the CNPS Inventory records for these species occurring in San Mateo County (CNPS 2020). We also queried the CNDDB (2020) for natural communities of special concern that occur in the project region.

2.2 Peer Review

After reviewing the project materials and background information, we sequentially considered the existing conditions, impacts, and mitigation measures pertaining to the project from the perspective of biological resources. Where WRA's existing information adequately addresses specific issues, we have documented in this report where that information is provided in WRA's materials and briefly summarized WRA's findings. Where additional information is necessary to support the IS/MND, we have provided that information.

Section 3. Regulatory Setting

Biological resources on the project site are regulated by a number of federal, state, and local laws and ordinances, as described below. The following sections describe these laws and ordinances, how they apply to the project, and how they are being addressed by the project according to the materials prepared by WRA.

3.1 Federal

3.1.1 Clean Water Act

The Clean Water Act (CWA) functions to maintain and restore the physical, chemical, and biological integrity of waters of the U.S., which include, but are not limited to, tributaries to traditionally navigable waters currently or historically used for interstate or foreign commerce, and adjacent wetlands. Historically, in non-tidal waters, U.S. Army Corp of Engineers (USACE) jurisdiction extends to the ordinary high water (OHW) mark, which is defined in Title 33, Code of Federal Regulations (CFR), Part 328.3. If there are wetlands adjacent to channelized features, the limits of USACE jurisdiction extend beyond the OHW mark to the outer edges of the wetlands. Wetlands that are not adjacent to waters of the U.S. are termed "isolated wetlands" and, depending on the circumstances, may be subject to USACE jurisdiction. If there are wetlands adjacent to channelized features, the limits of USACE jurisdiction extend beyond the OHW mark or high tide line to the outer edges of the wetlands.

On April 21, 2020, the Navigable Water Protection Rule (NWPR) was published in the Federal Register by the Environmental Protection Agency (EPA) and USACE, and this rule came into effect on June 22, 2020. The NWPR is intended to provide clear categories of regulated waters of the U.S., as well as regulating traditional navigable waters and the core tributary systems that provide perennial or intermittent flow into them. Under the NWPR, some ephemeral tributaries and isolated wetlands previously claimed by the USACE as waters of the U.S. may be considered to be disclaimed; however this will only occur after completing an Approved Jurisdictional Determination process with the USACE.

Construction activities within jurisdictional waters are regulated by the USACE. The placement of fill into such waters must comply with permit requirements of the USACE. No USACE permit will be effective in the absence of Section 401 Water Quality Certification. The State Water Resources Control Board (SWRCB) is the state agency (together with the Regional Water Quality Control Boards [RWQCBs]) charged with implementing water quality certification in California.

Project Applicability: This project occurs within San Francisquito Creek, which is considered waters of the U.S by the USACE. As indicated in WRA's July 2020 *Sections 404, and 401, and 1602 Regulatory Permit Application Package*, WRA has applied to the USACE for Section 404 authorization of the project under Nationwide Permit 13 for bank stabilization.

3.1.2 Federal Endangered Species Act

The Federal Endangered Species Act (FESA) protects federally listed wildlife species from harm or "take", which is broadly defined as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct." Take can also include habitat modification or degradation that directly results in death or injury of a listed wildlife species. An activity can be defined as "take" even if it is unintentional or accidental. Listed plant species are provided less protection than listed wildlife species. Listed plant species are legally protected from take under FESA only if they occur on federal lands.

The U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) have jurisdiction over federally listed, threatened, and endangered species under FESA. The USFWS also maintains lists of proposed and candidate species. Species on these lists are not legally protected under FESA, but may become listed in the near future and are often included in their review of a project.

Project Applicability: No federally-listed plants are present on the project site. One federally listed animal species, the Central California Coast (CCC) steelhead (*Oncorhynchus mykiss*; federally listed as threatened), is known to be present in San Francisquito Creek within the project area, and NMFS's designation of portions of San Francisquito Creek as critical habitat for this species includes the project area. In addition, the California red-legged frog (*Rana draytonii*; federally listed as threatened) may occur on the project site as a dispersant from populations far upstream. The California red-legged frog is highly unlikely to be present in the project area, but the possibility of an occasional dispersant occurring there cannot be discounted. Within WRA's July 2020 *Sections 404, and 401, and 1602 Regulatory Permit Application Package*, information on these two species is provided in several sections; most notably, Part 10 (Section 7 Biological Assessment) of that permit package focuses on these two species and describes measures that are incorporated into the project to avoid and minimize the potential for take of those species. That Biological Assessment determined that the project is likely to adversely affect both the CCC steelhead and California red-legged frog, and formal consultation with NMFS (for the steelhead) and USFWS (for the frog) will occur during Section 404 permitting.

3.1.3 Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act governs all fishery management activities that occur in federal waters within the United States' 200-nautical-mile limit. The Act establishes eight Regional Fishery Management Councils responsible for the preparation of fishery management plans (FMPs) to achieve the optimum yield from U.S. fisheries in their regions. These councils, with assistance from the NMFS, establish Essential Fish Habitat (EFH) in FMPs for all managed species. Federal agencies that fund, permit, or implement activities that may adversely affect EFH are required to consult with the NMFS regarding potential adverse effects of their actions on EFH, and respond in writing to recommendations by the NMFS.

Project Applicability: Within WRA's July 2020 *Sections 404, and 401, and 1602 Regulatory Permit Application Package*, Appendix C of Part 10 (Section 7 Biological Assessment) of the permit package discusses potential project effects on EFH. Although San Francisquito Creek is accessible to two species covered by the Pacific Salmon

Fisheries Management Plan, the Chinook salmon (*Oncorhynchus tshawytscha*) and Central California Coast Coho salmon (*Oncorhynchus kisutch*), neither species is known to occur in the creek. Appendix C of the permit package does not explicitly state that the creek therefore does not provide EFH; rather, it concludes that project effects on EFH would be negligible, and possibly beneficial based on the proposed bank stabilization. It is our opinion that the project will not result in impacts to EFH.

3.1.4 Federal Migratory Bird Treaty Act

The federal Migratory Bird Treaty Act (MBTA), 16 U.S.C. Section 703, prohibits killing, possessing, or trading of migratory birds except in accordance with regulations prescribed by the Secretary of the Interior. The MBTA protects whole birds, parts of birds, and bird eggs and nests, and it prohibits the possession of all nests of protected bird species whether they are active or inactive. An active nest is defined as having eggs or young, as described by the USFWS in its June 14, 2018 memorandum "Destruction and Relocation of Migratory Bird Nest Contents". Nest starts (nests that are under construction and do not yet contain eggs) and inactive nests are not protected from destruction.

In its June 14, 2018 memorandum, the USFWS clarified that the destruction of an active nest "while conducting any activity where the intent of the action is not to kill migratory birds or destroy their nests or contents" is not prohibited by the MBTA. On February 3, 2020, the USFWS published a proposed rule to codify the scope of the MBTA as it applies to activities resulting in the injury or death of migratory birds (85 FR 5915-5926); the USFWS is currently considering comments on the proposed rule.

Project Applicability: All native bird species that occur on the project site are protected under the MBTA.

3.1.5 Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (Eagle Act), 16 U.S.C. Section 668, provides for the protection of the bald eagle (*Haliaeetus leucocephalus*) and the golden eagle (*Aquila chrysaetos*) (as amended in 1962) by prohibiting the take, possession, sale, purchase, barter, offer to sell, purchase or barter, transport, export or import, of any bald or golden eagle, alive or dead, including any part, nest, or egg, unless allowed by permit (16 U.S.C. 668(a); 50 CFR 22). "Take" includes pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb (16 U.S.C. 668c; 50 CFR 22.3).

Project Applicability: The site is of such limited extent, and provides such poor foraging habitat, that neither the bald eagle nor the golden eagle is expected to forage within the project site, and the project will not impact either species.

3.2 State

3.2.1 Clean Water Act Section 401/Porter-Cologne Water Quality Control Act

The SWRCB works in coordination with the nine RWQCBs to preserve, protect, enhance, and restore water quality. Each RWQCB makes decisions related to water quality for its region, and may approve, with or without conditions, or deny projects that could affect waters of the State. Their authority comes from the CWA and the State's Porter-Cologne Water Quality Control Act (Porter-Cologne). Porter-Cologne broadly defines waters of the State as "any surface water or groundwater, including saline waters, within the boundaries of the state." Because Porter-Cologne applies to any water, whereas the CWA applies only to certain waters, California's jurisdictional reach overlaps and may exceed the boundaries of waters of the U.S. For example, Water Quality Order No. 2004-0004-DWQ states that "shallow" waters of the State include headwaters, wetlands, and riparian areas. Moreover, the San Francisco Bay Region RWQCB's Assistant Executive Director, has stated that, in practice, the RWQCBs claim jurisdiction over riparian areas. Where riparian habitat is not present, such as may be the case at headwaters, jurisdiction is taken to the top of bank.

On April 2, 2019, the SWRCB adopted the State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State. In these new guidelines, riparian habitats are not specifically described as waters of the state but instead as important buffer habitats to streams that do conform to the State Wetland Definition. The Procedures describe riparian habitat buffers as important resources that may both be included in required mitigation packages for permits for impacts to waters of the state, as well as areas requiring permit authorization from the RWQCBs if impacted.

Pursuant to the CWA, projects that are regulated by the USACE must also obtain a Section 401 Water Quality Certification permit from the RWQCB. This certification ensures that the proposed project will uphold state water quality standards. Because California's jurisdiction to regulate its water resources is much broader than that of the federal government, proposed impacts on waters of the State require Water Quality Certification even if the area occurs outside of USACE jurisdiction. Moreover, the RWQCB may impose mitigation requirements even if the USACE does not. Under the Porter-Cologne, the SWRCB and the nine regional boards also have the responsibility of granting CWA National Pollutant Discharge Elimination System (NPDES) permits and Waste Discharge Requirements for certain point-source and non-point discharges to waters. These regulations limit impacts on aquatic and riparian habitats from a variety of urban sources.

Project Applicability: This project occurs within San Francisquito Creek, which is considered waters of the State by the RWQCB. As indicated in WRA's July 2020 *Sections 404, and 401, and 1602 Regulatory Permit Application Package*, WRA has applied to the RWQCB for Section 401 water quality certification.

3.2.2 California Endangered Species Act

The California Endangered Species Act (CESA; California Fish and Game Code, Chapter 1.5, Sections 2050-2116) prohibits the take of any plant or animal listed or proposed for listing as rare (plants only), threatened, or

endangered. In accordance with CESA, the CDFW has jurisdiction over state-listed species (Fish and Game Code 2070). The CDFW regulates activities that may result in "take" of individuals (i.e., "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill"). Habitat degradation or modification is not expressly included in the definition of "take" under the California Fish and Game Code. The CDFW, however, has interpreted "take" to include the "killing of a member of a species which is the proximate result of habitat modification."

Project Applicability: No suitable habitat for any state listed plant or animal species is present on the project site, and no state-listed species are expected to occur on the site. We concur with the determinations regarding bsence of state-listed special-status species as reported in Part 9 (Special-status Species Table) of WRA's July 2020 *Sections 404, and 401, and 1602 Regulatory Permit Application Package*. Thus, no take of state-listed species will occur as a result of the project.

3.2.3 California Environmental Quality Act

CEQA is a state law that requires state and local agencies to document and consider the environmental implications of their actions and to refrain from approving projects with significant environmental effects if there are feasible alternatives or mitigation measures that can substantially lessen or avoid those effects. CEQA requires the full disclosure of the environmental effects of agency actions, such as approval of a general plan update or the projects covered by that plan, on resources such as air quality, water quality, cultural resources, and biological resources. The State Resources Agency promulgated guidelines for implementing CEQA are known as the State CEQA Guidelines.

Section 15380(b) of the State CEQA Guidelines provides that a species not listed on the federal or state lists of protected species may be considered rare if the species can be shown to meet certain specified criteria. These criteria have been modeled after the definitions in FESA and CESA and the section of the California Fish and Game Code dealing with rare or endangered plants and animals. This section was included in the guidelines primarily to deal with situations in which a public agency is reviewing a project that may have a significant effect on a species that has not yet been listed by either the USFWS or CDFW or species that are locally or regionally rare.

The CDFW has produced three lists (amphibians and reptiles, birds, and mammals) of "species of special concern" that serve as "watch lists". Species on these lists are of limited distribution or the extent of their habitats has been reduced substantially, such that threat to their populations may be imminent. Thus, their populations should be monitored. They may receive special attention during environmental review as potential rare species, but do not have specific statutory protection. All potentially rare or sensitive species, or habitats capable of supporting rare species, are considered for environmental review per the CEQA Section 15380(b).

The CNPS, a non-governmental conservation organization, has developed CRPRs for plant species of concern in California in the Inventory of Rare and Endangered Plants (CNPS 2020). The CRPRs include lichens, vascular, and non-vascular plants, and are defined as follows:

- CRPR 1A Plants considered extinct.
- CRPR 1B Plants rare, threatened, or endangered in California and elsewhere.
- CRPR 2A Plants considered extinct in California but more common elsewhere.
- CRPR 2B Plants rare, threatened, or endangered in California but more common elsewhere.
- CRPR 3 Plants about which more information is needed - review list.
- CRPR 4 Plants of limited distribution-watch list.

The CRPRs are further described by the following threat code extensions:

- .1—seriously endangered in California;
- .2—fairly endangered in California;
- .3—not very endangered in California.

Although the CNPS is not a regulatory agency and plants on these lists have no formal regulatory protection, plants appearing as CRPR 1B or 2 are, in general, considered to meet CEQA's Section 15380 criteria, and adverse effects on these species may be considered significant. Impacts on plants that are listed by the CNPS as CRPR 3 or 4 are also considered during CEQA review, although because these species are typically not as rare as those of CRPR 1B or 2, impacts on them are less frequently considered significant.

Compliance with CEQA Guidelines Section 15065(a) requires consideration of natural communities of special concern, in addition to plant and wildlife species. Vegetation types of "special concern" are tracked in Rarefind (CNDDB 2020). Further, the CDFW ranks sensitive vegetation alliances based on their global (G) and state (S) rankings analogous to those provided in the CNDDB. Global rankings (G1–G5) of natural communities reflect the overall condition (rarity and endangerment) of a habitat throughout its range, whereas S rankings reflect the condition of a habitat within California. If an alliance is marked as a G1–G3, all the associations within it would also be of high priority. The CDFW provides the Vegetation Classification and Mapping Program's currently accepted list of vegetation alliances and associations (CDFW 2009).

Project Applicability: All potential impacts on biological resources will be considered during CEQA review of the project.

3.2.4 California Fish and Game Code

Ephemeral and intermittent streams, rivers, creeks, dry washes, sloughs, blue line streams on USGS maps, and watercourses with subsurface flows fall under CDFW jurisdiction. Canals, aqueducts, irrigation ditches, and other means of water conveyance may also be considered streams if they support aquatic life, riparian vegetation, or stream-dependent terrestrial wildlife. A *stream* is defined in Title 14, California Code of Regulations Section 1.72, as "a body of water that flows at least periodically or intermittently through a bed or

channel having banks and that supports fish and other aquatic life. This includes watercourses having surface or subsurface flow that supports or has supported riparian vegetation." Using this definition, the CDFW extends its jurisdiction to encompass riparian habitats that function as part of a watercourse. California Fish and Game Code Section 2786 defines *riparian habitat* as "lands which contain habitat which grows close to and which depends upon soil moisture from a nearby freshwater source." The lateral extent of a stream and associated riparian habitat that would fall under the jurisdiction of the CDFW can be measured in several ways, depending on the particular situation and the type of fish or wildlife at risk. At minimum, the CDFW would claim jurisdiction over a stream's bed and bank. In areas that lack a vegetated riparian corridor, CDFW jurisdiction would be the same as USACE jurisdiction. Where riparian habitat is present, the outer edge of riparian vegetation is generally used as the line of demarcation between riparian and upland habitats.

Pursuant to California Fish and Game Code Section 1603, the CDFW regulates any project proposed by any person that will "substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake designated by the department, or use any material from the streambeds." California Fish and Game Code Section 1602 requires an entity to notify the CDFW of any proposed activity that may modify a river, stream, or lake. If the CDFW determines that proposed activities may substantially adversely affect fish and wildlife resources, a Lake and Streambed Alteration Agreement (LSAA) must be prepared. The LSAA sets reasonable conditions necessary to protect fish and wildlife, and must comply with CEQA. The applicant may then proceed with the activity in accordance with the final LSAA.

Specific sections of the California Fish and Game Code describe regulations pertaining to protection of certain wildlife species. For example, Code Section 2000 prohibits take of any bird, mammal, fish, reptile, or amphibian except as provided by other sections of the code.

The California Fish and Game Code Sections 3503, 3513, and 3800 (and other sections and subsections) protect native birds, including their nests and eggs, from all forms of take. Disturbance that causes nest abandonment and/or loss of reproductive effort is considered "take" by the CDFW. Raptors (i.e., eagles, hawks, and owls) and their nests are specifically protected in California under Code Section 3503.5. Section 3503.5 states that it is "unlawful to take, possess, or destroy any birds in the order Falconiformes or Strigiformes (birds of prey) or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by this code or any regulation adopted pursuant thereto."

Bats and other non-game mammals are protected by California Fish and Game Code Section 4150, which states that all non-game mammals or parts thereof may not be taken or possessed except as provided otherwise in the code or in accordance with regulations adopted by the commission. Activities resulting in mortality of non-game mammals (e.g., destruction of an occupied nonbreeding bat roost, resulting in the death of bats), or disturbance that causes the loss of a maternity colony of bats (resulting in the death of young), may be considered "take" by the CDFW.

Project Applicability: This project occurs within San Francisquito Creek, which is regulated by the CDFW under California Fish and Game Code Section 1603. As indicated in WRA's July 2020 *Sections 404, and 401, and 1602 Regulatory Permit Application Package*, WRA has applied to the CDFW for an LSAA for the project. Most native bird, mammal, and other wildlife species that occur on the project site and in the immediate vicinity are protected by the California Fish and Game Code.

3.3 Local

City of Palo Alto Municipal Code

The City of Palo Alto Municipal Code contains all ordinances for the city of Palo Alto. Title 8, Trees and Vegetation, includes regulations relevant to biological resources on the project site. Chapter 8.10, Tree Preservation and Management Regulations, establishes regulations for the preservation of protected trees, defined as:

- Coast live oak (*Quercus agrifolia*), 11.5 inches in diameter or greater when measured 4.5 ft above natural grade
- Valley oak (*Quercus lobata*), 11.5 inches in diameter or greater when measured 4.5 ft above natural grade
- Coast redwood (*Sequoia sempervirens*), 18 inches in diameter or greater when measured 4.5 ft above natural grade
- A heritage tree designated by the city council

To protect these trees, Section 8.10.030 establishes the Tree Technical Manual, requires a written permit to remove a protected tree, and outlines procedures for tree removal, which include the completion of a protected tree removal application, payment of a $145.00 review process fee, and submittal of an arborist letter report. The arborist letter report must include the locations of trees on the site, proximity to structures, health and general conditions, and necessity for removal or other anticipated action. If the findings listed in Section 3.05A of the Tree Technical Manual are met, the City Planning Division may issue a permit with appropriate conditions. Replacement of removed protected trees is required in most development circumstances.

Project Applicability: According to Part 7 (Tree Survey) of WRA's July 2020 *Sections 404, and 401, and 1602 Regulatory Permit Application Package*, a tree survey was conducted on February 6, 2018 and November 1, 2019 in accordance with the City of Palo Alto's Tree Technical Manual. Twenty-six trees were identified within the project site and immediate vicinity. Two protected trees large enough and of qualifying species to be considered protected per the City's Tree Ordinance are proposed to be removed by the project – a 14.1-inch diameter at breast height (DBH) coast live oak and a 12.6-inch DBH coast live oak located at the toe of slope at the bottom of the eroding creek bank along the downstream limit of the proposed crib wall. A tree removal permit will be obtained for the removal of these two protected coast live oak trees. In addition, a Tree Protection and Preservation Plan is described in Part 7 (Tree Survey) of the permit application package and is included WRA's Children's Health Council Creek Bank Stabilization Project: Phase II project plans (undated).

Section 4. Environmental Setting

4.1 Project Area Description

The project site is described in Part 4 (Supplemental Project Information) of WRA's July 2020 *Sections 404, and 401, and 1602 Regulatory Permit Application Package*. Specifically, Section 2.1 (Existing Conditions) includes the following information:

> "The project area is located on the east bank of San Francisquito Creek on a portion of the 4.3-acre CHC property located at 650 Clark Way (Assessor Parcel Number (APN) 142-02-020), owned by Stanford University (project area). The project area is located on the north border of Santa Clara County near San Mateo County, positioned between Sand Hill Road and residential neighborhoods. The surrounding land uses to the project area are primarily residential neighborhoods along with apartment buildings, a retirement community complex, City-owned open space, and CHC.
>
> The project area totals approximately 0.69 acre and is located within the northwest grounds of CHC. The dominant feature in the project area is San Francisquito Creek and its associated riparian corridor. The riparian corridor within the project area is in a semi-natural state. Portions of the creek bank are dominated by native and non-native woody species with an herbaceous understory. An approximately 100-foot section of the creek bank exposed by erosion events is partially vegetated primarily with non-native upland species. The creek maintains meandering flow throughout the project area. Scattered willows and facultative shrubs are present within the creek bed, below Ordinary High-water Mark (OHWM)."

4.2 Biotic Habitats/Land Uses and Wildlife

Section 2.1 of the Supplemental Project Information states that the project area contains landscaped and developed areas, areas of ruderal and weedy vegetation, perennial stream (San Francisquito Creek), and mixed riparian woodland. Section 2.1 also provides a summary of the dominant plant species in each of those habitat types. Although we have not visited the site, we are familiar with the habitat conditions in that general area. Based on our review of background material and our familiarity with the area, we have no reason to disagree with WRA's characterization of habitat conditions within the project area.

Although WRA's materials address special-status wildlife species that could potentially be impacted by the project in detail, those materials do not contain a description of general wildlife use of the project site aside from listing four species – western scrub-jay (*Aphelocoma californica*), American robin (*Turdus migratorius*), eastern gray squirrel (*Sciurus carolinensis*), and San Francisco dusky-footed woodrat (*Neotoma fuscipes annectens*) – that were observed in the study area by WRA biologists during a February 6, 2018 site visit; these species are listed in

Part 8 (Observed Species List) of WRA's July 2020 *Sections 404, and 401, and 1602 Regulatory Permit Application Package*. In addition to those species observed by WRA, we expect a number of other common animals to occur in the project site. For example, mixed riparian woodlands and landscaped areas on the site provide habitat for breeding birds such as the Bewick's wren (*Thryomanes bewickii*), chestnut-backed chickadee (*Poecile rufescens*), Anna's hummingbird (*Calypte anna*), dark-eyed junco (*Junco hyemalis*), California scrub-jay, Steller's jay (*Cyanocitta stelleri*), oak titmouse (*Baeolophus inornatus*), Hutton's vireo (*Vireo huttoni*), and American robin, as well as wintering birds including the hermit thrush (*Catharus guttatus*), ruby-crowned kinglet (*Regulus calendula*), and Townsend's warbler (*Setophaga townsendi*). Mammals, including the native raccoon (*Procyon lotor*) and nonnative eastern gray squirrel and eastern fox squirrel (*Sciurus niger*), occur in this habitat. Leaf litter and fallen logs provide cover and foraging habitat for California slender salamanders (*Batrachoseps attenuatus*) and western fence lizards (*Sceloporus occidentalis*), and reptiles such as the northern alligator lizard (*Elgaria multicarinata*) are also expected to occur in this habitat. Animals occurring in the ruderal and developed areas are most likely to consist of animals from adjacent, more well-vegetated areas foraging in or moving through ruderal/developed areas.

San Francisquito Creek provides habitat for a number of fish species, including the CCC steelhead, threespine stickleback (*Gasterosteus aculeatus*), western mosquitofish (*Gambusia affinis*), prickly sculpin (*Cottus asper*), pacific staghorn sculpin (*Leptocottus armatus*), rainwater killifish (*Lucania parva*), and others (AECOM 2016). Sierran chorus frogs (*Pseudacris sierra*), western toads (*Anaxyrus boreas*), and non-native bullfrogs (*Lithobates catesbeianus*) are expected to breed in the creek, and southwestern pond turtles (*Emys pallida*)[1] are expected to occur within the on-site reach of creek in low numbers.

[1] The southwestern pond turtle was previously considered a subspecies of western pond turtle and has been variously called *Emys marmorata pallida*, *Actinemys marmorata pallida*, and *Clemmys marmorata pallida*. This species was previously considered conspecific with the northwestern pond turtle (*Emys marmorata*) but is now considered a distinct species (Spinks and Shaffer 2005, 2009; Spinks et al. 2014, 2016). This is the same species referred to as Pacific (western) pond turtle (*Actinemys marmorata*) in WRA's July 2020 *Sections 404, and 401, and 1602 Regulatory Permit Application Package*.

Section 5. Special-Status Species and Sensitive Habitats

CEQA requires assessment of the effects of a project on species that are protected by state, federal, or local governments as "threatened, rare, or endangered"; such species are typically described as "special-status species". For the purpose of the environmental review of the project, special-status species have been defined as described below. Impacts on these species are regulated by some of the federal, state, and local laws and ordinances described in Section 3.0 above.

For purposes of this analysis, "special-status" plants are considered plant species that are:

- Listed under FESA as threatened, endangered, proposed threatened, proposed endangered, or a candidate species.
- Listed under CESA as threatened, endangered, rare, or a candidate species.
- Listed by the CNPS as CRPR 1A, 1B, 2, 3, or 4.

For purposes of this analysis, "special-status" animals are considered animal species that are:

- Listed under FESA as threatened, endangered, proposed threatened, proposed endangered, or a candidate species.
- Listed under CESA as threatened, endangered, or a candidate threatened or endangered species.
- Designated by the CDFW as a California species of special concern.
- Listed in the California Fish and Game Code as fully protected species (fully protected birds are provided in Section 3511, mammals in Section 4700, reptiles and amphibians in Section 5050, and fish in Section 5515).

Information concerning threatened, endangered, and other special-status species that potentially occur on the project site was collected from several sources and reviewed by H. T. Harvey & Associates biologists. Such sources included the CNDDB (2020), the Stanford University HCP (Stanford University 2013), and CNPS (2020) data.

5.1 Special-Status Plant Species

Section 3.4 in Part 4 (Supplemental Project Information) of WRA's July 2020 *Sections 404, and 401, and 1602 Regulatory Permit Application Package* includes WRA's discussion of the potential for occurrence of special-status plants in the project area, and Part 9 (Special-status Species Table) of WRA's materials includes an assessment of each special-status plant known to occur in the project vicinity. In those sections, WRA concludes the following:

"No special-status plant species were observed in the project area during biological surveys conducted on February 6, 2018 and November 1, 2019. Based on existing site conditions (i.e. prolific disturbance from eroding creek bank), abundance of non-native invasive species along the creek bank and riparian habitat, and absence of species from focused surveys conducted during the blooming period or when species would have been easily identifiable vegetatively, no special-status plant species occur within the project area or have the potential to occur. No follow-up surveys are recommended."

H. T. Harvey & Associates concurs that no special-status plants would be present on the project site or impacted by the project, for the reasons noted by WRA.

5.2 Special-Status Animal Species

Section 3.5 in Part 4 (Supplemental Project Information) of WRA's July 2020 *Sections 404, and 401, and 1602 Regulatory Permit Application Package* includes WRA's discussion of the potential for occurrence of special-status animals in the project area, and Part 9 (Special-status Species Table) of WRA's materials includes an assessment of each special-status animal known to occur in the project vicinity. Following is a discussion of WRA's conclusions and our opinions regarding six species of special-status animals that could potentially occur in the project area:

- CCC steelhead, federally listed as threatened – known to be present in San Francisquito Creek, including the segment within which the project occurs. Much of San Francisquito Creek, including the project segment, has been designated by NMFS as critical habitat for this species.

- California red-legged frog, federally listed as threatened and a California species of special concern – Part 9 (Special-status Species Table) of WRA's July 2020 *Sections 404, and 401, and 1602 Regulatory Permit Application Package* indicates this species' potential for occurrence in the project area as "moderate", stating "CNDDB states that California red-legged frogs is likely extirpated from an area of suitable breeding habitat in Lake Lagunita at Stanford University, approximately 1.3 miles from the Action Area. This site has been well monitored, and no California red-legged frogs have been encountered here since the last occurrence in 1956 (CNDDB 2020). There is an additional California red-legged frogs occurrence upstream on San Francisquito Creek, approximately 3.1 miles from the Action Area (CNDDB 2020). This occurrence is listed as possibly extirpated. Within the project area, the creek is unlikely to provide any breeding habitat, but may be used for dispersal and other movements, particularly during the rainy season."

  The Stanford University HCP does not include the project area, but nearby areas southeast of Sand Hill Road, which are within the HCP boundaries, are not indicated as being occupied by the California red-legged frog (Stanford University 2013). In our opinion, the California red-legged frog is highly unlikely to be present in the project area due to the site's remoteness from higher-quality habitats

known to support the species, but the possibility of an occasional dispersant occurring there cannot be discounted. We do not expect this species to breed in the project area or to occur regularly or in numbers.

- Southwestern pond turtle, a California species of special concern – Part 9 (Special-status Species Table) of WRA's July 2020 *Sections 404, and 401, and 1602 Regulatory Permit Application Package* indicates this species' potential for occurrence in the project area as "unlikely", stating "There are no deepwater areas that support Pacific pond turtle habitat. When flows are present in San Francisquito Creek they are fast flowing, not slow meandering flows required for regular use by Pacific pond turtle."

  Although southwestern pond turtles may not occur regularly or in numbers within the reach of San Francisquito Creek within the project area, the species is known to occur in the creek (CNDDB 2020), and it is expected to disperse along the creek. Therefore, it is our opinion that the southwestern pond turtle does likely occur in the project area, at least as an occasional dispersant. We do not expect this species to breed in the project area or to occur regularly or in numbers.

- San Francisco dusky-footed woodrat, a California species of special concern – Section 3.5 of the Supplemental Project Information states that "No special-status wildlife species have been observed within the project area", and Part 9 (Special-status Species Table) of WRA's July 2020 *Sections 404, and 401, and 1602 Regulatory Permit Application Package* indicates this species' potential for occurrence in the project area as "moderate", stating "Woodland and scrub areas within the project area may support this species." However, Part 8 (Observed Species List) lists this species as having been observed in the study area by WRA biologists during a February 6, 2018 site visit. Therefore, we conclude that the species is likely present, in which case it could potentially nest in trees or in denser vegetation on the ground.

- Yellow warbler (*Setophaga petechia*), a California species of special concern – Part 9 (Special-status Species Table) of WRA's July 2020 *Sections 404, and 401, and 1602 Regulatory Permit Application Package* indicates this species' potential for occurrence in the project area as "moderate", stating, "Riparian trees and other vegetation along San Francisquito Creek may be used for nesting."

  In our opinion, the probability of nesting by yellow warblers in the project area or immediate vicinity is low, as this species is a scarce breeder along San Francisquito Creek, but it is possible that a single pair might nest on or close to the site.

- White-tailed kite (*Elanus leucurus*), a state fully protected species – Part 9 (Special-status Species Table) of WRA's July 2020 *Sections 404, and 401, and 1602 Regulatory Permit Application Package* indicates this species' potential for occurrence in the project area as "moderate", stating, "Although this species requires open areas for foraging, nesting does occur adjacent to or even within developed sites."

We agree with WRA's conclusions that this species could potentially nest in or very close to the project site, as grassy habitat along the creek farther upstream is extensive enough to provide suitable foraging habitat for this species. Given this species' territoriality, no more than one pair would nest in the project area.

It is worth noting that the California tiger salamander is not expected to occur on the project site. This species breeds in Lagunita, on the Stanford University campus more than 1.1 miles south of the project site. Although this species has been known to disperse longer distances than 1.1 miles, the intervening development between Lagunita and the project site preclude individuals from dispersing to the project site. Stanford University's HCP indicates the portions of campus southeast of Sand Hill Road as "population sinks", meaning that any salamanders that dispersed into those areas would likely be lost from the population, as they would die from desiccation or predation and be unable to return to breed in Lagunita. This conclusion is consistent with WRA's conclusion that the species has "no potential" to occur on the project site.

In addition to the species addressed below, WRA's special-status species table included several species of USFWS Bird Species of Conservation Concern. In H. T. Harvey & Associates' opinion, species on USFWS's Bird Species of Conservation Concern list should not be considered special-status species for the purpose of CEQA assessment. Although such species may rely on habitats, such as oak woodlands, that are generally declining, those species that could occur on the project site, such as the oak titmouse and Nuttall's woodpecker (*Picoides nuttallii*), are regionally common and not in decline. Therefore, we have not assessed impacts on bird species that are on USFWS's Bird Species of Conservation Concern list but that do not meet the criteria for special-status animals listed above.

5.3 Sensitive Natural Communities, Habitats, and Vegetation Alliances

Natural communities have been considered part of the Natural Heritage Conservation triad, along with plants and animals of conservation significance, since the state inception of the Natural Heritage Program in 1979. The CDFW determines the level of rarity and imperilment of vegetation types, and tracks sensitive communities in its Rarefind database (CNDDB 2020). Global rankings (G) of natural communities reflect the overall condition (rarity and endangerment) of a habitat throughout its range, whereas state (S) rankings reflect the condition of a habitat within Natural communities are defined using NatureServe's standard heritage program methodology as follows (Faber-Langendoen et al. 2012):

- G1/S1: Critically imperiled
- G2/S2: Imperiled
- G3/S3: Vulnerable
- G4/S4: Apparently secure

- G5/S4: Secure

In addition to tracking sensitive natural communities, the CDFW also ranks vegetation alliances, defined by repeating patterns of plants across a landscape that reflect climate, soil, water, disturbance, and other environmental factors (Sawyer et al. 2009). If an alliance is marked G1-G3, all of the vegetation associations within it will also be of high priority (CDFW 2020). The CDFW provides the Vegetation Classification and Mapping Program's (VegCAMP) currently accepted list of vegetation alliances and associations (CDFW 2020). Impacts on CDFW sensitive natural communities, vegetation alliances/associations, or any such community identified in local or regional plans, policies, and regulations, must be considered and evaluated under CEQA (Title 14, Division 6, Chapter 3, Appendix G of the California Code of Regulations). Furthermore, aquatic, wetland and riparian habitats are also protected under applicable federal, state, or local regulations, and are generally subject to regulation, protection, or consideration by the USACE, RWQCB, CDFW, and/or the USFWS.

Sensitive Natural Communities. WRA's July 2020 *Sections 404, and 401, and 1602 Regulatory Permit Application Package* did not explicitly address sensitive natural communities, aside from the regulated habitats that are the subject of those permit applications. A query of sensitive habitats in Rarefind (CNDDB 2020) identified only one sensitive habitats as occurring near the project site, valley oak woodland (G3/S2.1). Part 8 (Observed Species List) of WRA's July 2020 *Sections 404, and 401, and 1602 Regulatory Permit Application Package* did not list valley oak as occurring in the project area, and therefore, valley oak woodland is considered absent from the project site. Other sensitive plant communities mapped by CNDDB (2020) in the vicinity, such as serpentine bunchgrass and northern coastal salt marsh, are present in areas within the foothills well to the southwest or along the bay well to the northeast of the site, respectively, and are therefore absent from the project site.

Sensitive Habitats (Waters of the U.S./State). San Francisquito Creek within the project site is considered waters of the U.S./state. Placement of fill into verified waters of the U.S./state within the project site would require a Section 404 permit from the USACE and Section 401 Water Quality Certification from the San Francisco RWQCB. Additionally, the mixed riparian woodland associated with San Francisquito Creek falls under the jurisdiction of the San Francisco RWQCB and CDFW, and any impacts would require both a Section 401 Water Quality Certification (or Porter-Cologne Waste Discharge Requirements) and a Lake and Streambed Alteration Agreement. WRA's permit application package appropriately addresses all these permitting requirements.

Section 6. Impacts and Mitigation Measures

The State CEQA Guidelines provide direction for evaluating the impacts of projects on biological resources and determining which impacts will be significant. CEQA defines a "significant effect on the environment" as "a substantial adverse change in the physical conditions which exist in the area affected by the proposed project." Under State CEQA Guidelines Section 15065, a project's impacts on biological resources are deemed significant if the project would:

A. "substantially reduce the habitat of a fish or wildlife species"

B. "cause a fish or wildlife population to drop below self-sustaining levels"

C. "threaten to eliminate a plant or animal community"

D. "reduce the number or restrict the range of a rare or endangered plant or animal"

In addition to the Section 15065 criteria that trigger mandatory findings of significance, Appendix G of State CEQA Guidelines provides a checklist of other potential impacts to consider when analyzing the significance of project effects. The impacts listed in Appendix G may or may not be significant, depending on the level of the impact. For biological resources, these impacts include whether the project would:

A. "have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service"

B. "have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service"

C. "have a substantially adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling hydrological interruption, or other means)"

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

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

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

6.1 Approach to the Analysis

The majority of the material in WRA's July 2020 *Sections 404, and 401, and 1602 Regulatory Permit Application Package* focuses on the regulatory permitting aspects of the project, rather than specifically addressing biological resources issues from the perspective of CEQA review. For example, Part 11 of the permit application package was listed as "CEQA Documentation (To be submitted under separate cover)" and was therefore not included in the application package. In addition, H. T. Harvey & Associates biologists were not authorized to visit the site in order to prepare this peer review report. Nevertheless, WRA's materials contain most of the information necessary for us to assess impacts to biological resources from a CEQA perspective, and our familiarity with the project vicinity allows us to fill in any gaps in information necessarily for us to confidently assess biological resources impacts for CEQA review of the project based on this existing information.

In determining whether impacts on biological resources would be less than significant, as opposed to requiring mitigation measures to reduce impacts to less-than-significant levels, we considered that all conservation measures proposed by the project, as listed in WRA's permitting package, are incorporated into the project. Therefore, those measures are part of the project, and we assessed whether the entire project (including those measures) would adequately reduce impacts to less-than-significant levels. We would have prescribed additional mitigation measures only if the measures described in WRA's permitting package did not adequately reduce impacts to less-than-significant levels, though as noted below, implementation of all measures incorporated into the project will reduce all biological resources impacts to less-than-significant levels without the need for additional mitigation.

6.2 **Impacts on Special-Status Species**: Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFW or USFWS

6.2.1 Impacts on the CCC Steelhead (Less than Significant)

Potential project impacts on the CCC steelhead, which is federally listed as threatened, are described in Part 10 (Section 7 Biological Assessment) of WRA's July 2020 *Sections 404, and 401, and 1602 Regulatory Permit Application Package*. Specifically, pages 18-21 describe the project's potential impacts on this species. These impacts are described below, using information from WRA's Biological Assessment.

If no water is present in the on-site reach of creek when bank stabilization work occurs, there would be no potential for direct impacts on the species, as it would be absent from the project site. If water is present, however, then juveniles may be present in pools within the project area. Dewatering would dry out these habitat features, stranding any steelhead that may be present. To avoid this impact, a NMFS-approved biologist will lead a fish rescue to capture and relocate any steelhead that may be holding within the project area. Rescuing steelhead also poses a risk to fish which will be exposed to stress during capture as well as effects specific to the capture methods (e.g., seining and electrofishing). In addition, relocation poses some risk of predation

following relocation, and crowding at relocation sites. The effort would be led by a NMFS-approved biologist who is knowledgeable in capture methods and techniques to minimize stress on captured steelhead, thereby making the relocation process as minimally stressful to steelhead as possible, while fulfilling the benefit of relocating fish to other sections of creek which are not subject to construction related dewatering effects.

The project is scheduled to occur during the dry season when flows are at their lowest, and when the local area is naturally dry. As such it is not expected that fish will be able to pass the area due to the natural drying cycle of the creek. If flows are present, they will either be diverted to the opposite side of the creek channel outside of the project area, or a gravity fed bypass system will be installed to allow the free flow of water downstream for as long as water is naturally present. The bypass will be suitably sized to carry the dry season flow of the stream in order to keep water flowing as long as it is naturally available. If any water is pumped or drained from the project area (i.e., remnant water or groundwater seepage) it would pass through a filtration system before reentering the creek channel to minimize any potential effects of turbidity or water quality on fish downstream.

The design of the project would have several beneficial indirect effects to steelhead. First, steelhead would benefit from increased habitat complexity within the project area following completion of the project. Currently the banks are composed of largely unvegetated sandstone which lacks structure to support cover or foraging resources for steelhead. The overall structure will be composed of root wads, topped by a timber or log crib wall which will increase habitat complexity and diversity. Steelhead individuals would likely benefit from interstitial spaces for cover, potentially decreasing predation risk. Steelhead may also use those spaces as velocity refugia in high flows, keeping individuals from washing out to the Bay before acclimation to saltwater could occur. Natural elements such as stone and timber are also better for supporting invertebrates or other similar food sources which benefit steelhead by increasing size of fish before migrating out. Additionally, riparian tree plantings will increase woody debris and detritus in the local system, further increasing the available foraging materials and potentially the growth and survival rate for individuals. The bank within the crib wall will be planted with numerous willow stakes while the higher elevations of the bank are planted with oaks and buckeye trees. Once mature, these trees will provide shade to waters beneath, decreasing thermal exposure, reducing heat stress on steelhead that can hold within the crib wall while migrating.

If any toxic substances remained in the creek after the completion of the project, they could potentially impact fish when flows return to the channel. Items such as treated lumber, and spills from equipment into the creek have potential to indirectly effect steelhead following completion of the project. These effects will be negated by using only non-treated lumber, and by the implementation of a spill prevention plan during project work. Additionally, any concrete, or other non-natural materials encountered during excavation will be hauled offsite and replaced with suitable fill, furthering the beneficial effect of the project. Given the design of the project and implementation of measures, no adverse indirect effects are anticipated as a result of the project.

Numerous conservation measures, including general conservation measures and measures specific to CCC steelhead, are incorporated into the project. The measures pertinent to CCC steelhead are described fully on pages 8-10 of WRA's Biological Assessment.

As described in Part 16 (Habitat Mitigation and Monitoring Plan) of WRA's July 2020 *Sections 404, and 401, and 1602 Regulatory Permit Application Package*, the project area's stream and riparian habitats will be restored immediately following final grading activities. Anticipated project outcomes include a stabilized stream bank using bioengineered techniques; enhanced stream and riparian habitat to provide flow refugia, stream shading and other benefits for fish and aquatic life and riparian canopy for birds; and reduced input of fine sediment to San Francisquito Creek.

Much of San Francisquito Creek, including the project segment, has been designated by NMFS as critical habitat for this species. Potential project impacts on this species' designated critical habitat would be as described above for this species. Implementation of conservation measures incorporated into the project will reduce the potential for and magnitude of these impacts, and the project is expected to have a net benefit to critical habitat for the reasons described above.

With incorporation of the conservation measures listed on pages 8-10 of Part 10 (Section 7 Biological Assessment) of WRA's July 2020 *Sections 404, and 401, and 1602 Regulatory Permit Application Package* and implementation of the Habitat Mitigation and Monitoring Plan to restore stream and riparian habitat, project impacts on CCC steelhead and their critical habitat will be less than significant.

6.2.2 Impacts on the California Red-legged Frog (Less than Significant)

Potential project impacts on the California red-legged frog, which is federally listed as threatened and a California species of special concern, are described in Part 10 (Section 7 Biological Assessment) of WRA's July 2020 *Sections 404, and 401, and 1602 Regulatory Permit Application Package*. Specifically, pages 22-23 describe the project's potential impacts on this species. These impacts are described below, using information from WRA's Biological Assessment.

Direct effects on California red-legged frogs resulting from the proposed project include injury or harassment associated with vegetation removal or relocation. Once initial surveys are complete, vegetation is removed and any initial grading is complete, all potential refugia for California red-legged frogs will have been removed, leaving no place for California red-legged frogs to hide and eliminating any future potential to be impacted by project activities. The project will occur during the dry season when rains are not likely to prompt California red-legged frogs to disperse into the project area, eliminating potential for further interaction with California red-legged frogs that may be in the vicinity. Through the limited scope and duration of project activities as well as implementation of the aforementioned conservation measures, including biological monitoring for vegetation clearing, the likelihood for injury or death of California red-legged frogs is very low. However, injury or harassment may occur if California red-legged frogs are in the vicinity of project activities and encountered by work or are observed and relocated during project activities.

Implementation of the project is not likely to modify California red-legged frog dispersal patterns, habitat type, or habitat connectivity in the area. Given the natural drying cycle of this section of San Francisquito Creek, the project area is not likely to support water of suitable depth or duration to be used as any form of aquatic habitat.

Overall potential use of the project area is not expected to change. The primary indirect effect may be in a localized increase in structural complexity that California red-legged frogs may use the structure as cover during dispersal events. Currently the banks are composed of unvegetated sandstone which lacks structure to support refugia for dispersing California red-legged frogs. The crib wall structure will increase complexity which may aid California red-legged frogs in dispersal by providing interstitial spaces for cover. Additionally, increasing natural elements (woody debris, detritus and live vegetation) may also support invertebrate or other food sources for California red-legged frogs that disperse through the area.

Items such as treated lumber, and spills of toxic substances have potential to indirectly affect California red-legged frogs following completion of the project. However, these effects will be avoided by using only non-treated lumber, and by the implementation of a spill prevention plan during project work. Given these project design elements and measures, no significant indirect effects (positive or negative) are anticipated as a result of the project.

Numerous conservation measures, including general conservation measures and measures specific to California red-legged frogs, are incorporated into the project. The measures pertinent to California red-legged frogs are described fully on pages 8-12 of WRA's Biological Assessment.

As described in Part 16 (Habitat Mitigation and Monitoring Plan) of WRA's July 2020 *Sections 404, and 401, and 1602 Regulatory Permit Application Package*, the project area's stream and riparian habitats will be restored immediately following final grading activities. Anticipated project outcomes include a stabilized stream bank using bioengineered techniques; enhanced stream and riparian habitat to provide flow refugia, stream shading and other benefits for fish and aquatic life and riparian canopy for birds; and reduced input of fine sediment to San Francisquito Creek.

With incorporation of the conservation measures listed on pages 8-12 of Part 10 (Section 7 Biological Assessment) of WRA's July 2020 *Sections 404, and 401, and 1602 Regulatory Permit Application Package* and implementation of the Habitat Mitigation and Monitoring Plan to restore stream and riparian habitat, project impacts on California red-legged frogs and their habitats will be less than significant.

6.2.4 Impacts on the Southwestern Pond Turtle (Less than Significant)

Although WRA considered the southwestern pond turtle, a California species of special concern, unlikely to occur in the project area, it is our opinion that the species could potentially occur there as an occasional dispersant, given that it is known to occur in San Francisquito Creek (at least upstream from the site) and that individuals would use the creek corridor for dispersal. If the species is present, it could be impacted much the same way that California red-legged frogs could be impacted as described in Section 6.2.3 – individuals could be injured or killed, and habitat and movements could be temporarily disrupted. However, the project may provide a net benefit to the species by addressing the erosion issues within the project site and providing more vegetative cover along the creek bank.

With implementation of all the conservation measures incorporated into the project for CCC steelhead and California red-legged frogs, it is our opinion that impacts on the southwestern pond turtle would be less than significant, even if those conservation measures do not specifically address the turtle. The proposed conservation measures would minimize the potential for turtles to be present within the work area through dewatering (if necessary) and would minimize temporary impacts on habitat and water quality.

Although not necessary (in our opinion) to avoid a significant impact, we recommend that the project's conservation measures for the California red-legged frog incorporate relocation of any southwestern pond turtles that are found in harm's way during project activities. We expect that conditions of the LSAA from CDFW will include such a measure.

6.2.3 Impacts on the White-tailed Kite, Yellow Warbler, and Other Nesting Birds (Less than Significant)

Given the limited extent of the project area, no more than one pair of white-tailed kites (a state fully protected species) and yellow warblers (a California species of special concern) may nest in the project area or close enough to be disturbed by project activities. In addition, a number of other, more regionally common bird species may nest in or close to the project area, though the actual number of nests or nesting pairs that may be impacted would be low due to the highly disturbed nature of the project area (due to erosion) and the limited extent of the project area. Nevertheless, if any active nests are present when project activities occur, nests with eggs or young could be destroyed, and disturbance associated with project implementation could cause adults in adjacent areas to abandon active nests.

The habitats in and adjacent to the project area represent a very small proportion of the habitats that support these species regionally, and they are relatively degraded. As a result, impacts to active nests and nesting attempts of the birds that potentially nest in and near the project area would affect only a very small proportion of regional populations. Further, the project may have some benefit to nesting birds by providing additional nesting habitat within the stabilized bank and preventing further erosion and loss of nesting substrate.

Part 4 (Supplemental Project Information) of WRA's July 2020 *Sections 404, and 401, and 1602 Regulatory Permit Application Package* describes measures to avoid and minimize impacts to nesting birds in Section 4.3, as follows:

> "A qualified wildlife biologist will conduct a nesting bird survey no more than 14 days prior to the start of project activities. If no active nests are identified during the surveys, no disturbances will occur to birds and work will progress without restriction. If active nests are identified, a no-disturbance buffer around the nest will be implemented to avoid disturbances to nesting birds. Buffers will be determined by a qualified biologist, and typically range from 25 feet to 500 feet depending on the species and protection status of that species. Once an active nest is determined to no longer be active, because of young fledging or predation, the buffer around the nest will be removed and work will progress without restriction."

With implementation of these measures that are incorporated into the project, impacts on the white-tailed kite, yellow warbler, and other nesting birds will be less than significant.

6.2.4 Impacts on the San Francisco Dusky-footed Woodrat (Less than Significant)

Given the limited extent of the project area, the number of San Francisco dusky-footed woodrats (a California species of special concern) and their nests that may be impacted by the project would be low, if any will be impacted at all. Nevertheless, if any active nests are present when project activities occur, nests with young could be destroyed, and adults could potentially be injured, killed, or displaced into areas where they may suffer from predation or over-crowding. The habitats in and adjacent to the project area represent a very small proportion of suitable woodrat habitat regionally, and they are relatively degraded. As a result, impacts to woodrats and their habitat would affect only a very small proportion of regional populations. Further, the project may have some benefit to woodrats by providing additional nesting habitat in vegetation within the stabilized bank and preventing further erosion and loss of nesting substrate.

Part 4 (Supplemental Project Information) of WRA's July 2020 *Sections 404, and 401, and 1602 Regulatory Permit Application Package* describes measures to avoid and minimize impacts to woodrats in Section 4.3, as follows:

> "Prior to the initiation of project work within the creek or banks of San Francisquito Creek, a qualified biologist will conduct a preconstruction survey for dusky-footed woodrat nests. If a dusky-footed woodrat nest is found during surveys, the qualified biologist will relocate it outside of the project area, out of harm's way. Individuals encountered during this action will be allowed to move out of the area under its own power."

With implementation of these measures that are incorporated into the project, impacts on the San Francisco dusky-footed woodrat will be less than significant.

6.3 **Impacts on Sensitive Communities**: Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service

6.3.1 Impacts on Riparian Habitat (Less than Significant)

Project impacts on riparian habitats are described in Part 4 (Supplemental Project Information) of WRA's July 2020 *Sections 404, and 401, and 1602 Regulatory Permit Application Package*. Specifically, pages 8-9 describe the project's potential impacts on riparian habitat. These impacts are described below, using information from WRA's materials.

Crib wall work within vegetated riparian area includes 0.08 acre (3,485 square feet) of permanent disturbance as a result of the placement of bioengineered bank stabilization materials, excavation of 101 cubic yards of artificial and native fill material, grading, and placement of approximately 315 cubic yards of fill for the crib

wall structure and backfill material. The temporary access road will also extend into the riparian area and will disturb 0.01 acre (553 square feet, includes area above OHWM and below top of bank) requiring placement of approximately 191 cubic yards of clean fill. Riparian vegetation removal will disturb 0.06 acre below top of bank and entail the removal of six trees; three coast live oak, two California buckeyes (*Aesculus californica*), and one red willow (*Salix laevigata*). In addition, understory poison oak (*Toxicodendron diversilobum*) patches and herbaceous cover will be cleared and grubbed.

Numerous conservation measures, including measures to minimize impacts on riparian habitats, are incorporated into the project, as described on page 11 of Part 4 (Supplemental Project Information) of WRA's permit application package.

As described in Part 16 (Habitat Mitigation and Monitoring Plan) of WRA's July 2020 *Sections 404, and 401, and 1602 Regulatory Permit Application Package*, riparian habitat disturbed in the project area will be restored immediately following final grading activities. Riparian revegetation totals approximately 0.15 acre (6,360 square feet). Tree replacement will occur at a minimum of a 3:1 ratio for the number of trees removed, with new native tree species planted to add greater diversity to the riparian cover within the project area.

The project will result in enhancement of riparian habitat quality. Disturbed vegetated riparian habitat within the project area will be restored with native riparian plantings, which will further stabilize and enhance the ecological functions and values that the removed riparian trees currently provide to San Francisquito Creek. The enhanced riparian habitat will be of higher quality to the stream corridor, as the banks will be stabilized and tree composition will be more native and diverse. Anticipated project outcomes include a stabilized stream bank using bioengineered techniques; enhanced stream and riparian habitat to provide flow refugia, stream shading and other benefits for fish and aquatic life and riparian canopy for birds; and reduced input of fine sediment to San Francisquito Creek.

With implementation of the conservation measures and Habitat Mitigation and Monitoring Plan incorporated into the project, impacts on riparian habitat will be less than significant.

6.3.2 **Impacts due to the Spread of Nonnative and Invasive Species** (Less than Significant)

Part 8 (Observed Species List) of WRA's July 2020 *Sections 404, and 401, and 1602 Regulatory Permit Application Package* includes two plant species that are listed as having a "high" invasive status by the California Invasive Plant Council (Cal-IPC) – French broom (*Genista monspessulana*) and English ivy (*Hedera helix*). During project activities, movement of earth and vegetation could spread propagules from existing invasive species throughout the site or into adjacent areas, and equipment used during construction could potentially introduce new invasive species into the project area. Given the ecological value of the riparian habitats along San Francisquito Creek, introduction of new invasive species or spread of invasive species could degraded habitat quality and adversely affect native plants and wildlife that occur there.

The project incorporates measures to monitor and address invasive species following project implementation. One of success criteria in Table 6 of Part 16 (Habitat Mitigation and Monitoring Plan) of the permit application package is that plants listed as having "high" invasiveness on the Cal-IPC list will not exceed 10% cover within the riparian restoration area. Section 6 of the Habitat Mitigation and Monitoring Plan includes the following measures to monitor and manage invasive species:

> "After construction, weed maintenance will focus on invasive species with a Cal-IPC rating of High. Weed removal activity will be conducted using methods specifically identified as effective for those target species. Surveying for the presence of invasive exotic plant species will occur during the spring or summer monitoring visit. Removal by hand will occur if possible wherever these species are observed on the restoration site. Invasive non-native plant species monitoring will occur once per year concurrent with vegetation monitoring."

With implementation of the invasive species monitoring and management aspects of the Habitat Mitigation and Monitoring Plan incorporated into the project, impacts of invasive species on riparian habitat will be less than significant.

6.4 **Impacts on Wetlands**: Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling hydrological interruption, or other means)

No vegetated wetlands are present within the project area or would be impacted by the project. However, the project will impact San Francisquito Creek, which is considered jurisdictional waters of the U.S. and waters of the State. Project impacts on jurisdictional waters of San Francisquito Creek are described in Part 4 (Supplemental Project Information) of WRA's July 2020 *Sections 404, and 401, and 1602 Regulatory Permit Application Package*. Specifically, page 8 describe the project's potential impacts on wetted channel habitat. These impacts are described below, using information from WRA's materials.

Construction activities will disturb a total of approximately 0.14 acre (6,140 square feet) of streambed below OHWM within San Francisquito Creek and includes the excavation of 1,080 cubic yards of artificial and native alluvium, grading, and placement of approximately 1,450 cubic yards of boulder/cobble, woody material, and engineered fill in the streambed. However, all impacts to aquatic habitat within San Francisquito Creek will be temporary, and no loss of stream area below OHWM will occur. In addition, vegetation clearing and placement of clean fill material is necessary for the purpose of constructing a temporary access route to access the project area. Work for the temporary access route will disturb 0.02 acre (819 square feet) of vegetation and includes the temporary placement of 158 cubic yards of clean fill material. Upon completion of the project, fill material used for the temporary access route will be off-hauled from the site to an appropriate disposal site, grades restored to match surrounding areas, and the area revegetated with riparian species.

Numerous conservation measures, including measures to minimize impacts on stream habitats, are incorporated into the project, as described on page 11 of Part 4 (Supplemental Project Information) of WRA's permit application package.

As described in Part 16 (Habitat Mitigation and Monitoring Plan) of WRA's July 2020 *Sections 404, and 401, and 1602 Regulatory Permit Application Package*, the project area's stream and riparian habitats will be restored immediately following final grading activities. Anticipated project outcomes include a stabilized stream bank using bioengineered techniques; enhanced stream and riparian habitat to provide flow refugia, stream shading and other benefits for fish and aquatic life and riparian canopy for birds; and reduced input of fine sediment to San Francisquito Creek.

With implementation of the conservation measures and Habitat Mitigation and Monitoring Plan incorporated into the project, impacts on stream habitat within San Francisquito Creek will be less than significant.

6.5 **Impacts on Wildlife Movement and Nursery Sites**: Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites

6.5.1 Impacts on Wildlife Movement (Less than Significant)

The existing materials developed for project permitting do not address impacts on wildlife movement, so those impacts are addressed here.

For many species, the landscape is a mosaic of suitable and unsuitable habitat types. Environmental corridors are segments of land that provide a link between these different habitats while also providing cover. Development that fragments natural habitats (i.e., breaks them into smaller, disjunct pieces) can have a twofold impact on wildlife: first, as habitat patches become smaller they are unable to support as many individuals (patch size), and second, the area between habitat patches may be unsuitable for wildlife species to traverse (connectivity).

San Francisquito Creek functions as an important corridor for wildlife movement through the Palo Alto, Menlo Park, and East Palo Alto areas. The aquatic habitat within the creek allows numerous species of fish, amphibians, and reptiles to move throughout this area, and between more urbanized regions at lower elevations and more natural regions at higher elevations. In addition, riparian areas along the creek provide breeding, nonbreeding, and dispersal habitat that allows terrestrial animals to disperse along the creek and/or for exchange of genetic material among various segments of creek over generations.

The project will result in a partial, temporary impediment to wildlife movement along San Francisquito Creek. The project will only affect the east side of the creek, so animals would still be able to move along the west side of the creek during project implementation. After the project has been completed, the stabilized east bank will

provide more stable vegetation, which provides cover and breeding/nonbreeding habitat for animals, and the stabilization of the creek itself will benefit aquatic species. Therefore, after the partial, temporary constraint on wildlife movement that may occur during project implementation, the project will result in a slight long-term benefit to wildlife movement. Therefore, impacts of the project on wildlife movement will be less than significant.

6.6 **Impacts due to Conflicts with Local Policies**: Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance

6.6.1 City of Palo Alto Municipal Code Tree Protection (Less than Significant)

City of Palo Alto Municipal Code Title 8 (Trees and Vegetation) includes regulations relevant to biological resources on the project site. Chapter 8.10, Tree Preservation and Management Regulations, establishes regulations for the preservation of protected trees.

The project's impacts on trees protected by the City of Palo Alto are described in Part 7 (Tree Survey) of WRA's July 2020 *Sections 404, and 401, and 1602 Regulatory Permit Application Package* and in project description information from a May 2020 application to the City of Palo Alto for a Minor Architectural Review. Of 26 trees identified within the project site and immediate vicinity, two protected trees large enough and of qualifying species to be considered protected per the City's Tree Ordinance are proposed to be removed by the project – a 14.1-inch DBH coast live oak and a 12.6-inch DBH coast live oak. The project will obtain a tree removal permit for these two protected trees and will comply with the conditions of that permit.

In addition, a Tree Protection and Preservation Plan is described in Part 7 (Tree Survey) of the permit application package and is included WRA's Children's Health Council Creek Bank Stabilization Project: Phase II project plans (undated). This plan describes the measures that will be implemented to protect trees that are not intended to be impacted during project implementation. Finally, as described in Part 16 (Habitat Mitigation and Monitoring Plan) of the permit application package, riparian habitat disturbed in the project area will be restored immediately following final grading activities. Riparian revegetation totals approximately 0.15 acre (6,360 square feet). Tree replacement will occur at a minimum of a 3:1 ratio for the number of trees removed, with new native tree species planted to add greater diversity to the riparian cover within the project area.

By obtaining a tree removal permit for the loss of two protected trees and implementing the Tree Protection and Preservation Plan and the Habitat Mitigation and Monitoring Plan, the applicant will reduce impacts on trees protected by the City of Palo Alto to less-than-significant levels.

6.7 **Impacts due to Conflicts with an Adopted Habitat Conservation Plan**: Conflict with the provisions of an adopted habitat conservation plan,

natural community conservation plan, or other approved local, regional, or state habitat conservation plan (No Impact)

The project site is not located within an area covered by an adopted HCP, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan. Although Stanford University has a HCP for activities on portions of its lands, the San Francisquito Creek Bank Stabilization Project Phase II is not included within the HCP boundaries and would not be covered by that plan. Therefore, the project would not conflict with any such plans.

Section 7. References

AECOM. 2016. Summary of the 2016 San Francisquito Creek fish capture and relocation effort. Prepared for the California Department of Transportation.

[CDFW] California Department of Fish and Wildlife. 2020. VegCAMP Natural Communities Lists. <https://www.wildlife.ca.gov/data/vegcamp/natural-communities>. Accessed March 2019.

[CNDDB] California Natural Diversity Database. 2020. Rarefind 5.0. California Department of Fish and Wildlife. Accessed October 2020 from https://wildlife.ca.gov/Data/CNDDB/Maps-and-Data.

[CNPS] California Native Plant Society. 2020. Inventory of Rare and Endangered Plants. Accessed October 2020 from http://www.cnps.org/inventory.

Faber-Langendoen, D., J. Nichols, L. Master, K. Snow, A. Tomaino, R. Bittman, G. Hammerson, B. Heidel, L. Ramsay, A. Teucher, and B. Young. 2012. NatureServe Conservation Status Assessments: Methodology for Assigning Ranks. NatureServe, Arlington, VA.

Google Inc. 2020. Google Earth (Version 7.3.0.3832) [Software]. Available from earth.google.com.

Sawyer, J. O., T. Keeler-Wolf and J. M. Evens. 2009. A Manual of California Vegetation [online]. Second Edition. California Native Plant Society.

Spinks, P. Q., and H. B. Shaffer. 2005. Range-wide molecular analysis of the western pond turtle (*Emys marmorata*): cryptic variation, isolation by distance, and their conservation implications. Molecular Ecology 14(7): 2047-2064.

Spinks, P. Q., and H. B. Shaffer. 2009. Conflicting mitochondrial and nuclear phylogenies for the widely disjunct *Emys* (Testudines: Emydidae) species complex, and what they tell us about biogeography and hybridization. Systematic Biology. 58(1): 1-20.

Spinks, P. Q., R. C. Thomson, and H. B. Shaffer. 2014. The advantages of going large: genome wide SNPs clarify the complex population history and systematics of the threatened western pond turtle. Molecular Ecology 23(9): 2228-2241.

Spinks, P. Q., R. C. Thomson, E. McCartney-Melstad, and H. B. Shaffer. 2016. Phylogeny and temporal diversification of the New World pond turtles (Emydidae). Molecular Phylogenetics and Evolution 103(2016): 85-97.

Stanford University. 2013. Stanford University Habitat Conservation Plan. Accessible online at http://hcp.stanford.edu/.

WRA, Inc. 2020. Sections 404, and 401, and 1602 Regulatory Permit Application Package. Prepare for Children's Health Council.

GEOTECHNICAL INVESTIGATION

CHILDREN'S HEALTH COUNCIL
FAILING CREEKBANK RECOMMENDATIONS
SAN FRANCISQUITO CREEK, PALO ALTO, CALIFORNIA

Prepared for:
CHILDREN'S HEALTH COUNCIL
650 Clark Way
Palo Alto, California 94304

November 2017

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COTTON, SHIRES AND ASSOCIATES, INC.
CONSULTING ENGINEERS AND GEOLOGISTS

November 21, 2017
E5417

Mr. Terence Boyle
CHILDREN'S HEALTH COUNCIL
Chief Financial Officer
Chief Operating Officer
650 Clark Way
Palo Alto, CA 94304

SUBJECT: **Geotechnical Investigation**
RE: Failing Creekbank Recommendations – Children's Health Council
San Francisquito Creek, Palo Alto, California

Dear Mr. Boyle:

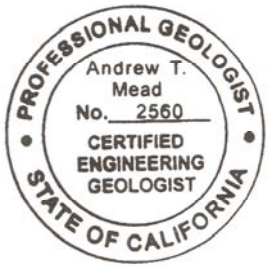
Cotton, Shires and Associates, Inc. (CSA) is pleased to submit the following report in which we describe the findings, conclusions and recommendations of our geotechnical investigation for addressing a failing creekbank at the Children's Health Council (CHC), in Palo Alto, California. In this report, we describe our scope of work, provide a description of the project, describe the surface and subsurface conditions as well as the seismic setting, and provide conclusions, recommendations and the limitations of our investigation.

We appreciate the opportunity to have been of service to you on this project. If you have any questions regarding this report, please feel free to call us.

Sincerely,
COTTON, SHIRES AND ASSOCIATES, INC.

David T. Schrier
Principal Geotechnical Engineer
GE 2334

Andrew T. Mead
Senior Engineering Geologist
CEG 2560



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GEOTECHNICAL INVESTIGATION
FAILING CREEKBANK RECOMMENDATIONS – CHILDREN'S HEALTH COUNCIL
SAN FRANCISQUITO CREEK
Palo Alto, California

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EXECUTIVE SUMMARY

In this Executive Summary, Cotton, Shires and Associates, Inc. (CSA) is providing a summary of the pertinent conclusions and recommendations resulting from our Geotechnical Investigation, of the over-steepened and undermined creekbank, located on San Francisquito Creek in Palo Alto, California, at the Children's Health Council (CHC). In this report, we characterize the geologic and geotechnical conditions in the vicinity of creekbank, provide conclusions and recommendations regarding creekbank stability, and discuss design alternatives for the over-steepened, undermined and failing creekbank. A more detailed discussion of our findings, conclusions and recommendations is presented in the main body of this report.

Conclusions

- The playground on the northern side of the CHC is bounded by a meander of San Francisquito Creek. The western side of the playground is being impacted by an actively eroding, up to 30-foot high, cut bank of San Francisquito Creek.

- During the winter of 2016-2017, portions of the cut bank failed, and the CHC reportedly lost up to 10 feet of property. The failure mechanism appears to consist of the creek scouring and undermining the base of the bank, which then results in a portion of the creek calving off and sliding into the channel.

- In our subsurface exploration we encountered a 4 to 7-foot thick layer of fill overlying alluvium which extended to the bottoms of our borings. We also encountered silty sandy layers between about 4 to 7 feet and 19 to 24 feet which were classified as being loose to medium dense. Below the silty sand layers, the alluvium appeared to be denser.

- Groundwater was encountered in two of our borings at a depth of 45 feet, at the time of drilling.

- The creekbank from the top to a depth of about 19 to 24 feet is also very susceptible to future scour, erosion, undermining and bank failures.

- The very loose to medium dense silty sand layers encountered between about 4 to 7 feet and 19 to 24 feet are susceptible to seismically induced creekbank failures (landsliding) and dry densification with a total settlement of up to 4-1/2 inches.

Recommendations

- Several alternatives were considered and evaluated for the over steepened and undermined creekbank. Ultimately, the project team selected an alternative that consists of constructing a row of concrete reinforced shear pins, connected at the tops with a tie beam and possibly equipped with a row of tiebacks for added lateral support.

- The shear pins should be at least 30 inches in diameter, spaced at approximately 6-foot on-center, and extended to a depth of at least 45 to 50 feet.

- Each shear pin pier hole should be excavated under the supervision of an archaeologist per the requirements of the Stanford University Archeologist prior to installing the wall.

GEOTECHNICAL INVESTIGATION
FAILING CREEKBANK RECOMMENDATIONS – CHILDREN'S HEALTH COUNCIL
SAN FRANCISQUITO CREEK
Palo Alto, California

1.0 INTRODUCTION

Cotton, Shires and Associates, Inc. (CSA) is pleased to submit the following report in which we describe the findings, conclusions, and recommendations of our geotechnical investigation for a failing creekbank at the Children's Health Council site along San Francisquito Creek, in Palo Alto, California (Figure 1, Site Location Map). In this report, we describe our scope of work, provide a description of the project, describe the surface and subsurface conditions, seismic setting, and provide conclusions, recommendations and the limitations of our investigation.

1.1 Purpose and Scope of Work

Our Geotechnical Engineering Investigation has been performed with the intent of characterizing the site geologic and geotechnical conditions in the vicinity of the precipitous embankment, quantifying the potential geologic hazards and risks to the site, and providing geotechnical design recommendations for future embankment instability and resultant encroachment into the CHC property. In order to complete our geotechnical investigation, we performed the following tasks:

1. **Initial Surficial Geotechnical Evaluation** – We reviewed pertinent technical documents and maps pertaining to the site, and performed a geotechnical reconnaissance to evaluate site conditions, drill rig access and locate borings for underground utility marking.

2. **Preparation of Topographic Base Map** – We performed detailed topographic surveying of the playground area, creekbank, and creek corridor utilizing total station equipment, for the purpose of generating an original topographic base map suitable for geologic mapping and design. The computer-aided survey data was processed using 3-D analysis and further refined by hand using drafting methods to produce a 1" = 20-foot

base map of the creek corridor. We also surveyed six creek profiles for Schaaf and Wheeler.

3. **Detailed Engineering Geologic Mapping and Profiling** – We performed engineering geologic mapping of the creek area and prepared profiles through the property and creek utilizing a total station. This work resulted in the generation of our Engineering Geologic Map (Figure 4) and Engineering Geologic Cross Sections A-A' (Figure 5).

4. **Subsurface Exploration** – We excavated three (3) exploratory boreholes along the top of the creek embankment utilizing track-mounted drilling equipment provided by Britton Exploration, Inc. These boreholes were logged and sampled by our geologist in the field, and the holes were filled with cement grout at the end of the day. Logs of these boreholes are in Appendix A at the end of the report.

5. **Laboratory Testing** – Representative samples obtained from the subsurface exploration were tested in a laboratory to determine engineering properties needed for geotechnical analysis and design.

6. **Geologic and Geotechnical Analysis** – Surface and subsurface data were analyzed to provide a basis for engineered design. We considered, researched and evaluated various conceptual alternatives, and presented the three most promising to the Project Team. Once the Team selected the preferred alternative, we developed active and passive pressure design criteria, suitable for a structural engineer to calculate necessary wall designs.

7. **Meetings and Consultation** – We have consulted with you during the course of the project and have attended meetings with you and the Project Team to discuss various alternatives for stabilizing the creek embankment.

8. **Reporting** - We summarized the findings and conclusions of our investigation in this geotechnical investigation report with pertinent graphic illustrations.

1.2 Project Description

We have performed a geotechnical investigation of the failing creekbank at the CHC playground with the intent of characterizing the oversteepened slope and subsurface materials, and evaluating the erosion hazard along the precipitous bank. We understand that that the steep creekbank on San Francisquito Creek has experienced instability in the past, particularly along the upstream/western portion of the property. Our geotechnical investigation was performed with the objective to evaluate the site conditions along the creek corridor, characterize the nature of the geologic hazard posed by the current site conditions, and develop suitable design alternatives and design criteria for the selected alternative. In this report, we provide an assessment of the risks to CHC property, discuss the selected alternative, and corresponding recommendations.

2.0 SITE CONDITIONS

2.1 Surface Conditions

In general, San Francisquito Creek flows northeast forming the border between the cities of Menlo Park and Palo Alto. A mostly-level alluvial terrace characterizes the majority of the subject property with a sharp break in slope adjacent to San Francisquito Creek. The playground on the northern side of the CHC property is bounded by a meander of San Francisquito Creek (see Figure 5, Engineering Geologic Map). The western side of the playground is being impacted an actively eroding, up to 30-foot high cut bank of San Francisquito Creek.

The creekbank, at the CHC property is characterized by very steep to precipitously steep (75- to 80-degree inclinations) slopes that are approximately 24 to 28 feet in height (see Figure 6, Engineering Geologic Cross Sections A-A'). The low-level creek channel is between 8 feet and 30 feet wide in the vicinity of the CHC property, and had low flows during our topographic survey and engineering geologic mapping work, but was dry during our surface investigation.

We observed areas of creekbank erosion/scour, a landslide, an area of undermined and over-hanging bank that was likely formed by a recent scour related failure (Figure 5), and deposits of loose landslide debris deposited at the toe of the slope (Figure 5).

We also observed remnants of an old brick foundation exposed in the top of the bank and down at the toe debris and is depicted on our Engineering Geologic Map (Figure 5).

We have previously researched the high-water flow levels from the December 22-23, 2012 flood event, estimated to be the third highest flow on record (extending back to 1935), and exceeded only by the 1955 flood and the 1998 flood. The 2012 high-water flood level averages approximately 12 to 13 vertical feet above the bottom of the creek channel, just upstream of the CHC property.

We understand that during the winter of 2016-2017, portions of the cut bank failed, and the CHC reportedly lost up to 10 feet of property. The failure mechanism appears to consist of the creek scouring and undermining the base of the bank, which then results in a portion of the creek calving off and sliding into the channel.

2.2 Subsurface Conditions

The site is mapped as being underlain by coarse-grained alluvium consisting of silts, sands and gravels (Figure 2, Regional Geologic Map). The bottom of the creek channel is roughly 30 feet below the adjacent grades, and the banks with near-vertical faces at the recent failure. Exposures of earth materials along the creek indicate that the site is underlain by fill material, and alluvial floodplain deposits (i.e., semi-consolidated to unconsolidated cobble, gravel, sand, silt and clay).

We explored the subsurface conditions along the creekbank edge by means of three small-diameter borings and encountered fill and alluvium to the maximum depths explored of 61.5 feet (see Appendix A, Boring Logs CSA/SD-1, CSA/SD-2, and CSA/SD-3). Our borings encountered a 4 to 7-foot thick layer of fill overlying alluvium which extended to the bottoms of our borings. We also encountered a silty sandy layer between about 4 to 7 feet and 19 to 24 feet which was classified as being loose to medium dense. Below the silty sand layer, the alluvium appeared to be denser. All three borings encountered a very dense/stiff layer at roughly 30 feet.

Groundwater was encountered at a depth of 45 feet in Borings CSA/SD-1 and CSA/SD-3 at the time of drilling. We anticipate that during winter months, the groundwater will rise at least to the level of the creek. Groundwater levels may vary with time and location depending on rainfall and runoff.

2.3 Laboratory Testing

We performed laboratory tests on representative undisturbed samples obtained from our exploratory borings. These tests included in-situ unit weight of the soil, natural moisture content, unconsolidated, sieve analysis, and consolidated undrained triaxial compression strength tests on the alluvial creekbank materials (see Appendix B, Laboratory Testing Results). Based on the results of these tests, at the time of our investigation the creekbank material appeared to have relatively low to high moisture content (7.7 percent to 26.8 percent), moderate to high dry unit weights (97.7 pcf to 134.9 pcf), and a moderate effective friction angle ($\phi = 32^0$).

2.4 Seismic Setting

The project site is situated in a very seismically active area. Historically, this area has been subjected to very strong to violent ground shaking from major earthquakes and the site will continue to experience very strong ground shaking in the future. The significant active faults located closest to the site are the San Andreas Fault zone (located 4.6 miles/7.4km toward the southwest), the San Gregorio fault (located 14 miles/22.4 km to the southwest), and the Hayward fault (located 13.7 miles/22.1 km toward the northeast) (See San Francisco Bay Area Fault Map, Figure 3). The site is located within a State (California Geological Survey) Mapped Liquefaction Hazard Zone (see Figure 3, Seismic Hazard Zone Map).

2.4.1 Probabilistic Analysis - We performed a peak ground acceleration analysis of the site employing the U.S.G.S. Seismic Design Tool, with the 2010 ASCE 7 (with March 2013 errata) Design Code. The results of our analysis indicate an appropriate Maximum Considered Earthquake Geometric Mean (MCE_G) Peak Ground Acceleration (PGA_M) of **0.67g**.

The subject site is located approximately 32 miles north of the epicenter of the 1989, M=6.9 Loma Prieta Earthquake and, based on preliminary strong-motion records of a nearby station in Palo Alto, probably experienced maximum horizontal and vertical ground accelerations of 0.21g (USGS, 1994).

Taking into account the faults described above, the 2016 California Building Code (CBC), the ASCE 7-10 code coefficients presented in Section 4.8 of this report, the strong-motion records from the 1989 Loma Prieta Earthquake and the results of the peak ground

acceleration analysis, it is our opinion that the proposed new hand excavated shear pin wall at this site could experience a peak horizontal ground acceleration (PGA_M) as high as **0.67g**.

3.0 POTENTIAL GEOLOGIC AND GEOTECHNICAL HAZARDS

Geologic and geotechnical hazards at the site include the following: 1) creekbank failures (landslides, erosion and scour); and 2) seismic shaking, liquefaction/lateral spreading. In the following sections, we describe these hazards along with corresponding degrees of determined potential risk, and provide design recommendations.

3.1 Creekbank Failure (Landslide, Erosion and Scour) – Based on our investigation and mapping, we judge that the potential for future creekbank failures along the CHC property, including landslide, erosion and scour to be **high**, especially along the western (upstream) side of the property where we encountered very loose to medium dense silty sandy materials down to depths of 19 to 24 feet in the creekbank. The western bank of the property also appears to be a cut bank (a bank that is actively eroding in a meander) and receives high energy flows.

In order to address the high potential for future creekbank failures to further erode and encroach on the CHC property, we considered several alternatives including a row of shear pin piers, a row of overlapping cement mixed columns and shotcrete and soil nail facing on the creekbank. After discussions with the Project Team and the Stanford University Archeologist and Biologist, the consensus was that a row of shear pins pier with a connecting tie beam was the preferred alternative. The limits of the shear pins across the western side of the property still needs to be determined, and will be based on northern and southern limits of erosion and funds to reduce the bank erosion at the turn-around area.

The Stanford University Archeologist was interested in pre-coring and inspecting each shear pin location to a depth of 15 to 20 feet to evaluate whether the construction will impact archeologically sensitive areas. We confirmed that the shear pin locations could be relocated, provide that on-center spacing was maintained.

3.2 Seismic Ground Shaking - Seismic ground shaking associated with a large earthquake on either the San Andreas or Hayward Faults, is considered to be a **high**

potential hazard in the project area. Peak ground accelerations of up to 0.67g should be anticipated at the site. Seismically-induced ground failure mechanisms include fault rupture, lurching, landslides, liquefaction (and lateral spreading), and dry densification. No active faults have been recognized on, or mapped through the subject property; consequently, the potential for surface faulting and ground rupturing on the property is considered to be **low**.

The potential for lurching due to earthquake shaking is considered to be **moderate,** and could result in minor differential settlements, while the potential for seismically induced landsliding of the creekbank is considered to be **high**. The potential for deep landsliding, which could impact (undermine) the proposed deep shear pin foundation, is considered to be **low**. The designed shear pin wall should address the potential adverse impacts of earthquake-induced creekbank failures on the western side of the playground.

Soil liquefaction is a phenomenon in which a saturated, cohesionless or non-plastic, near-surface soil layer loses strength during cyclic loading (such as that typically generated by earthquakes). During the loss of strength, the soil develops mobility sufficient to permit both horizontal and vertical movements. Soils that are most susceptible to liquefaction are loose, saturated, fine-grained sands and non-plastic silts and clays that are generally located within 50 feet of the ground surface. Due to the depth of groundwater (measured at 45 feet), the potential for liquefaction (and lateral spreading) is considered to be **low to moderate** (moderate risk is associated with short term, temporary high or perched groundwater following prolonged rainfall increasing the potential).

We calculated a **high** potential for dry densification of the very loose to medium dense soils encountered in our boings located adjacent to the near the top of creekbank based on the procedure outlined in the Soil Liquefaction During Earthquakes monograph (Idriss, Boulanger). We calculated these potentials using a site peak ground acceleration of 0.67g, as well as the site boring and laboratory test data. We determined the factors of safety against triggering liquefaction (FS_l) (dry densification) by calculating the ratio of: 1) the horizontal cyclic shear stress necessary to trigger liquefaction (dry densification), to 2) the average horizontal cyclic shear stress induced by the design earthquake. When this ratio is 1.3 or less (i.e., $FS_l \leq 1.3$), liquefaction (dry densification) is predicted to occur or could potentially be a problem (the State of California considers a FS=1.3 as the threshold for identifying the site as having a liquefaction hazard).

We calculated that there is a **high** potential for dry densification and associated settlement of the very loose to medium dense alluvial soils encountered in the upper 19 to 24 feet in all three Borings CSA/SD-1, CSA/SD-2 and CSA/SD-3.

In the following table we present a summary of the results of our dry densification and associated settlement analysis of Borings CSA/SD-1:

Depth (ft)	N_{60}	N_{160}	CRR_l	CSR_{eq}	N_{160cs}	Volumetric Strain (%)	Settlement (in)
4.5-7.5	8	17	0.23	0.41	23.4	2	0.72
7.5-10.5	3	5	0.11	0.40	10.9	3.9	1.40
10.5-13.5	9	14	0.19	0.37	20.3	2.3	0.83
13.5-16.5	10	15	0.20	0.33	21.4	2.2	0.79
16.5-19.5	10	15	0.21	0.29	21.8	1.8	0.65

In the following table we present a summary of the results of our dry densification and associated settlement analysis of Borings CSA/SD-3:

Depth (ft)	N_{60}	N_{160}	CRR_l	CSR_{eq}	N_{160cs}	Volumetric Strain (%)	Settlement (in)
4.5-7.5	5	10	0.14	0.41	15.2	2.9	1.09
7.5-10.5	10	18	0.29	0.40	26.6	1.25	0.47
10.5-13.5	10	17	0.23	0.37	23.1	2.0	0.74
13.5-16.5	12	19	0.26	0.33	25.3	1.2	0.40
16.5-19.5	14	21	0.39	0.29	29.6	0	0

Based on our dry densification settlement calculations summarized in the above tables, we anticipate total settlements of between to 2-3/4 and 4-1/2 inches and differential settlements of up to 1-3/4 inches over 30 feet during or immediately following the design seismic event.

4.0 GEOTECHNICAL RECOMMENDATIONS

4.1 Creekbank Preferred Alternative

We considered several alternative measures to address the undermined and over-steepened creekbank, and arrest the on-going and future creekbank scour, including the following: 1) constructing a row of drilled, shear pin piers inboard of the creekbank; 2) constructing a row of drilled, intersecting cement mixed columns inboard of the creekbank; and 3) constructing a soil nail and shotcrete wall across the face of the creekbank. Based on discussions with the project team, the Stanford University Archeologist and Biologist, and a contractor with expertise in deep foundation construction, we understand that the team selected the row of drilled shear pin piers as the preferred alternative. This alternative has several advantages, including the following: 1) there shouldn't be in-creek channel work which is difficult to permit; 2) the environmental impacts should be relatively minor since all of the construction will occur in the CHC yard; and 3) ease of construction since a drill rig and concrete trucks can access the proposed shear pin alignment from the turn-around bulb.

The proposed shear wall will extend roughly 200 feet adjacent to the edge of the creekbank, beginning near the northwestern end of the peninsula in the playground, and extend south, past the turn-around bulb.

Based on our discussions with the Stanford University Archeologist, we understand that each shear pin location should be pre-cored to at least 18 feet to allow for archeological inspection. In the event that a potentially archeological feature is observed in the core, the Project Team will evaluate alternatives for re-locating the shear pin(s). We also suggest that this work be constructed during the drier months of the year to increase construction progress and reduce the potential for a bank failure during construction.

4.2 Recommendations

In order to protect the creekbank and the rear yard from future failures, we recommend constructing deep (approximately 45 to 50 feet) drilled piers situated roughly 5 to 15 feet from the top of the creekbank (See Figures 7 and 8). This buried shear pin wall structure should reduce the potential for future creek scour from eroding the playground east of

the row of proposed shear pins; however, it would not protect the creekbank from erosion, scour and undermining elsewhere (including west/creek side of the shear pins). It is likely that, over time, the creek will continue to erode and undermine the bank, and will eventually expose portions of the new shear pin piers. This exposure should not compromise the integrity of the wall, if properly designed and constructed. However, once the piers are exposed, we recommend that exposed bays between shear pins be secured with reinforcing steel and shotcrete to reduce the scour potential. Additional work would also be required to remove and/or support the abandoned brick foundation.

It should be noted that no work is planned within the creek channel for the purpose of the pier or wall construction.

4.3 Drilled Shear Pin Piers

The shear pin piers should be drilled and have a minimum 2.5-foot diameter dimension. The piers should be spaced at approximately 6-foot centers (3.5-foot edge-to-edge) and can varying slightly to avoid significant tree roots, extend at least to a depth of at least 40 to 50 feet, which is 10 to 20 feet below the bottom of the creek channel, and consist of cast-in-place reinforced concrete piers that derive passive resistance to lateral forces below a depth of 24 feet (as measured from the top of the creekbank). The piers should be designed to resist an active lateral fluid pressure of 35 pounds-per-cubic foot (pcf) for horizontal backfill (ground upslope) and an additional seismic lateral fluid pressure of 12 pounds-per-cubic foot (pcf). This active lateral fluid pressure should be extended from the ground surface down to a depth of 24'. The lateral loads can be resisted by an equivalent fluid pressure of 475 pounds-per-cubic foot (pcf) applied against the sides of the pier and over an effective width of two (2) pier diameters starting at a depth of 24' to the bottom of the piers. Piers should be constructed using a cage of reinforcing bars or a steel beam, as designed by the Project Structural Engineer.

The top of the piers should terminate just below the ground surface. The upper portion of the piers may require forming to create vertical surfaces, and avoid "mushrooming" of pier tops and over-pours around tie beams. The pier holes should be cleaned of all loose material prior to the placement of steel and concrete. If water is present in the pier holes prior to placing concrete (and we anticipate that this could be the case), the water should be pumped out until the pier holes are dry (maximum 6 inches of standing water). Casing may be necessary to prevent caving. Drill spoils will need to be off-hauled.

4.4 Tie Beam

The tops of the shear pins should be held together and connected with a minimum 2.33-foot wide by 3-foot deep continuous concrete reinforced tie beam, as required by the Project Structural Engineer.

4.5 Tiebacks

The tiebacks should be located through the tie beam, and consist of double corrosion protected multi-strand tendons. The tiebacks should be installed in a minimum 6-inch diameter hole and declined at 15 degrees downward into the slope. The tiebacks should be tested to 1.33 times the design capacity. Tiebacks should be designed with an unbonded length of at least 15 feet.

The designed adhesion in the bonded zone should be determined by the tieback contractor; however, based on our experience, 3,000 psf could be used for skin friction between the grout body and earth material.

The first two tiebacks installed and an additional 10% of the installed tiebacks shall be performance tested. The remaining tiebacks shall be proof tested.

The tiebacks will extend below the playground area from depths of 5 feet (near the tie beam) to over 20 feet (at the end of the tieback). Consequently, future excavations in the playground area will need to protect the tensioned tiebacks.

4.6 Grading

Grading excavations should be within the capabilities of heavy duty drilling equipment; however, excavations (drilling) below depths of 24 feet, will be significantly more difficult and time consuming especially due to layers of dense sands and gravels. Depending on the time of year, excavations below about 20 feet could require dewatering. All loose material, vegetation, debris, and other deleterious material should be stripped, removed and off-hauled. This material should be disposed of in a suitable, legal location off-site. Excavation should proceed as necessary for planned grades, and soft and/or yielding materials in the location of the planned structure should be over-excavated and replaced with engineered fill. Areas to be filled should be scarified to at least an 8-inch depth,

moisture conditioned to at least optimum moisture content and compacted to at least 90 percent relative compaction based on ASTM D-1557-16.

4.6.1 **Compaction** - Excavated on-site material is suitable for re-use as compacted fill provided it is free of organic material and other debris and rocks greater than 4 inches in maximum dimension. Imported fill should be free of organic material, should contain no material larger than 4 inches and should have a Plasticity Index of less than 16. Once the area has been prepared, including removing the existing fill material, the new fill should be placed in horizontal lifts not exceeding 8 inches in loose lift thickness, moisture conditioned to at least optimum moisture content, and compacted in lifts to at least 95 percent relative compaction beneath all structures, and 18 inches below aggregate base rock for pavements, and 90 percent relative compaction elsewhere.

4.6.2 **Utilities** - Replaced underground utilities should be placed at least 2 feet below final ground surface. Bedding materials for pipes should be in accordance with the manufacturer's recommendations. Trenches should be backfilled with either on-site or approved import fill material compacted to a minimum of 90% of maximum dry unit weight in non-structural areas and a minimum of 95% of maximum dry unit weight beneath structures and the upper 18 inches of pavement subgrades. It is important to use equipment and methods that are suitable for work in confined areas without damaging the walls or conduits.

4.7 Erosion Control

All grounds disturbed by construction activities should be planted with vegetation or treated with hydroseed prior to exposure to rain. If freshly graded surfaces are exposed to rain, this plan should include properly staked straw bale barriers at the top of the creekbank.

4.8 Seismic Design

A Maximum Considered Earthquake (MCER) peak horizontal ground acceleration (PGA_M) as high as **0.67g**, and Design Earthquake peak horizontal ground acceleration of **0.45g** should be anticipated for design purposes at the site. Based on our geotechnical investigation, the site location, our interpretation of the 2016 CBC documents related to Earthquake Loads and

using the USGS U.S. Seismic Design Maps tool, we are providing the following parameter recommendations from the corresponding figures and tables:

Parameter	Value
Site Classification	D
Mapped Spectral Acc. 0.2 Sec. (g)	Ss = 1.674
Mapped Spectral Acc. 1 Sec. (g)	S_1 = 0.771
Fa – Site Coefficient	1.0
Fv – Site Coefficient	1.5
S_{MS} = FaSs	1.674
S_{M1} = FvS_1	1.157
S_{DS}=2/3 S_{MS}	1.116
S_{D1}=2/3 S_{M1}	0.771

4.9 Earthwork Construction Inspection

We should observe all excavations to confirm that the bearing material is as anticipated and that the bottom is in firm material. We should test grading, including subgrade preparation, to verify that the contractor meets the recommended material quality, moisture conditioning and compaction requirements. We should inspect pier excavations to confirm that the materials encountered are as anticipated and to verify adequate embedment depth of piers. A representative of Cotton Shires and Associates, Inc. should be given a minimum of 48 hours advance notice of construction activities requiring inspection and/or testing services.

5.0 LIMITATIONS

Our services consist of professional opinions and recommendations made in accordance with generally accepted engineering geology and geotechnical engineering principles and practices. No warranty, expressed or implied, or merchantability of fitness, is made or intended in connection with our work, by the proposal for consulting or other services, or by the furnishing of oral or written reports or findings. The investigation was performed and this report prepared for the exclusive use of the client, and for specific application to proposed site development as outlined in the body of the report.

Any recommendations and/or design criteria presented in this report are contingent upon our firm being retained to review the final drawings and specifications, to be consulted when any questions arise with regard to the recommendations contained herein, and to provide testing and inspection services for earthwork and construction operations. Unanticipated soil and geologic conditions are commonly encountered during construction that cannot be fully determined from existing exposures or by limited subsurface investigation. Such conditions may require additional expenditures during construction to obtain a properly constructed project. Some contingency fund is recommended to accommodate these possible extra costs.

This report is issued with the understanding that it is the responsibility of the owner, or of his representative, to ensure that the information and recommendations contained herein are called the attention of the project engineer and incorporated into the plans. Furthermore, it is also the responsibility of the owner, or of his representative, to ensure that the contractor and subcontractors carry out such recommendations in the field.

6.0 REFERENCES

Bowles, J.E., Foundation Analysis and Design, Third Edition, 1982, McGraw-Hill Book Company, Pages 158, 184, and Tables 2-6 and 2-7.

California Department of Conservation, Division of Mines and Geology, 1996, Probabilistic Seismic Hazard Assessment For the State of California, DMG Open File Report 96-08.

California Geological Survey, Seismic Hazard Zones, Palo Alto Quadrangle, April 18, 2006.

Duncan J.M., Horz R.C., and Yang T.L., August 1989, Shear Strength Correlations for Geotechnical Engineering, Virginia Tech, Department of Civil Engineering, Geotechnical Engineering.

Idriss I.M., Boulanger R.W., Soil Liquefaction During Earthquakes, Earthquake Engineering Research Institute, 2008.

Ishihara, K., 1985, Stability of natural deposits during earthquakes: Proceedings of the Eleventh International Conference on Soil Mechanics and Earthquake Engineering, p. 321-376.

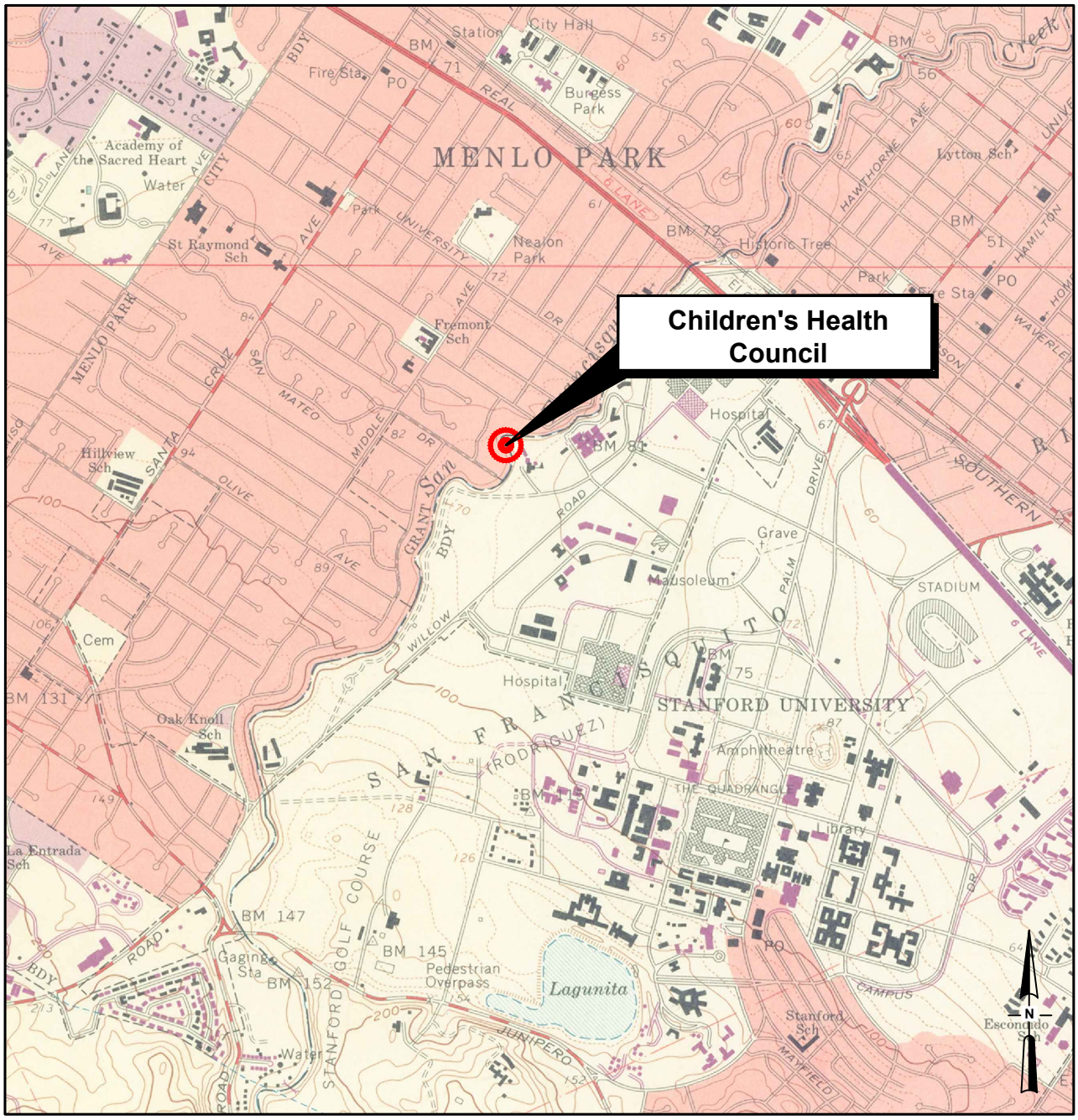
Tokimatsu, K. and Seed, H. B., 1987, Evaluation of settlements in sands due to earthquake shaking: Journal of Geotechnical Engineering, v. 113, p. 861-878.

U. S. Department of the Navy, 1982, Design Manual Soil Mechanics, Foundations, and Earth Structures, NAVFAC DM-7.2.

Pampeyan, E.H., U.S.G.S. Geologic Map of the Palo Alto and Part of the Redwood Point 7-1/2' Quadrangles, San Mateo and Santa Clara County, California, 1993.

U.S.G.S. U.S. Seismic Design Maps Tool Web Application, ASCE 7-10, errata March 2013.

APPENDIX A
FIGURES



Reference: USGS Palo Alto Topographic Quadrangle

0' 2000 4000

Scale 1" = 2000 feet

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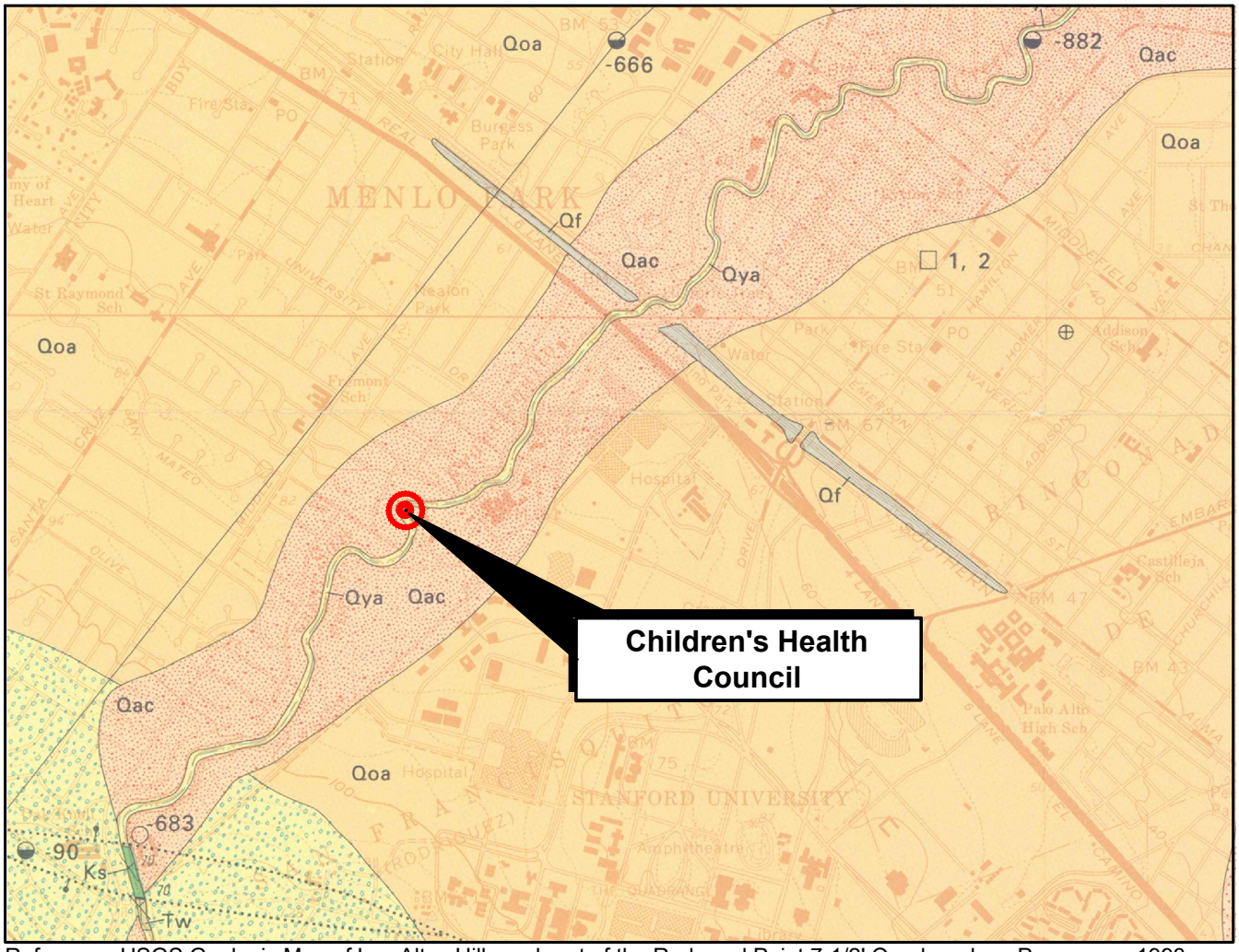
CONSULTING ENGINEERS AND GEOLOGISTS

Site Location Map

Children's Health Council

Palo Alto, California

GEO/ENG BY	SCALE	PROJECT NO.
DTS	1"= 2000'	E5417
APPROVED BY	DATE	FIGURE NO.
AM	November 2017	1



Reference: USGS Geologic Map of Los Altos Hills and part of the Redwood Point 7-1/2' Quadrangles , Pampeyan, 1993

EXPLANATION

Qf	Artificial fill
Qya	Younger alluvium
Qac	Coarse-grained alluvium
Qst	Stream terrace deposits
Qoa	Older alluvium
Tw	Whiskey Hill Formation
Ks	Cretaceous shale

Fault trace, dotted where concealed.

0' 2000' 4000'

Scale 1" = 2000'

N

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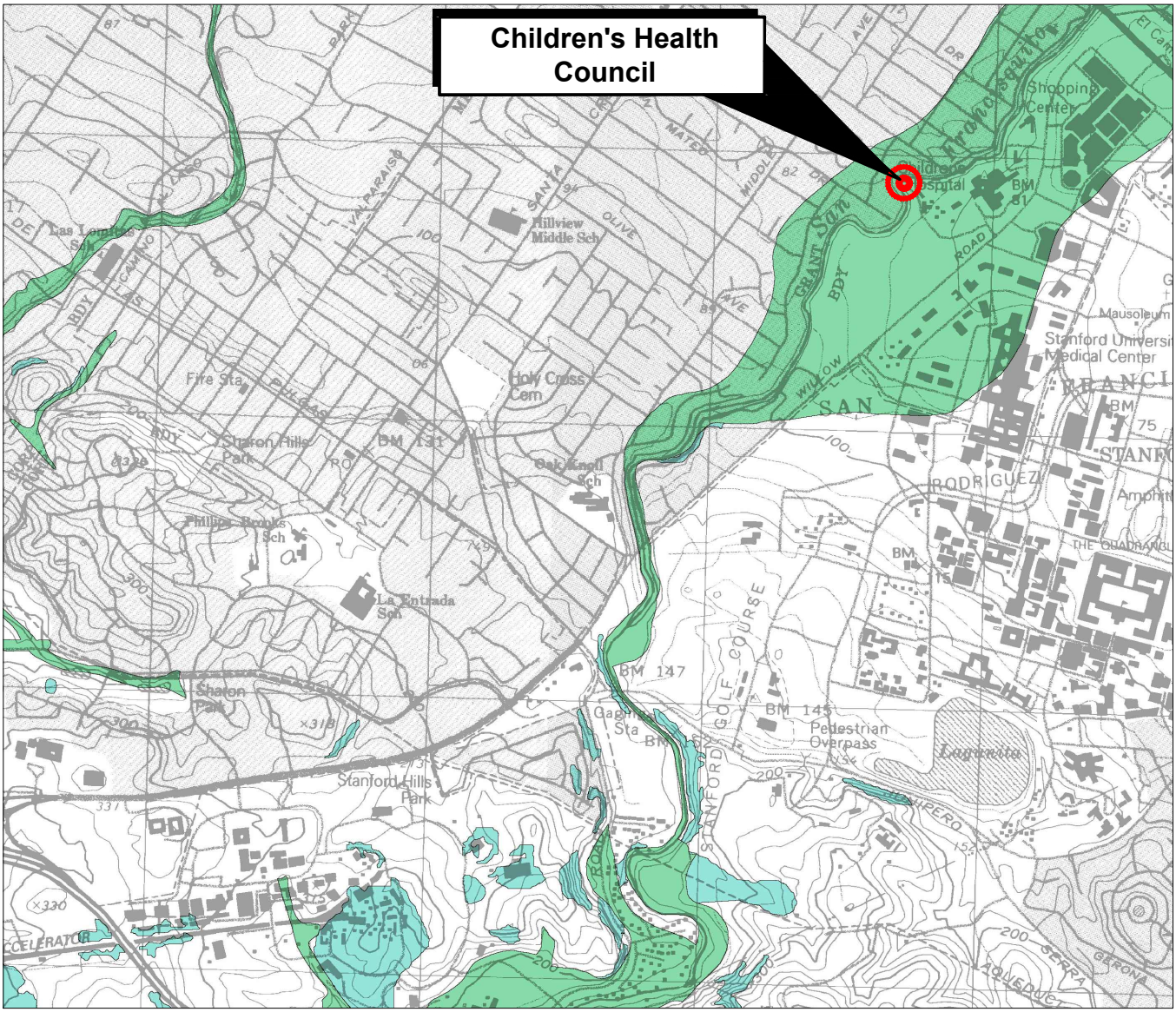
Regional Geologic Map

Children's Health Council

Palo Alto, California

GEO/ENG BY	SCALE	PROJECT NO.
DTS	1"= 2000'	E5417
APPROVED BY	DATE	FIGURE NO.
AM	November 2017	2



Reference: California Geological Survey Seismic Hazards Zone Map, Palo Alto Quadrangle, 2006

EXPLANATION

Liquefaction

Earthquake-Enduced Landslides

0' 2000' 4000'

Scale 1" = 2000'

N

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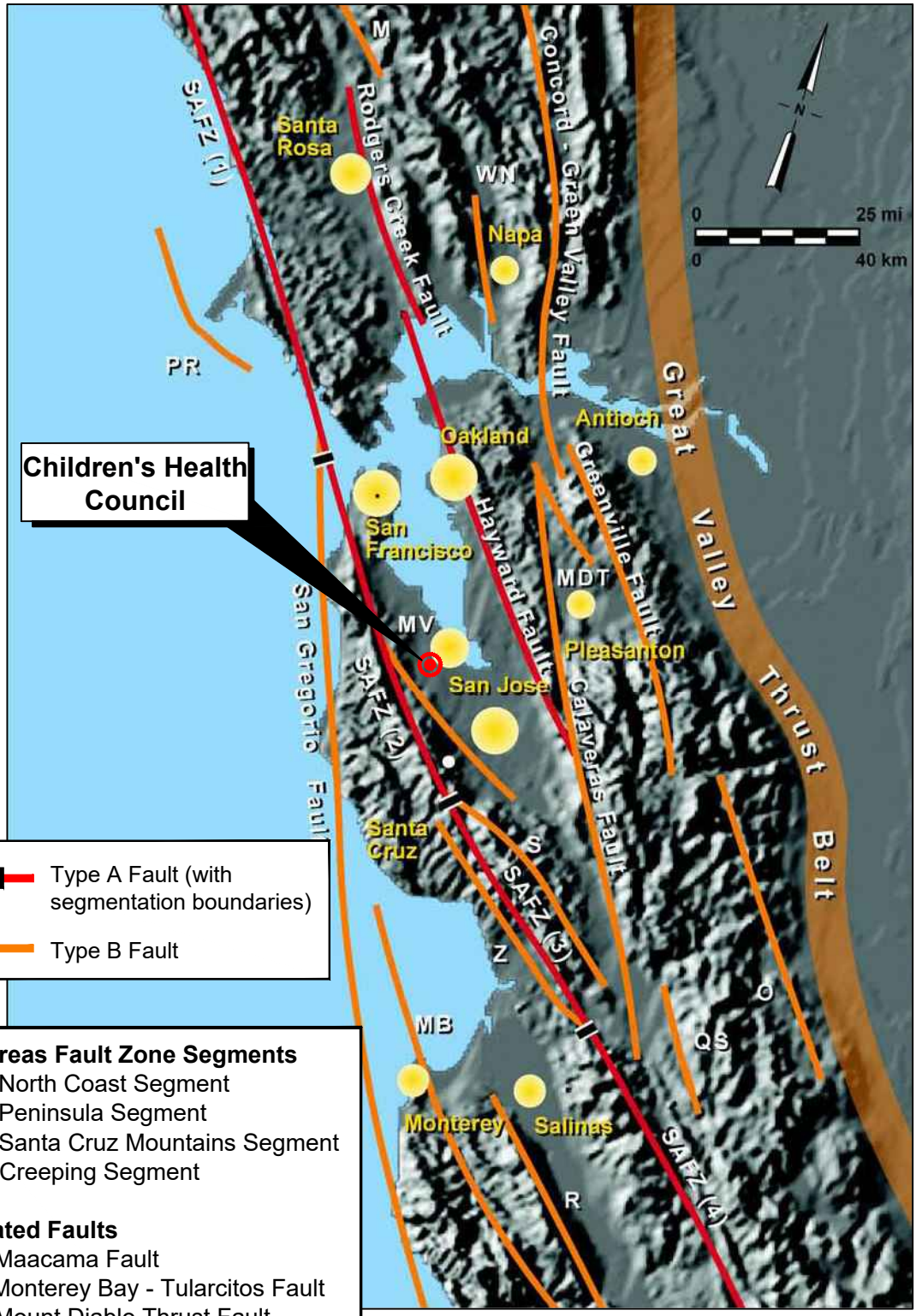
Seismic Hazards Map

Children's Health Council

Palo Alto, California

GEO/ENG BY	SCALE	PROJECT NO.
DTS	1"= 2000'	E5417
APPROVED BY	DATE	FIGURE NO.
AM	November 2017	3



San Andreas Fault Zone Segments

SAFZ-1 North Coast Segment
SAFZ-2 Peninsula Segment
SAFZ-3 Santa Cruz Mountains Segment
SAFZ-4 Creeping Segment

Abbreviated Faults

M	Maacama Fault
MB	Monterey Bay - Tularcitos Fault
MDT	Mount Diablo Thrust Fault
MV	Monta Vista - Shannon Fault
O	Ortigalita Fault
PR	Point Reyes Fault
QS	Quien Sabe Fault
R	Rinconada Fault
S	Sargent - Berrocal Fault
WN	West Napa Fault
Z	Zayante - Vergeles Fault

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San Francisco Bay Area Fault Map

Children's Health Council
Palo Alto, California

GEO/ENG BY	SCALE	PROJECT NO.
DTS	1"= 600'	E5417
APPROVED BY	DATE	FIGURE NO.
AM	November 2017	4

Buried Brick Structure

A

Af (CL/SM)

Fence

CSA/SD-1

CSA/SD-2

CSA/SD-3

Access Gate

Af (CL/SM)

Qa_{SM}

Qa_{SW}

Als

Qa_{SP}

SAN FRANCISQUITO CREEK

A'

North

0 5 10 20
(feet)

EXPLANATION

EARTH MATERIALS

- Als — Active Landslide Deposit
- Af — Artificial Fill
- Qa_{SP} — Alluvium - Sand
- Qa_{SM} — Alluvium - Silty Sand to Sandy Silt
- Qa_{SW} — Alluvium - Gravelly Sand

MAP SYMBOLS

- Tension Crack
- Limit of Recent Creek Bank Failure
- Limit of Landslide Deposit (Als)
- CSA/SD-3 — Location of Small-Diameter Exploratory Boring
- A A' — Location of Engineering Geologic Cross Section

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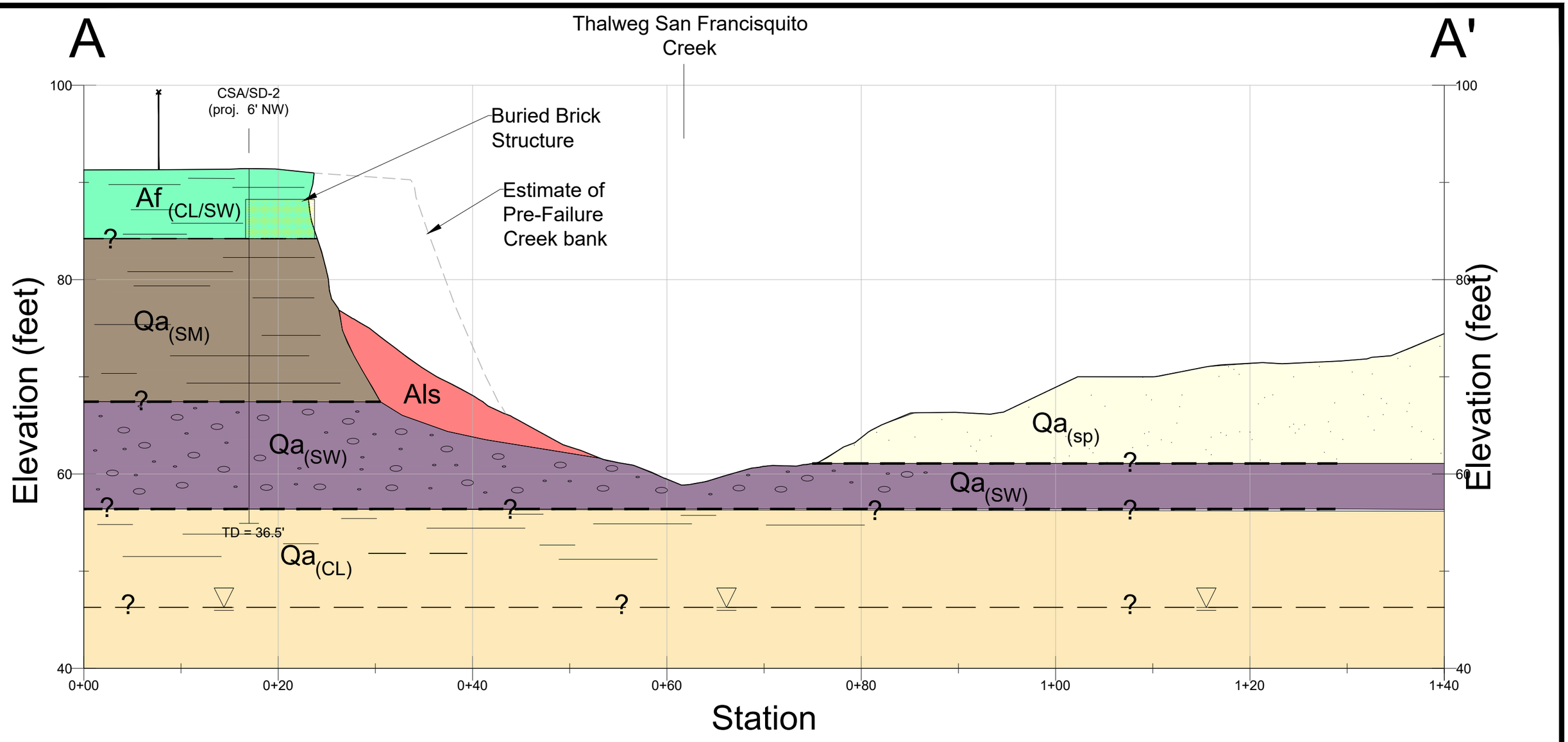
ENGINEERING GEOLOGIC MAP
Children's Health Council
PALO ALTO, CALIFORNIA

GEO/ENG BY	SCALE	PROJECT NO.
AM	1"=20'	E5417
APPROVED BY	DATE	FIGURE NO.
DTS	NOVEMBER 2017	5



EXPLANATION

EARTH MATERIALS

Als	Active Landslide Deposit
Af	Artificial Fill
Qa(SP)	Alluvium - Sand
Qa(SM)	Alluvium - Silty Sand to Sandy Silt
Qa(SW)	Alluvium - Gravelly Sand
Qa(CL)	Alluvium - Clay

MAP SYMBOLS

CSA/SD-2 | TD=36.5'	Location of Small-Diameter Exploratory Boring
▽	Groundwater at time of drilling

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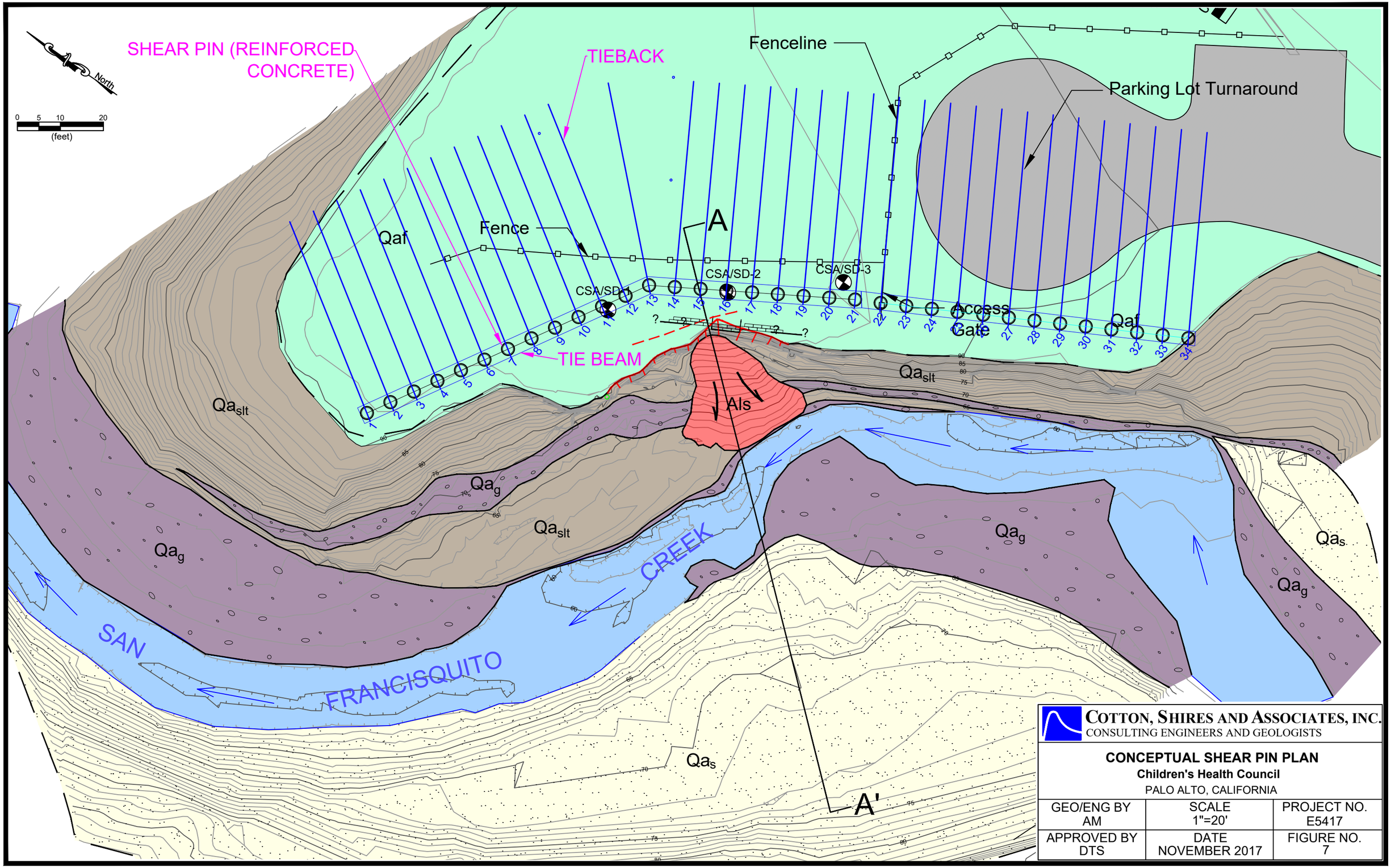
ENGINEERING GEOLOGIC CROSS SECTION A-A'
Children's Health Council
PALO ALTO, CALIFORNIA

GEO/ENG BY AM	SCALE 1"=10'	PROJECT NO. E5417
APPROVED BY DTS	DATE NOVEMBER 2017	FIGURE NO. 6



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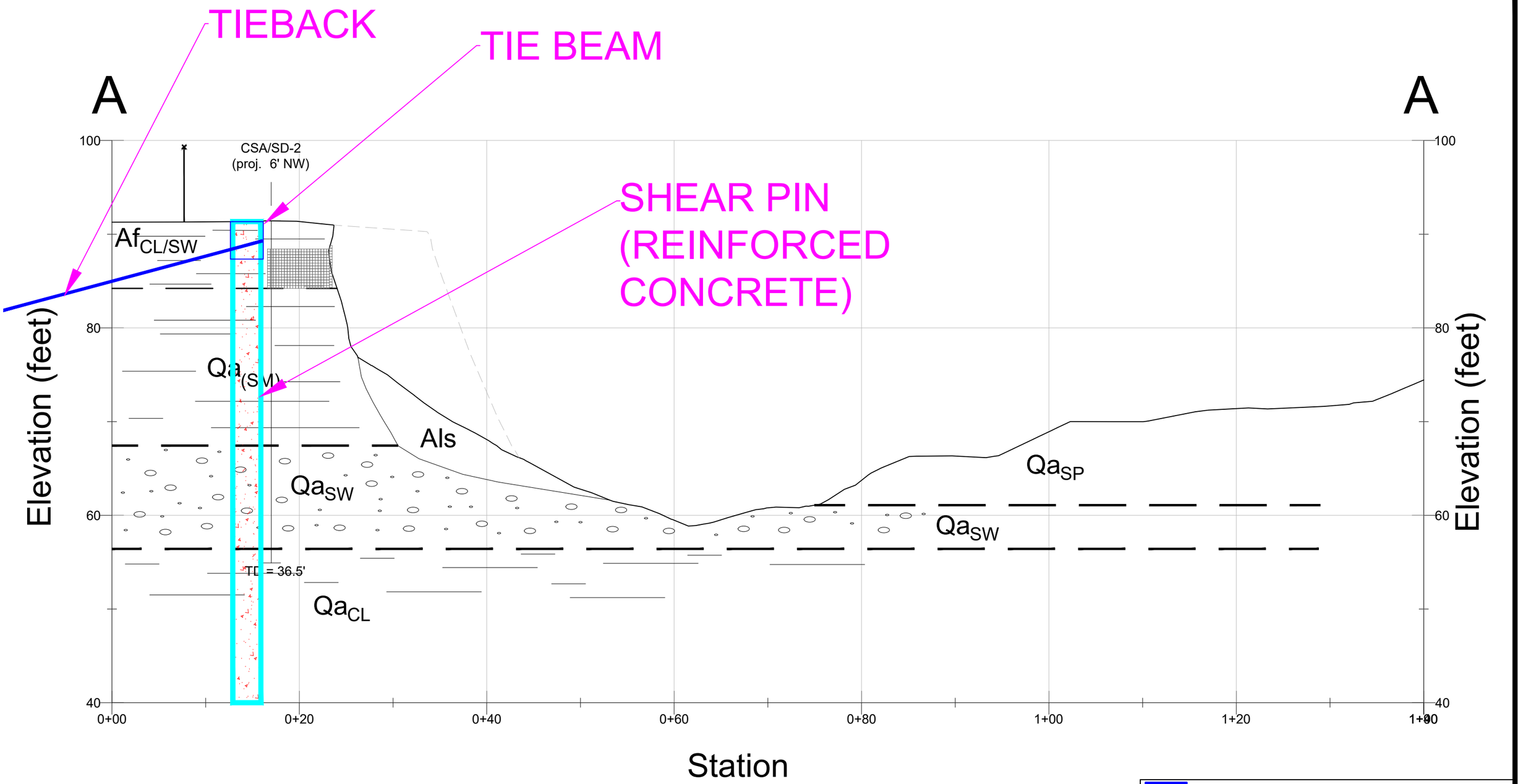
CONCEPTUAL SHEAR PIN PLAN
Children's Health Council
PALO ALTO, CALIFORNIA

GEO/ENG BY AM	SCALE 1"=20'	PROJECT NO. E5417
APPROVED BY DTS	DATE NOVEMBER 2017	FIGURE NO. 7



COTTON, SHIRES AND ASSOCIATES, INC.
CONSULTING ENGINEERS AND GEOLOGISTS

CONCEPTUAL SHEAR PIN CROSS SECTION

Children's Health Council
PALO ALTO, CALIFORNIA

GEO/ENG BY AM	SCALE 1"=10'	PROJECT NO. E5417
APPROVED BY DTS	DATE NOVEMBER 2017	FIGURE NO. 8

APPENDIX B
FIELD INVESTIGATION AND LOGS OF EXPLORATORY BORINGS

APPENDIX B

We performed a detailed topographic and geomorphic survey of the rear portion of CHC at 650 Clark Way in Palo Alto, California on June 12, 13 and 21, 2017 using a Leica TS12 reflectorless total station. The data from this survey were compiled in AutoCAD to produce detailed topographic contour elevations of the site at scale of 1 inch equals 20 feet. This detailed base map was utilized for the purpose of generating the engineering geologic map, engineering geologic cross sections, and in the engineering design of the shear pin creekbank mitigation.

Subsurface exploration consisted of drilling three small-diameter boreholes along the top of creekbank in the rear, western portion of the property. The drilling subcontractor, Britton Exploration Inc., used a track-mounted drill rig to drill three, 8-inch diameter holes to depths of 36.5 feet to 61.5 feet. The locations of the borings are shown on Figure 4. The small-diameter borings were logged by a geologist who visually classified the soils in accordance with ASTM D-2487.

We obtained relatively undisturbed samples of the materials encountered at selected depths in the small-diameter borings. These samples were obtained in brass liners that were 2.5 inches in outside diameter and 6 inches long; the liners were placed inside a 3-inch diameter modified split-barrel California Sampler for sampling. The sampler was driven with a 140-pound hammer that was raised by cathead and allowed to freely fall about 30 inches. We also performed Standard Penetration Tests at selected depths. The depths of the sampling are shown on the boring logs. The circled number at the conclusion of the sampling interval represents the corrected blow count from a modified California sampler to Standard Penetration Test value accomplished by multiplying the blow count by a factor of 0.68.

Descriptive logs of the small-diameter borings are presented in this appendix. These logs depict our interpretation of the subsurface conditions at the dates and locations indicated, based on representative samples collected at roughly five-foot sampling intervals. It is not warranted that they are representative of subsurface conditions at other times and locations. The contacts on the logs represent the approximate boundaries between earth materials, and the transitions between these materials may be gradual.

COTTON, SHIRES AND ASSOCIATES, INC.

LOG OF EXPLORATORY DRILLING

Project Children's Health Council — **Boring** CSA/SD-1

Location Playground Near Creek Bank (Northern Hole) — **Project No.** E5417

Drilling Contractor/Rig Britton/CME 55 Crawler — **Date of Drilling** 7/26/17

Ground Surface Elev. 91' — **Logged By** RR — **Hole Diameter** 8" Hollow Stem

Surface Baserock — **Weather** Clear /Sunny

Depth (feet)	USCS Class.	Geotechnical Description	Sample Desig.	Dry Unit Weight	Moisture Content (%)	*SPT Blows/ft	Sample Type	Recov. (%)	Remarks
0	ML	**0.0'-6.0': ARTIFICIAL FILL** 0'-6.0' Sandy Silt with Gravels - Dark brown, stiff, dry, rootlets, gravels up to ¼"	B-1			5 10 (21) 11	SPT	50%	Begin Drilling at 8:29 AM Continuous SPT sampling from surface to 24'
2			B-2			11 13 (26) 13	SPT	50%	
4			B-3			5 8 (15) 7	SPT	20%	
6			B-4			3 3 (8) 5	SPT	50%	
6	ML	**6.0-BOH: ALLUVIUM** 6.0' to 8.0' Silt - Light brown, stiff, dry, rootlets	B-5			3 3 (7) 4	SPT	40%	
8	SM	8.0' to 22.0' Silty Sand - Brown, very loose to loose, moist	B-6			1 1 (3) 2	SPT	40%	9:02
10			B-7			2 4 (9) 5	SPT	50%	
12		- Tan to light brown, loose, dry, fine grain sand	B-8			4 4 (9) 5	SPT	60%	9:11 24.8% Fines
			B-9			3 4 (8) 4	SPT	60%	
14		- Yellowish brown, loose to medium dense, moist, fine grain sand	B-10			4 5 (10) 5	SPT	70%	
16			B-11			5 6 (13) 7	SPT	60%	
18			B-12			6 5 (10) 5	SPT	75%	
			B-13			4 4 (9) 5	SPT	50%	9:31
20		Silty Sand - Light brown, medium dense, damp	B-14			4 8 (16) 8	SPT	60%	
22			B-15			7 9 (18) 9	SPT	75%	
	SP	22.0' to 25.5' Sand with Gravel - tan to orangish brown, medium dense, moist, course grain sand	B-16			10 14 (21) 7	SPT	65%	9:53 Driller adds water
24									
						12			9:59
26	CL	25.5' to 30.0' Sand with Gravel and Clay - tan to orangish brown, stiff, moist, course grain sand	T-1 T-2	108.3	13.3	16 12 (19)	MC	65%	Driller adds water LL=29, PI=14
28									

Project Children's Health Council **Date** 7/26/2017 **Boring** CSA/SD-1

Depth (feet)	Graphic Log	USCS Class.	Geotechnical Description	Sample Desig.	Dry Unit Weight	Moisture Content (%)	SPT Blows/ft	Sample Type	Recov. (%)	Remarks
32		SC	30.0' to 36.0' Clayey Sand with Gravels - Brown to yellowish brown, dense, moist, sandstone clast 1" diameter	B-17			7 10 23 (33)	SPT	40%	10:18
34										
36				T-3 T-4	103.2	23.1	4 7 8	MC	65%	10:37 Driller adds water TX/CU (C'=0, Ø'=32)
38		CL	36.0' to 41.5' Sandy Clay - Orangish brown to reddish brown, stiff, moist				(10)			
40				B-18			1 4 10	SPT	100%	10:54 LL=28, PI=12
42		SC	41.5' to 50.0' Clayey Sand with Gravels - Orange brown to reddish brown, medium dense, moist to wet, gravels 0.5" diameter				(14)			
44										
46				B-19			5 8 15	SPT	80%	11:06 LL=45, PI=25
48							(23)			
50		CL	50.0' to BOH Clay - Tan, stiff, wet	T-5 T-6	111.7	18.7	12 10 15	MC	65%	11:19 LL=38, PI=19
52							(17)			
54										
56			- Silty, Orange tan to gray molted, stiff, wet	T-7 T-8	101.5	24.5	4 7 9	MC	65%	11:30 Finish Drilling
58			TD = 56.5' Groundwater Encountered at 45'				(11)			
60										
62										

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LOG OF EXPLORATORY DRILLING

Project Children's Health Council **Boring** CSA/SD-2

Location Playground, Near Creek Bank (Center Hole) **Project No.** E5417

Drilling Contractor/Rig Britton/CME 55 Crawler **Date of Drilling** 7/26/17

Ground Surface Elev. 91' **Logged By** RR **Hole Diameter** 8" Solid Stem

Surface Baserock **Weather** Clear /Sunny

Depth (feet)	USCS Class.	Geotechnical Description	Sample Desig.	Dry Unit Weight	Moisture Content (%)	*SPT Blows/ft	Sample Type	Recov. (%)	Remarks
0	CL/SM	**0.0-7.0': ARTIFICIAL FILL** 0.0-7.0'- Clay and Silty Sand with Gravels - Dark brown, dry, dense, rootlets, gravels up to ¼" 3.0'-6.0' Brick Foundation in Fill	B-1			6, 9, (19), 10	SPT	30%	Begin Drilling at 12:18 AM continuous SPT sampling from surface to 24'
2			B-2			11, 8, (15), 7	SPT	30%	LL 36, PI 14
4			B-3			6, 4, (9), 5	SPT	30%	
6			B-4			4, 5, (11), 6	SPT	20%	
			B-5			2, 3, (5), 2	SPT	40%	
8	SM	**7.0'-BOH: ALLUVIUM** 7.0' to 10.0' Silty Sand - brown, very loose to loose, dry	B-6			1, 1, (6), 5	SPT	40%	12:40
10	ML	10.0' to 14.0' Sandy Silty - brown, stiff, moist	B-7			1, 2, (4), 2	SPT	50%	56.4% fines
			B-8			2, 1, (3), 2	SPT	60%	
12			B-9			1, 2, (4), 2	SPT	70%	
14	SM	14.0' to 24.0' Silty Sand - light brown, loose to medium dense, dry, fine grain sand	B-10			2, 3, (7), 4	SPT	30%	1:02
			B-11			4, 5, (11), 6	SPT	60%	
16			B-12			6, 8, (17), 9	SPT	50%	Driller adds water
18			B-13			4, 4, (9), 5	SPT	50%	
20		- Yellowish brown, with gravels up to ¼" diameter	B-14			6, 7, (17), 10	SPT	40%	1:31
			B-15			10, 10, (20), 10	SPT	40%	
22			B-16			12, 16, (32), 16	SPT	60%	
24	SW	24.0' to 35.0' Sand with Gravel - Yellowish brown, medium dense to dense, dry, sandstone clast up to ¾" diameter							
26			T-1			12, 23, (30)	MC	60%	1:54
			T-2	119.1	5.4	21			
28									

Project Children's Health Council **Date** 7/26/17 **Boring** CSA/SD-2

Depth (feet)	Graphic Log	USCS Class.	Geotechnical Description	Sample Desig.	Dry Unit Weight	Moisture Content (%)	SPT Blows/ft	Sample Type	Recov. (%)	Remarks
32		SC	30.0' to 35.0' Clayey Sand with Gravel - Yellowish brown to dark brown, dense, moist	B-17			12 16 16	SPT	50%	2:00
34							(32)			
36		CL	35.0' to BOH Silty Clay - Orangish brown to gray moltted, stiff, moist	B-18			5 7 9	SPT	60%	2:19 Finish Drilling
38			TD = 36.5' Groundwater not encountered				(16)			
40										
42										
44										
46										
48										
50										
52										
54										
56										
58										
60										
62										

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LOG OF EXPLORATORY DRILLING

Project Children's Health Council **Boring** CSA/SD-3

Location Playground Near Creek Bank (Southern Hole) **Project No.** E5417

Drilling Contractor/Rig Britton/CME 55 Crawler **Date of Drilling** 7/27/17

Ground Surface Elev. 91' **Logged By** RR **Hole Diameter** 8" Hollow Stem

Surface Baserock **Weather** Clear /Sunny

Depth (feet)	USCS Class.	Geotechnical Description	Sample Desig.	Dry Unit Weight	Moisture Content (%)	*SPT Blows/ft	Sample Type	Recov. (%)	Remarks
0	SM	**0.0-4.0': ARTIFICIAL FILL**							Begin Drilling at 12:18 AM continuous SPT sampling from surface to 24' (Britton calibrating autohammer)
		0.0' to 4.0' Silty Sand with Gravels - Dark brown, dry, medium dense to dense, rootlets, gravels up to ¾"	B-1		30	11, 12, 18	SPT	30%	
2			B-2		20	14, 10, 10	SPT	10%	
			B-3		6	5, 3, 3	SPT	15%	Hammer Calibration
4		**4.0'-BOH: ALLUVIUM**							
	ML/ SM	4.0' to 8.0' Silty Sand/Sandy Silt - brown, loose, dry	B-4		5	4, 3, 2	SPT	10%	
6			B-5		8	3, 4, 4	SPT	40%	
8		- rootlets	B-6		10	4, 5, 5	SPT	60%	Hammer Calibration
			B-7		6	4, 3, 3	SPT	50%	Hammer Calibration
10	SM	4.0' to 19.0' Silty Sand - tan to light brown, loose, dry, fine grain sand	B-8		10	4, 5, 5	SPT	40%	
12			B-9		8	3, 4, 4	SPT	50%	
14			B-10		12	4, 5, 7	SPT	50%	
			B-11		18	5, 9, 9	SPT	30%	8:43 Hammer Calibration
16		- tan to brown, medium dense	B-12		14	9, 7, 7	SPT	50%	31.7% fines Hammer Calibration
18		- gravels	B-13		8	3, 4, 4	SPT	50%	
20	SP	19.0' - 30.0' Sand with Gravel - brown, medium dense to dense, moist, medium grain sand, gravels up to 0.5" diameter	B-14		28	10, 13, 15	SPT	40%	Hammer Calibration
			B-15		34	13, 20, 14	SPT	40%	Driller adds water
22			B-16		18	11, 9, 9	SPT	30%	
24									Driller adds water
		- coarse grain sand, gravels up to 1" diameter	T-1			13, 18, 19	MC	60%	9:11
26			T-2	121.4	7.7	25			
28									

Project Children's Health Council **Date** 7/27/17 **Boring** CSA/SD-3

Depth (feet)	USCS Class.	Geotechnical Description	Sample Desig.	Dry Unit Weight	Moisture Content (%)	SPT Blows/ft	Sample Type	Recov. (%)	Remarks
	CL	30.0' to 34.0' Silty Clay with Gravels - Tan to dark brown, very stiff, moist, gravels up to 1" diameter	B-17			10 15 22	SPT	75%	9:29
32						(37)			Driller adds water
34									9:38 Hammer Calibration (Completed)
	CL	34.0' to 36.5' Sandy Clay - Orangish brown, stiff, moist				4			
36			T-3 T-4	103.0	23.6	4 5	MC	67%	Driller adds water TX/CU (C'=0, Ø'=32)
	SC	36.5' to 38.0' Clayey Sand lense				(6)			
38	CL	38.0' to 44.0' Silty Clay with Gravels - Tan to brown, very stiff, moist, low plasticity, gravels 1" diameter							
40						7			
			T-5 T-6	115.4	16.9	12 18	MC	100%	
42						(20)			
44									
						6			10:18
46	SC	44.0' to 50.0' Clayey Sand - Brown, medium dense, moist	B-18			9 11	SPT	80%	
48						(20)			
50						4			10:21
	CL	50.0' to 54.0' Silty Clay with Gravels - Orangish brown to yellowish brown, very stiff, wet, gravels up to 1/8" diameter	B-19			6 9	SPT	75%	
52						(15)			
54									
						6			10:37
56	ML	54.0' to 58.0' Sandy Silt - Orange brown to yellowish brown, stiff, wet	T-7 T-8	97.7	26.8	9 10	MC	67%	
58						(13)			
	CL	58.0' to BOH Silty Clay - Orangish brown to yellowish brown, very stiff, wet							
60						6			10:48 Finish Drilling
			T-9 T-10	98.8	26.0	10 11	MC		
62		TD = 61.5' Groundwater encountered at 45'				(14)			

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APPENDIX C
LABORATORY TEST RESULTS
Triaxial Compression Test

APPENDIX C

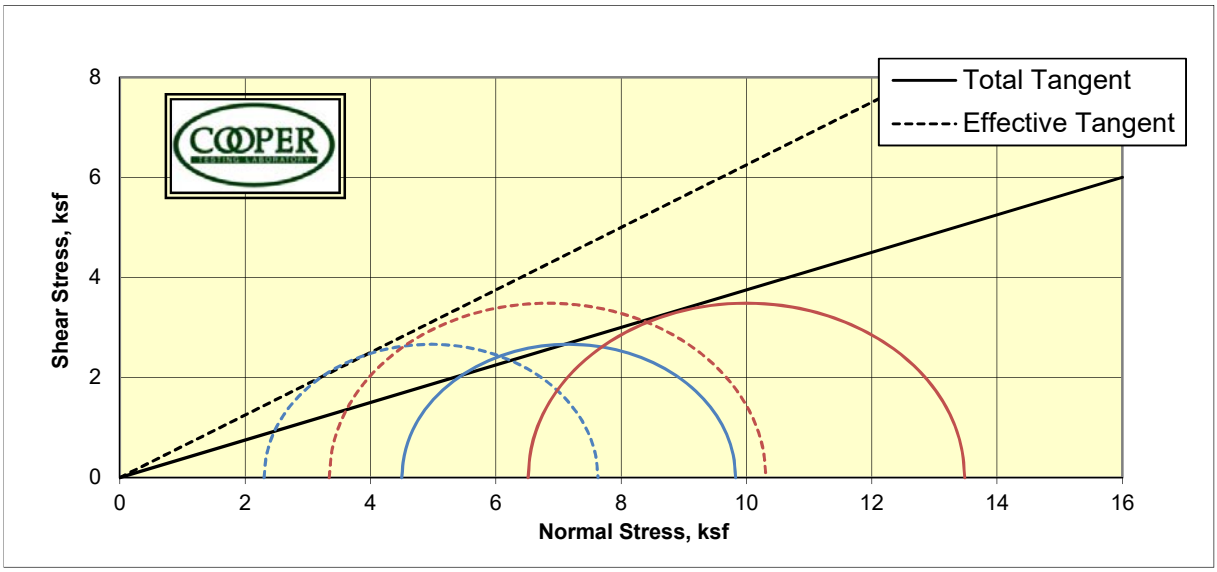
Laboratory Testing:

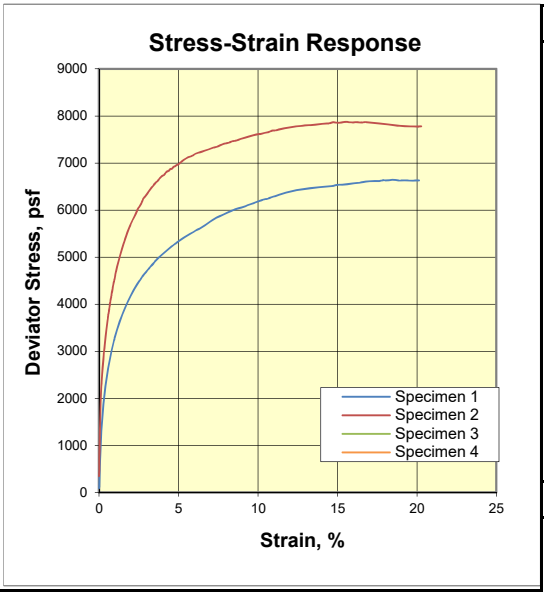
The laboratory analysis performed for the site consisted of limited testing of the principal soil types sampled during the field investigation to evaluate index properties and strength parameters of subsurface materials. The soil descriptions and the field and laboratory test results were used to assign parameters to the various materials at the site. The results of the laboratory testing program are presented on the boring logs and in this appendix in the attached laboratory test figures.

The following laboratory tests were performed as part of this investigation:

1. Detailed soil description ASTM D 2487;
2. Natural moisture content of the soil ASTM D 2937;
3. Atterberg limits determination, ASTM D 4318;
4. Particle size determination, ASTM D 422;
5. In-situ unit weight of the soil (wet and dry); and
6. Triaxial compression shear strength testing (consolidate undrained) ASTM D 4767.

Consolidated Undrained Triaxial Compression with Pore Pressure
ASTM D4767





CTL Number:	026-643
Client Name:	Cotton, Shires & Associates
Project Name:	CHC
Project Number:	E5417
Date:	8/9/2017 By: MD/DC
Total C	0.000 ksf
Total phi	20.6 degrees
Eff. C	0.000 ksf
Eff. Phi	32.0 degrees ©

Specimen	1	2	3	4
Boring	SD-1	SD-2		
Sample	T-4	T-4		
Depth	36.0	36.0		
Visual Description	Brown CLAY	Brown CLAY		
MC (%)	23.1	23.6		
Dry Density (pcf)	103.2	103.0		
Saturation (%)	93.4	94.7		
Void Ratio	0.694	0.697		
Diameter (in)	2.40	2.40		
Height (in)	5.04	5.00		
	Final			
MC (%)	22.2	22.3		
Dry Density (pcf)	107.8	107.6		
Saturation (%)	100.0	100.0		
Void Ratio	0.622	0.624		
Diameter (in)	2.36	2.37		
Height (in)	4.98	4.94		
Cell Pressure (psi)	111.2	124.9		
Back Pressure (psi)	80.0	79.7		
	Effective Stresses At:			
Strain (%)	5.0	5.0		
Deviator (ksf)	5.329	6.970		
Excess PP (psi)	15.3	22.0		
Sigma 1 (ksf)	7.631	10.313		
Sigma 3 (ksf)	2.303	3.343		
P (ksf)	4.967	6.828		
Q (ksf)	2.664	3.485		
Stress Ratio	3.314	3.085		
Rate (in/min)	0.0004	0.0004		

APPENDIX D
PHOTOGRAPHS

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MEMORANDUM

To: Terry Boyle **From:** Ben Snyder, PE

cc: Justin Semion; Brian Bartell, RLA

Date: March 2, 2020

Subject: San Francisquito Creek Bank Stabilization – Phase 2 – 30% Design

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This document was written to accompany the permit-level design for Phase 2 of rebuilding and stabilizing the bank along San Francisquito Creek. The concept of a living crib wall with rock toe protection was presented to representatives from Stanford University, California Department of Fish and Wildlife, National Marine Fisheries Service, US Fish and Wildlife Service, the Regional Water Quality Control Board, the US Army Corps of Engineers, and independent third party experts, who provided helpful feedback as we advanced the design from conceptual to the permitting level. Attached you will find the 30% Design Drawings and reports associated with this project. We have also included a brief summary of our analysis and design development process below.

1. Background

The banks of San Francisquito Creek, at the margin of the Stanford property leased to Children's Health Council (CHC), are at high risk for erosion, and are identified as a high priority for stabilization in the San Francisquito Creek Joint Powers Authority (JPA, 2000) Bank Stabilization and Revegetation Master Plan (JPA, 2000). Erosion of the channel banks on the CHC property accelerated during the 2016 – 2017 rainy season, resulting in the loss of approximately 50 horizontal feet of the creek bank and 7,500 square feet of the outdoor learning area, which poses a danger to public safety and property, if left unmanaged. The channel banks in the area of accelerated erosion are approximately 30 feet high, with a vertical face and some undercut portions of the bank. Existing soil behind the bank failure and directly adjacent to the outdoor learning area are cracking and near failure.

The project has been split into two phases, corresponding to work outside and inside the channel. Phase 1 was located beyond the top of the channel bank and consisted of concrete "shear pins" and steel tie-backs. The shear pins, which were installed in 2019, are set back from the creek bank by about 6 ft, and extend 20 ft vertically below the elevation of the existing creek bed. The Phase 1 project features are a line-of-last-defense against bank retreat and loss of property into the creek, but do not protect the existing character of San Francisquito Creek, which has significant ecological and cultural resources. Based on comments received from the San Francisquito Creek Joint Powers Authority and Santa Clara Valley Water District, the City of Palo Alto required in Condition of Approval #14 that in-channel improvements below the top of bank be designed and implemented prior to December of 2021.

Phase 2 of the project will be an in-channel living crib wall structure, designed to protect the toe of the existing bank, prevent future bank failure, and provide habitat for Steelhead trout. Phase 2 will meet stipulation #14 of the Conditions of Approval letter issued by the City of Palo Alto authorizing the shear pin wall project, which states:

> *…The purpose of this secondary project would be to minimize risk of future exposure to the shear pin wall, maintain or improve sediment transport by minimizing continued erosion along the base of the wall adjacent the subject property, and maintain or otherwise improve stream function.*

2. Design Constraints

Primary site constraints influencing the design include:

- No excavation of the existing bank is allowed by the property owner, Stanford University, due to the risk of disturbing cultural resources.
- San Francisquito Creek is considered critical habitat for Steelhead trout (*Oncorhynchus mykiss*) in the segments that adjoin the property, therefore, any work proposed within the channel will require special provisions to minimize potential impacts to the species.
- The project may not result in increased flood risk.
- The project may not increase risk of bank failure to neighboring properties.
- The property boundary of the parcel upon which CHC is located is delineated by the historic centerline of the creek channel, therefore any work that would potentially impact adjacent properties would require obtaining temporary or permanent easements on the adjacent properties.
- The Stanford-owned property located immediately to the southeast is subject to a conservation easement that does not allow construction of any kind.

3. Site Assessment

WRA engineers visited the site at 650 Clark Way in Palo Alto on October 11, 2018. We descended the steep, 30 foot high bank of San Francisquito Creek with the aid of rope, observed the recent bank failure, and walked the project area, which extends approximately 500 feet upstream and downstream of the project area as shown in Figure 1. The flagged locations of the Phase 1 shear pins designed by Cotton Shire were observed along the top of bank. Approximately 200 feet of bank failures were observed along the property.

Flows appear to impinge on the bank, which is comprised of a mixture of unconsolidated sandy gravel alluvium, and is sparsely vegetated. Toe scour was evident along much of the project area. There appears to be evidence of the formation of a pool along the main bank failure, which was likely followed by a land slide of the bank material into the pool. The channel bed is partially armored with large cobbles, particularly upstream of the bank failure. The bed along the Project Area appeared less armored, with several areas of exposed sand and gravel (Figure 2).

The combination of the height and steepness of the bank, sparse vegetation, evidence of recent incision, evidence of ongoing toe erosion, and the unconsolidated nature of the bank material strongly suggests that the bank will continue to retreat laterally unless it is adequately reinforced using engineered methods.

4. Data Collection and Review

A variety of pertinent site data and existing work was reviewed as part of the design process in order to characterize the site and identify any gaps or needs for additional information, including: the geotechnical site evaluation, topography, hydrology, and hydraulics. A robust description of the hydrologic and geomorphic setting was developed in the San Francisquito Creek Bank Stabilization and Revegetation Management Plan (JPA, 2000).

Sand layers were observed within the bank material along the toe of the bank failure. An active landslide is mapped near the middle of the bank failure (CSA 2017). No bedrock is exposed at the site and none was mapped during subsurface explorations.

Recent topographic data and hydrologic data were reviewed prior to developing the conceptual design. A topographic survey was completed by Cotton Shires and Associates, Inc. and covered the width of San Francisquito Creek channel along the project area, extending approximately 100 ft upstream and downstream of the recent bank failure (CSA, 2017). Topographic survey points collected by CSA were combined with topographic data from a 1-D hydraulic model developed by Noble Consultants, Inc. in order to create a digital terrain model of the site (Noble Consultants, Inc., 2010). The topographic data from the Noble model captured more channel length than was surveyed by CSA, allowing for more complete representation of the system in the digital terrain model.

5. Hydrology

The watershed is a mix of rural mountain streams with suburban settings in flatter areas. There are a number of tributary creeks including Bear Creek, Corte Madera Creek, and Los Trancos Creek. Major factors in the hydrology of the San Francisquito Creek include historical land use changes such as urbanization, agriculture, and logging. There are also multiple structures impacting flows throughout the system. The largest structure is likely the Searsville Dam on Corte Madera Creek. Detailed information about the watershed is available in the Master Plan (JPA, 2000).

Historical flow records are useful for defining the local flow regime, particularly discharge magnitudes, which tend to control erosion and sedimentation processes and may be used to aid in defining jurisdictional zones, such as ordinary high water and the 100-year flood elevation. The United States Geologic Survey (USGS) has operated stream gage #11165400 on San Francisquito Creek near Stanford University intermittently since 1930. Streamflow statistics provided estimates of discharge magnitude for events ranging from mean annual flow to a 500-year event (USGS, 2019).

The Federal Emergency Management Agency published a Flood Insurance Study for San Francisquito Creek in 2014 (FEMA, 2014), which included peak flow values for 10-, 50-, 100- and 500-yr events and backwater profiles in the Project Area for 10- and 100-year events. An update to the FIS was released in 2019, which omitted the backwater profiles (FEMA, 2019).

The hydrology for this report was defined by data presented in the 2014 Flood Insurance Study and from USGS stream gauge #11164500. Stipulation #16 of the City of Palo Alto Conditions of Approval for the project stated that FEMA-approved hydrology and hydraulics are to be used to define the 100-year event. Therefore, the data from FEMA is used to define the 100-year event peak discharge and backwater surface profile. Discharge magnitudes are presented in Table 1.

6. Hydraulics

Project features were evaluated using hydraulic modeling to ensure that the project would not increase flood risk, would be stable under design conditions with an allowable factor of safety, and would not increase risk of bank failure along adjacent properties. Our analysis made use of both one-dimensional (1D) and two-dimensional (2D) models, with the 1D model primarily being used for assessment of the water surface profile, and 2D model used to evaluate shear and velocity distributions in the study area. Methods and results of each approach are discussed in the following sections.

6.1 One-Dimensional Hydraulics

A one-dimensional (1D) hydraulic model was developed by Schaaf and Wheeler to evaluate the hydraulics of Phase 1 of the bank stabilization project, and included San Francisquito Creek from well above the project area down to San Francisco Bay. This model was provided to WRA with permission from Children's Health Council to use for evaluating Phase 2. The model included existing conditions geometry, in addition to proposed conditions for the Phase 1 project, assuming that the remaining channel cross section had been eroded to the alignment of the Phase 1 shear pins. The 1D model geometry was modified by WRA to represent existing conditions in the project area as surveyed in 2016, as well as proposed conditions based on the WRA design. The model was run using the FEMA 100-year discharge, 8,330 cfs. 100-yr water surface elevations are presented in Table 2.

The existing conditions model developed by WRA predicts water surface elevations lower than those published by FEMA. This is likely due to the bank failure that occurred at the CHC property, which increased cross sectional area, and flow conveyance. Construction of Phase 2 is expected to increase water surface elevations upstream of the project by as much as 0.4 feet. Backwater effects of greater than 0.1 feet are expected to extend as far as 1,000 feet upstream of the project.

This area of San Francisquito Creek is in a FEMA Zone A (FEMA, 2019). Increases in 100-year water surface are generally acceptable in these zones, as long as there is no increase in flood risk. The 100-year flood is expected to be well below the top of bank in this area, and this minor increase in predicted water surface elevation will not result in damage to any insured properties (FEMA, 2014). Furthermore, both the existing condition modeling and proposed condition modeling show a backwater surface well below the FEMA 100-year backwater surface profile, which was based on the channel geometry before the bank failure.

6.2 Two-Dimensional Hydraulics

WRA developed a two-dimensional hydrodynamic model using US Army Corps of Engineers software HEC-RAS v. 5.0.6 to evaluate flow conditions at the site and identify suitable bank stabilization measures. Model geometry was created using the digital terrain model of existing conditions developed by Cotton Shires and Associates (CSA) for the Phase 1 project. A rectilinear mesh of 10 ft grid cells was created for the project area. The manning's roughness value used for the project area was a composite value of 0.043. The model was run using an adjustable time step controlled by the Courant condition and "full

momentum" solver in order to evaluate the distribution of flow velocity and shear within the project area. The use of the full momentum solver resulted in an increase in predicted water surface elevations, but only the official FEMA backwater profile will be used for defining the 100-yr floodplain. Model results will not be used to redefine flood insurance rate maps.

The hydraulic modeling for the 100-year event shows flow velocities to be over 8 feet per second and through the project area. The shear stress values range from 0.5 to 1.8 pounds per square foot. These hydraulic values are well within the parameters of stabilized streambank using rock slope protection and a live crib wall. The shear and velocity values indicate that rock toe protection with median particle diameter of at least 12 inches will be required.

A plan view of 10-year model results showing existing conditions and proposed condition velocity distribution is presented in Figure 4 and Figure 5, respectively. A plan view of model results showing existing conditions and proposed condition shear distribution is presented in Figure 6 and Figure 7, respectively. A section view of existing conditions velocity and shear across the channel near the middle of the project area is presented in Figure 8 and Figure 9, respectively. A section view of proposed conditions velocity and shear across the channel near the middle of the project area is presented in Figure 10 and Figure 11, respectively. A comparison of existing and proposed conditions of the terrain and water surface elevations for the 2-year, 10-year, and 100-year storm events is presented in Figure 12.

7. Crib Wall Description

WRA developed a live log crib wall design along the bank failure, incorporating feedback from 3rd party reviewers, the interagency review team, and Stanford University, the property owner. Crib walls have a natural aesthetic, provide immediate erosion protection, and support the establishment of woody plant species. This method has been found to be highly effective on the outside bend of streams where there are high velocities and where a wall is needed to stabilize the toe. Crib walls can have a slope of up to 0.25:1 (horizontal to vertical) and can withstand flows of up to 12 feet per second. No other "soft" bank stabilization measures meet those criteria. Boulder grade control will be required to prevent the channel from undercutting the crib wall.

The design calls for toe protection at the base of the slope using large boulders and cobbles. Additional rock is used as the foundation of the crib wall structure. The design involves stacking 1.5' diameter logs in a fashion similar to a log cabin but instead of building a vertical wall, this structure has a 1:1 slope. The first level of the crib wall uses tie-back logs, which are logs set into the bank, braced to absorb the impact of the streamflow. The first level of the crib wall also includes rootwads along the natural pool of the creek shown in Sheet C-3.0 of the drawings. These rootwads provide interstitial spaces for fish habitat. The second layer of the crib consists of two rows of logs parallel to the streamflow connecting the first layer of tie-back logs. Each log is pinned to the logs below using steel bolts, nuts, and washers to provide redundancy in structural loading. Helical anchors will be driven into the soil and connected to the crib wall to prevent the overall structure from moving laterally. The third layer of crib wall is similar to the first layer using tie-back logs and the fourth layer will match the second layer and so on. Live willow cuttings are inserted in the voids between logs to provide riparian habitat, reduce water velocities along the crib wall and grow complex root structures around the crib wall providing additional stability. Logs will be placed until the desired height of bank protection is achieved. The bank above the crib wall will be graded at a 2:1 slope from the top of the crib wall to the existing bank. Native riparian plantings will be installed and established to provide additional habitat value and soil stability. Non-planted areas will receive native riparian hydroseed targeted for the local ecosystem.

8. Next Steps

Once City and resource agency comments on the permit application package are received, additional design details will be defined prior to construction, including the final gradation of rock toe protection. A detailed force-balance analysis will be developed. Sizing calculations and gradations for varying rock types will be fine-tuned in conjunction with material available in nearby quarries.

Hydrodynamic modeling will be performed to evaluate the proposed crib all and grade control structures, and refine the design to ensure that it will be robust and not impact bank stability in neighboring properties. Additional documentation regarding the design, implementation and post-project success monitoring will be developed.

9. Tables

Table 1. Peak flow magnitudes for San Francisquito Creek

Recurrence Interval	Annual Exceedance Probability (%)	Discharge Magnitudes (cfs)	Reference
Winter Base Flow[1]	-	50	USGS Gage Site #11164500
Mean Annual Flood	100	811	Streamstats Site #11164500
2-yr	50	1,610	Streamstats Site #11164500
5-yr	20	3,100	Streamstats Site #11164500
10-yr	10	4,350	FIS Upstream of Middlefield Road
25-yr	4	5,610	Streamstats Site #11164500
50-yr	2	7,100	FIS Upstream of Middlefield Road
100-yr	1	8,330	FIS Upstream of Middlefield Road
200-yr	0.5	8,700	Streamstats Site #11164500
500-yr	0.2	9,850	FIS Upstream of Middlefield Road

[1]Winter Base Flow is based on historical data from the USGS Stream Gage

Table 2. 100-yr Water Surface Elevations for San Francisquito Creek (ft NAVD 88)

River Station	FEMA 2014 FIS	Existing Condition 1-D Model Results	Proposed Condition 1-D Model Results
(ft)	(ft)	(ft)	(ft)
31410	80.4	79.6	79.4
31509	80.7	80.1	80.1
31613	81.0	80.3	80.6

10. Figures

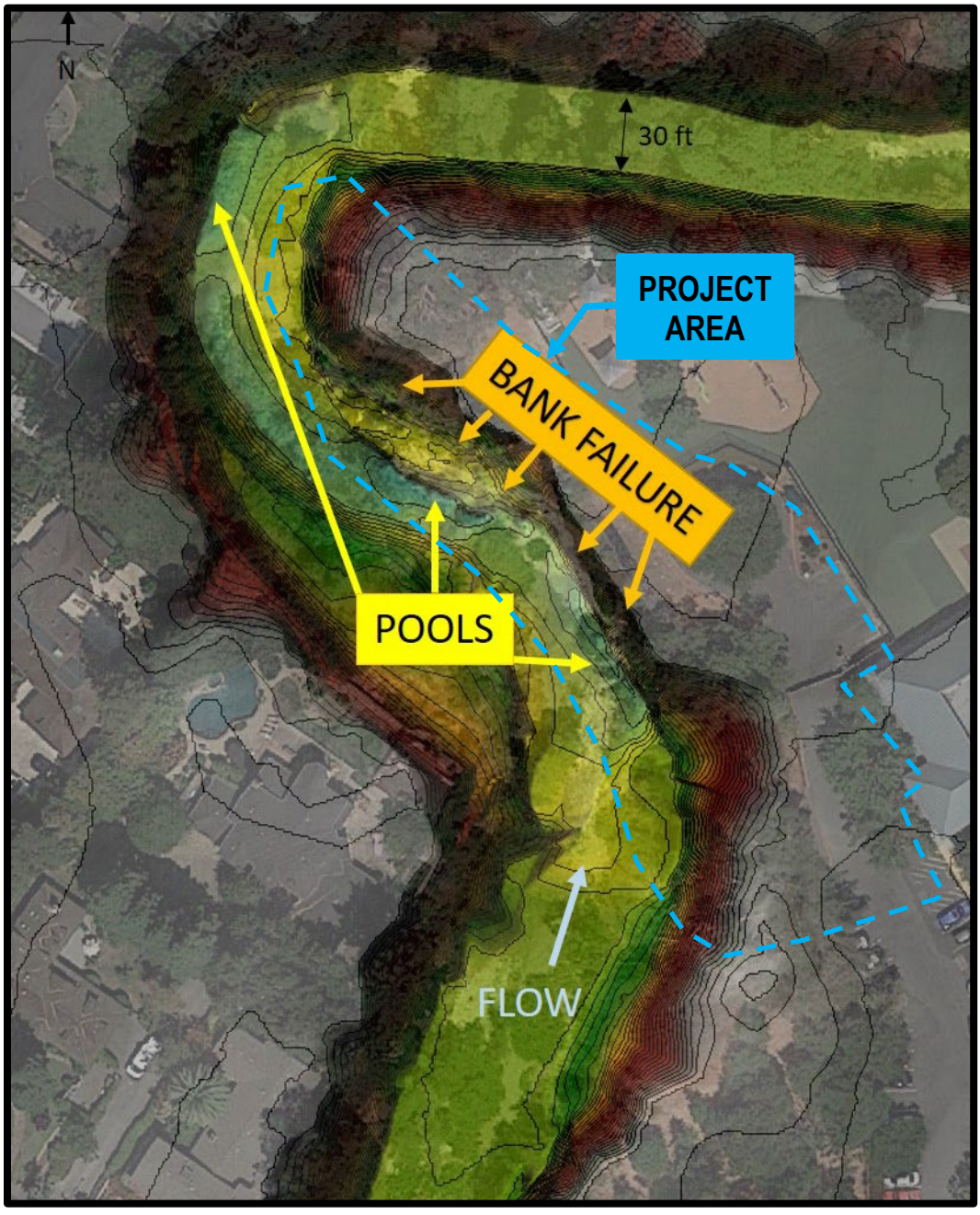

Figure 1. Aerial photograph overlain on topographic map showing bank failure and pools

Figure 2. Oblique view of project area as viewed from San Francisquito Creek, looking upstream

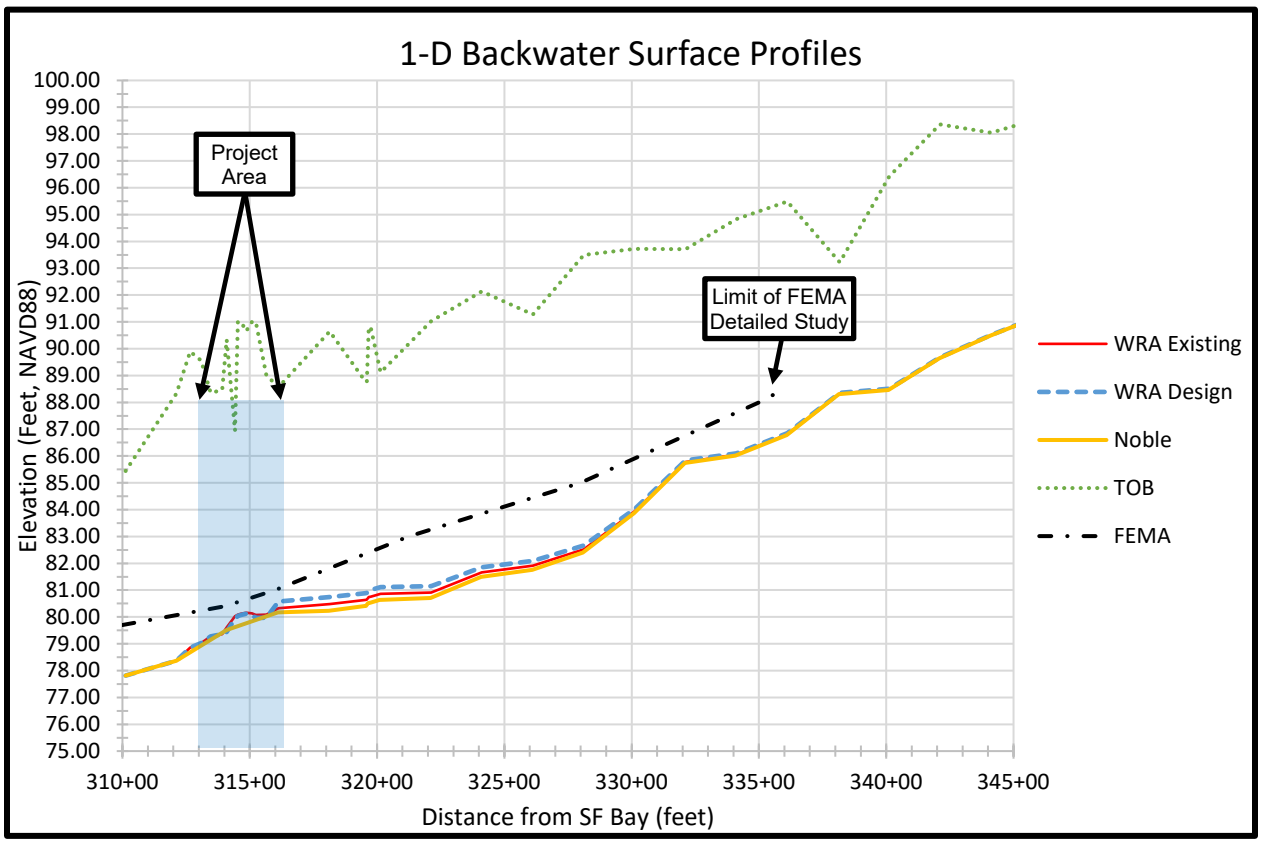

Figure 3. Backwater Surface Profiles from 1-D Modeling of 100-Year Storm Event

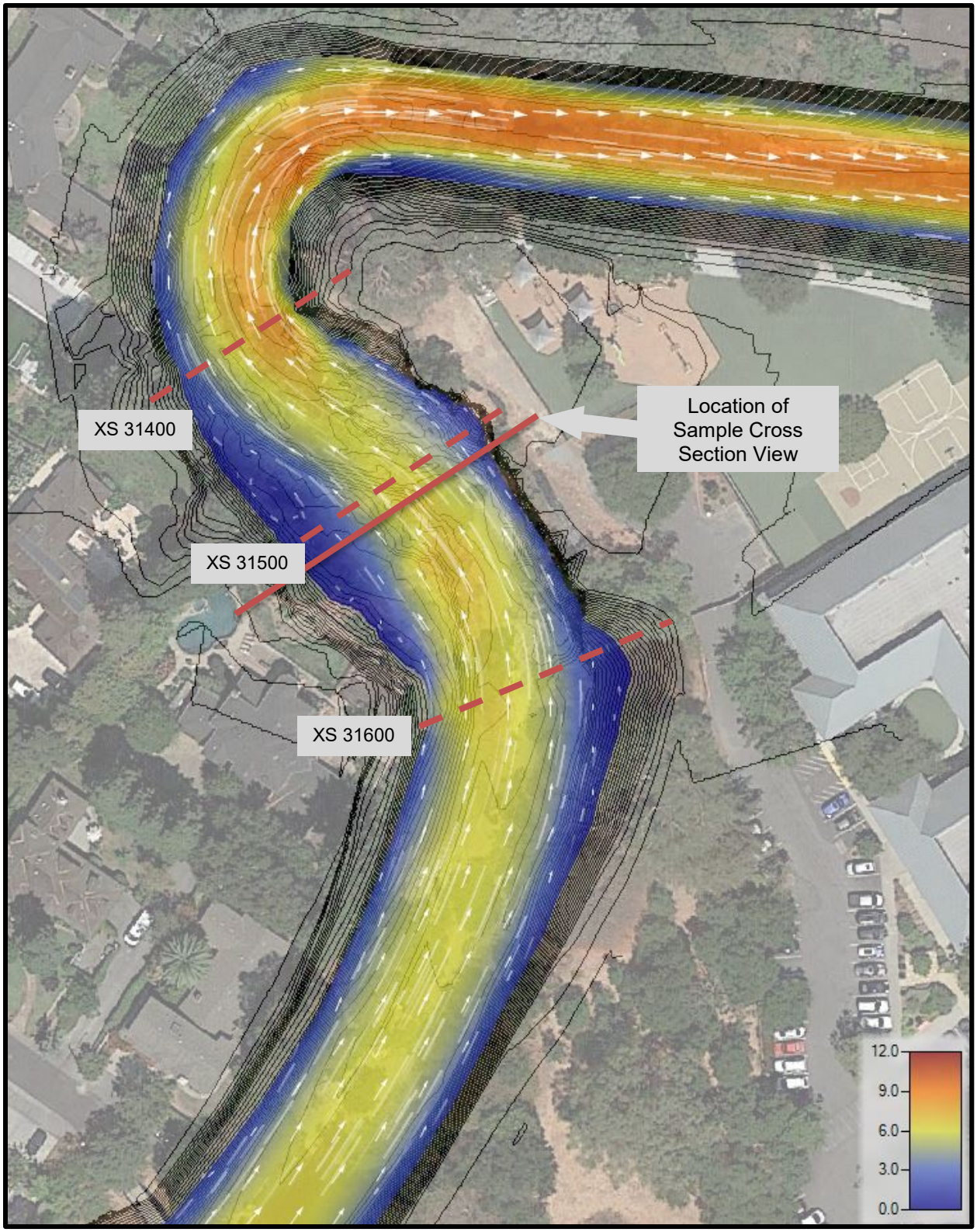

Figure 4 . Existing Conditions model of velocity (ft/s) for 10-year event

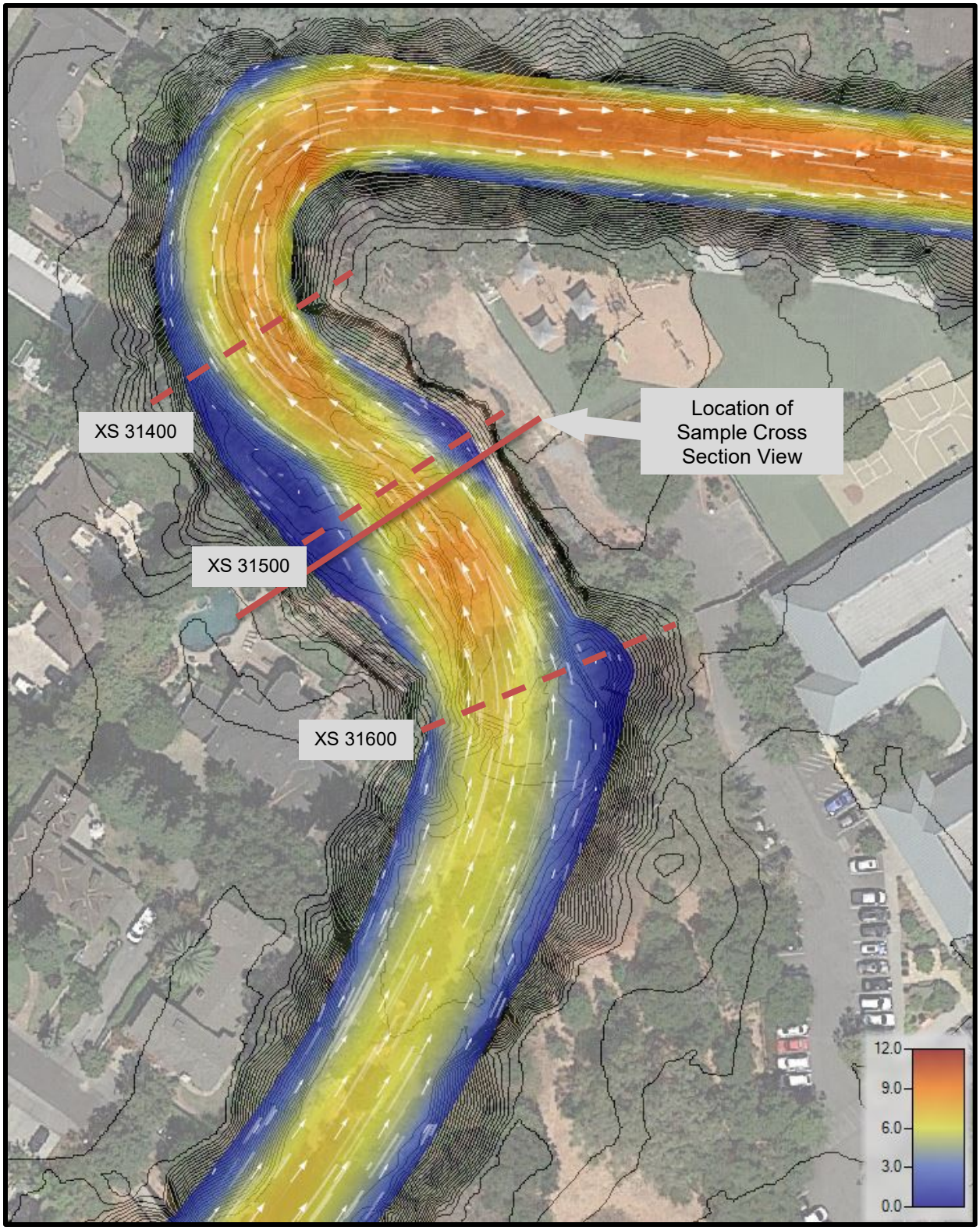

Figure 5 . Proposed Conditions model of velocity (ft/s) for 10-year event

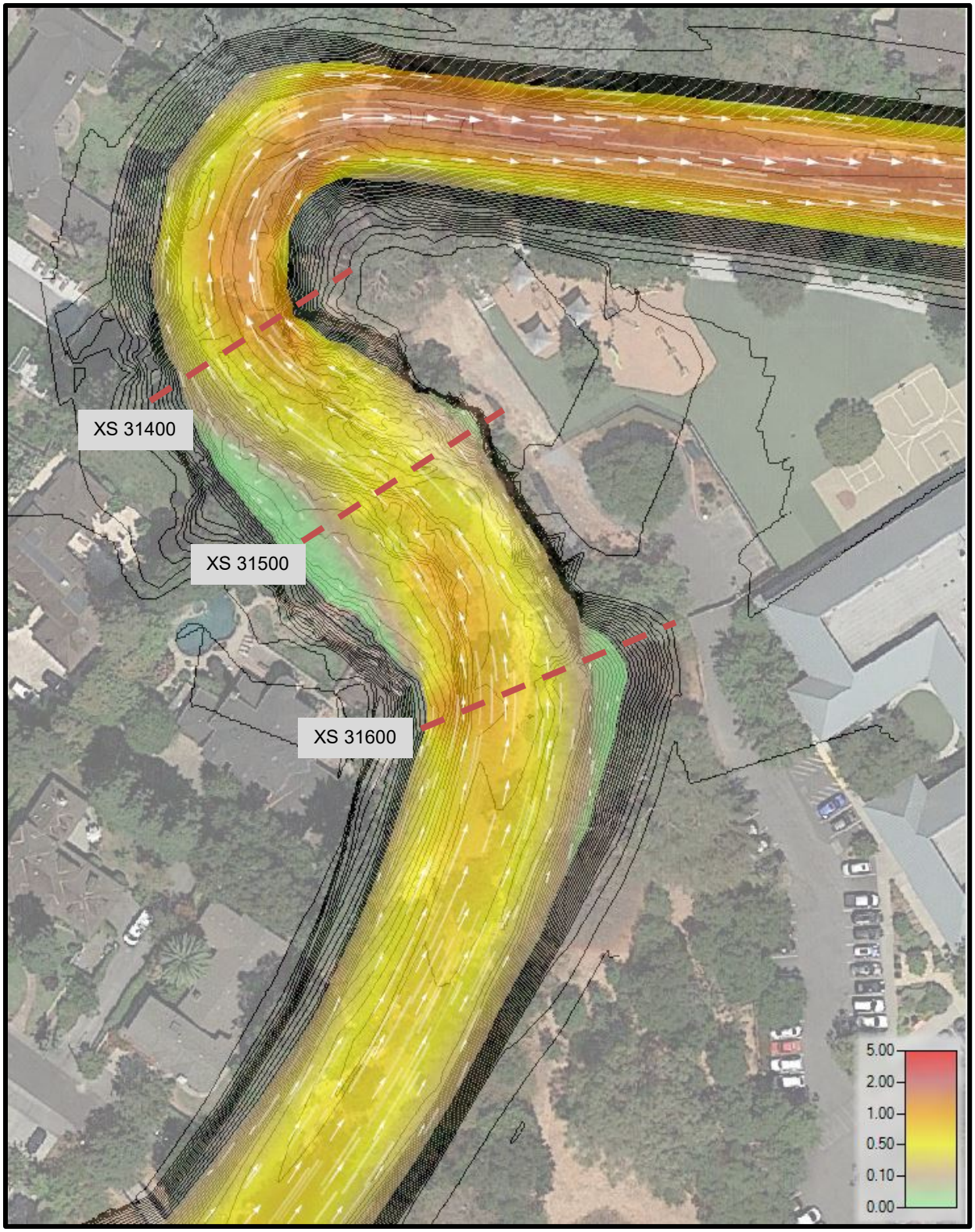

Figure 6 . Existing Conditions model of shear (lb/sf) for 10-year event

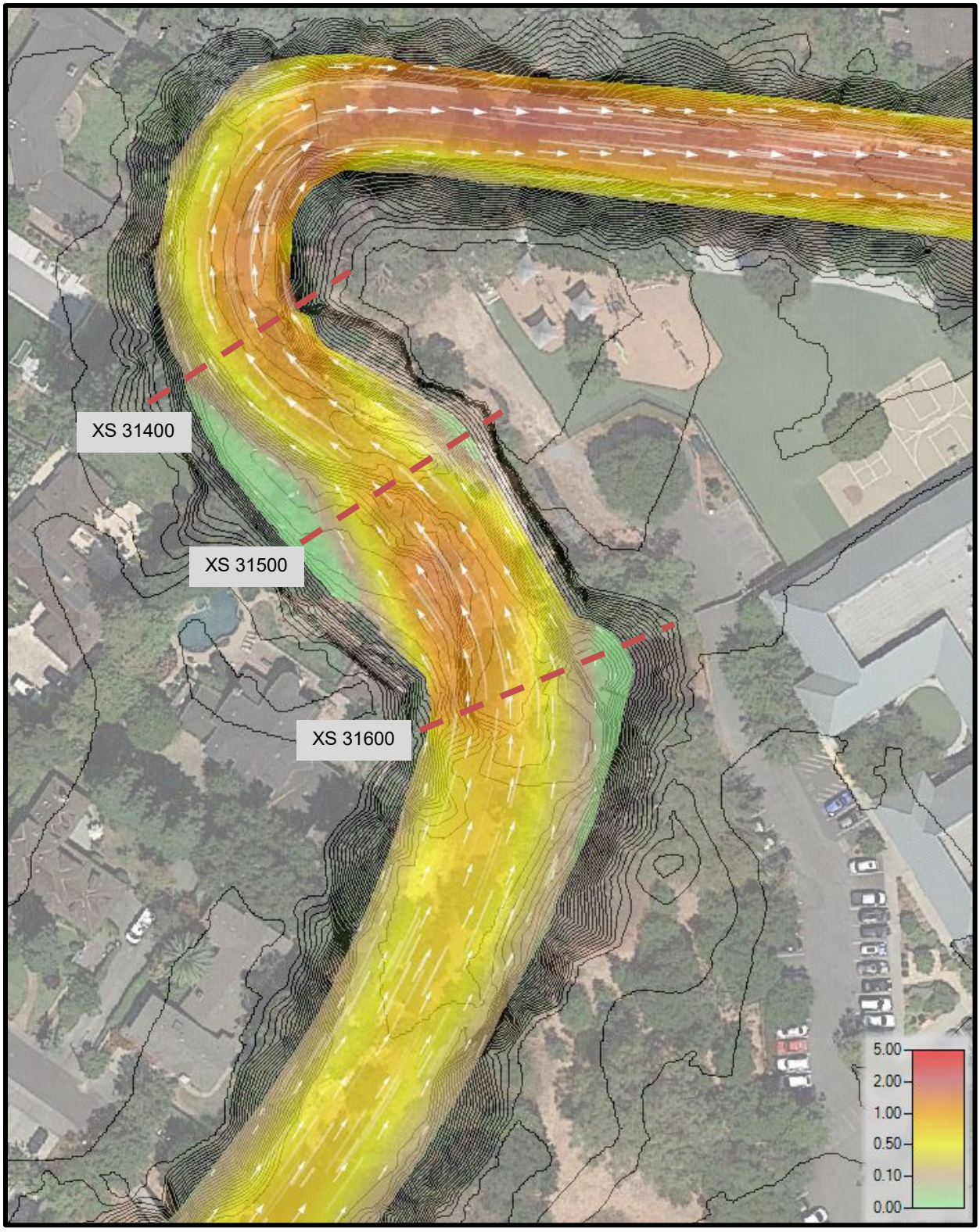

Figure 7 . Proposed Conditions model of shear (lb/sf) for 10-year event

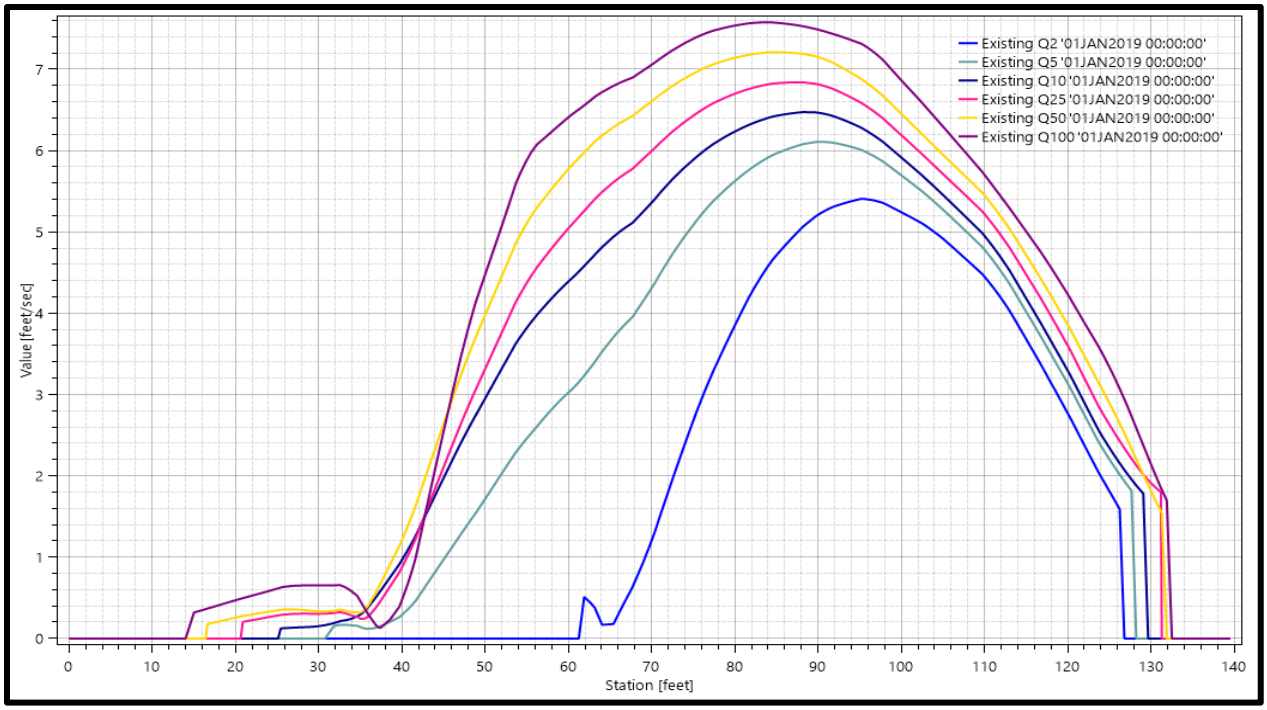

Figure 8. Existing Conditions model output showing velocity (ft/s) for 2-year to 100-year events at a sample cross section within the Project Area

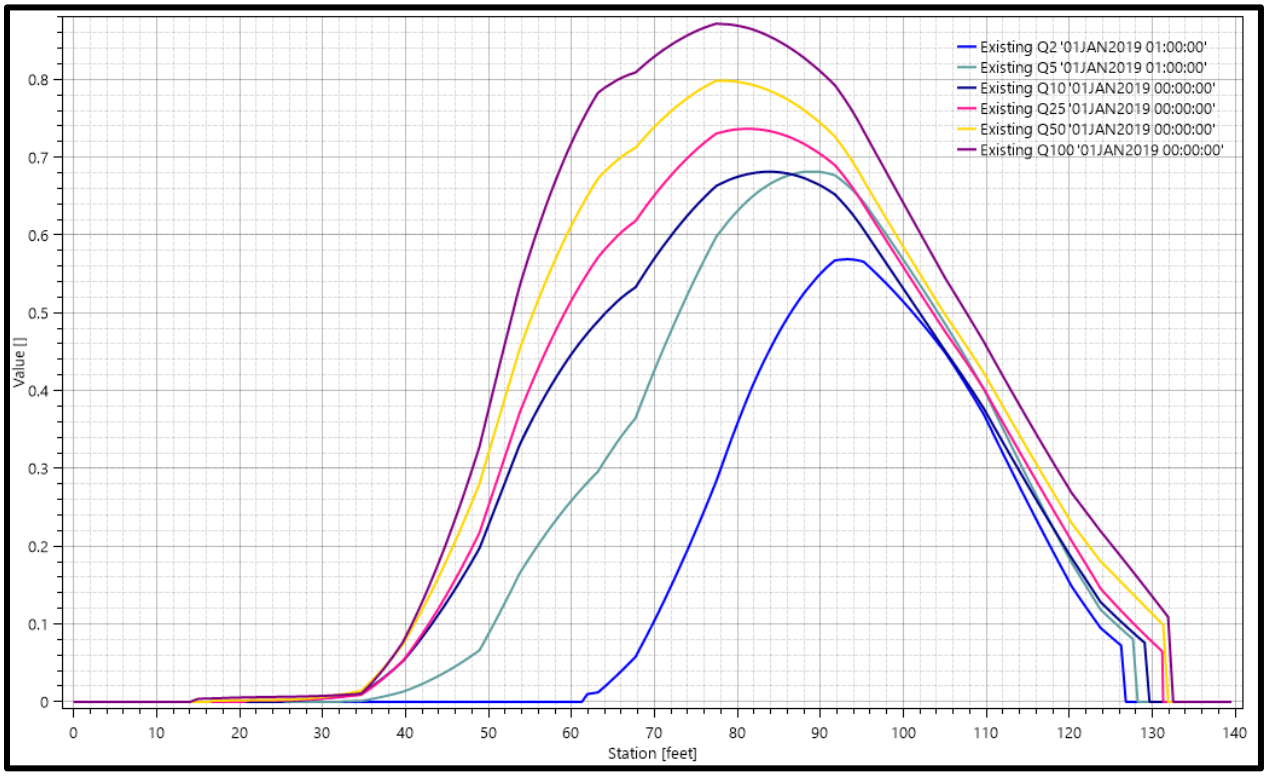

Figure 9. Existing Conditions model output showing shear stress (lb/sf) for 2-year to 100-year events at a sample cross section within Project Area

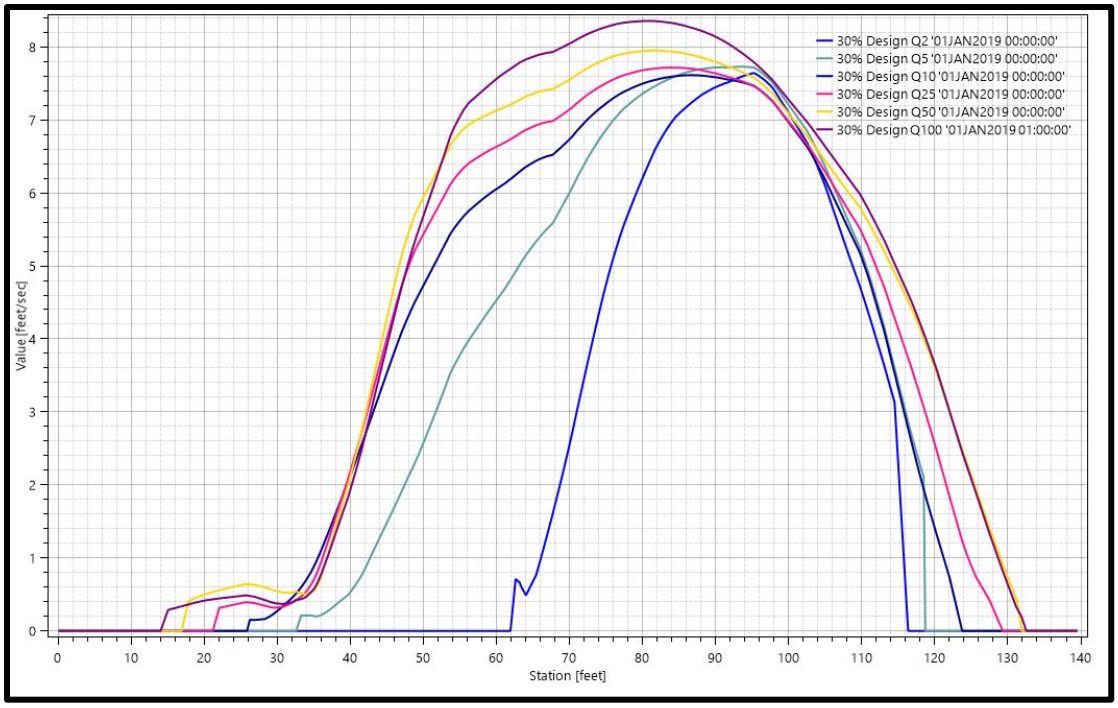

Figure 10. Proposed Conditions model output showing velocity (ft/s) for 2-year to 100-year events at a sample cross section within the Project Area

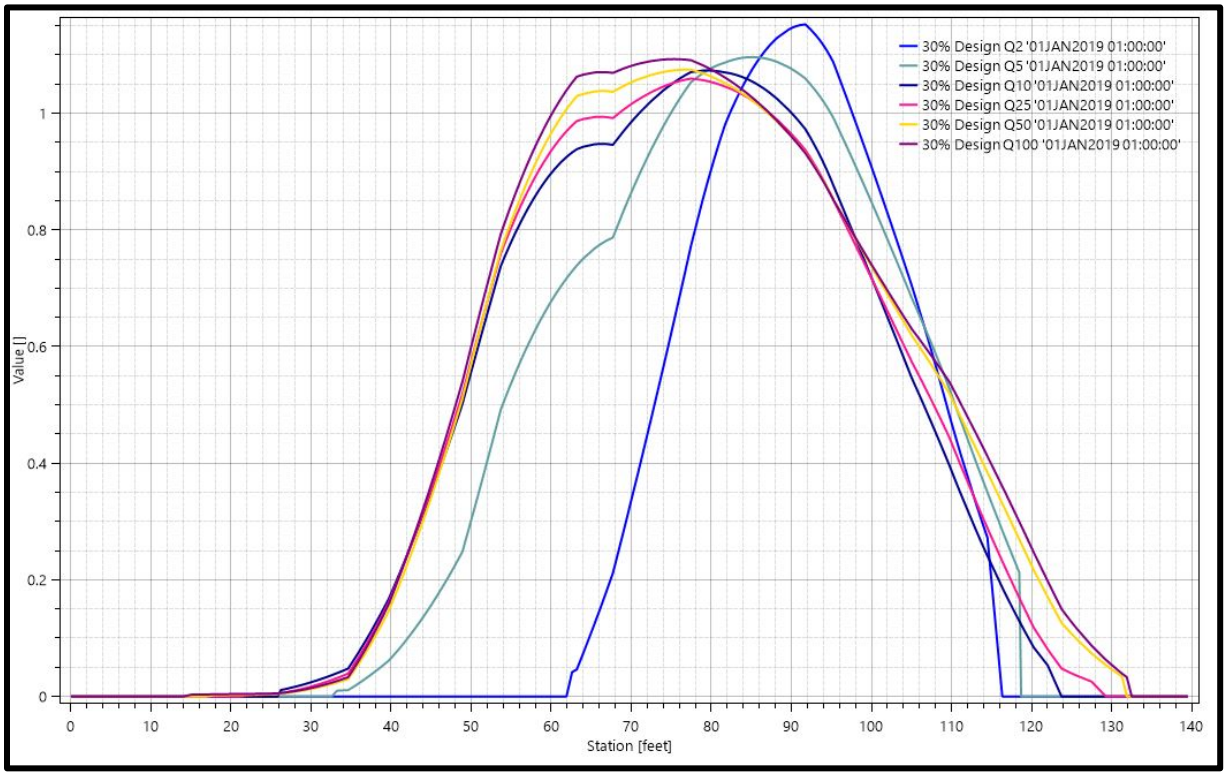

Figure 11. Proposed Conditions model output showing shear stress (lb/sf) for 2-year to 100-year events at a sample cross section within Project Area

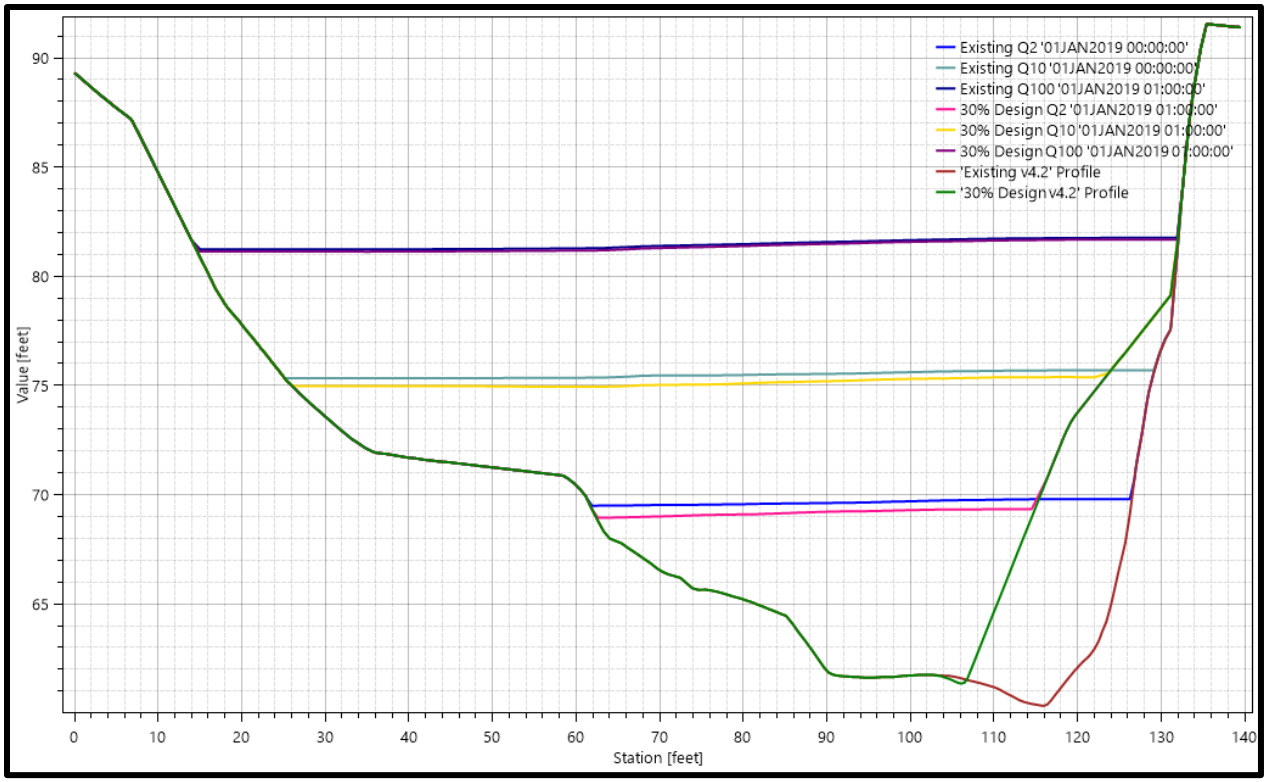

Figure 12. Comparison of Existing and Proposed terrain and Water surface elevations (feet) at sample cross section

References

CSA. (2017). Cotton Shires and Associates, Inc. *Children's Health Center Surveying and Engineering*. California, USA.

FEMA. (2014). *Flood Insurance Study, Santa Clara County and Incorporated Areas.* FEMA.

JPA. (2000, September). *San Francisquito Creek Bank Stabilization and Revegetation Master Plan.* Retrieved 2019, from City of Menlo Park: https://www.menlopark.org/207/Master-Plan-Report

Noble Consultants, Inc. (2010). *San Francisquito Creek Hydraulic Modeling and Floodplain Mapping.* San Francisco: US Army Corps of Engineers.

Philip Williams and Associates. (1998). *San Francisquito Creek Stabilization and Revegetation Master Plan.* Menlo Parl, Palo Alto, East Palo Alto: Cities of Menlo Park, Palo Alto, East Palo Alto; Counties of San Mateo and Santa Clara.

USGS. (2019, 7 2). *StreamStats Data-Collection Station Report #11164500*. Retrieved from usgs.gov: https://streamstatsags.cr.usgs.gov/gagepages/html/11164500.htm

Sections 404, and 401, and 1602 Regulatory Permit Application Package

SAN FRANCISQUITO CREEK
BANK STABILIZATION PROJECT: PHASE II
PALO ALTO, SANTA CLARA COUNTY, CALIFORNIA

Prepared For:
Children's Health Council
650 Clark Way
Palo Alto, California 94304

Contact:
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clarke@wra-ca.com

WRA Project: 27109

Date: July 2020

ENVIRONMENTAL CONSULTANTS

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List of Preparers

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Regulatory Permit Application Package Contents

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Part 1. U.S. Army Corps of Engineers Application for Section 404 Nationwide Permit 13

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U.S. Army Corps of Engineers
South Pacific Division

Nationwide Permit Pre-Construction Notification (PCN)

This form integrates requirements of the U.S. Army Corps of Engineers (Corps) Nationwide Permit Program within the South Pacific Division (SPD). Boxes 1-10 must be completed to include all information required by General Condition 32. Box 11 (or other sufficient information to show compliance with all General Conditions) must be completed for activities in Arizona, California, Nevada, and Utah, and is recommended for activities in Colorado and New Mexico. If additional space is needed, please provide as a separate attachment. Please refer to the *Instructions for the South Pacific Division Nationwide Permit Pre-Construction Notification (PCN)* (Instructions) for instructions for completing the PCN, as well as additional information on the attachments and tables included with this PCN that may be used.

0. To be filled by the Corps

Application Number:	Date Received:	Date Complete:

1. Prospective Permittee and Agent Name and Addresses (see Instructions)

a. Prospective Permittee

First - Mr. Terry Middle - _____ Last - Boyle

Company - Children's Health Council Email Address - tboyle@chconline.org

Address - 650 Clark Way City - Palo Alto State - CA Zip - 94304

Phone (Residence/Mobile) - _____ Phone (Business) - (650) 688-3602

b. Agent (if applicable)

First - Ms. Bianca Middle - _____ Last - Clarke

Company - WRA, Inc. Email Address - clarke@wra-ca.com

Address - 2169-G East Francisco Blvd City - San Rafael State - CA Zip - 94901

Phone (Residence/Mobile) - _____ Phone (Business) - (415) 524-7255

c. Statement of Authorization: I hereby authorize Bianca Clarke, WRA Inc., to act in my behalf as my agent for the proposed activity. (Optional, see instructions)

_____ 07/06/2020

Signature of Applicant Date

2. Name and Location of the Proposed Activity (see Instructions)

☐ The proposed work would involve multiple-single and complete projects. See attachment for the information required in Boxes 2 through 10, and 11, if applicable.

a. Project Name or Title:	**b. County, State:**
Children's Health Council Creek Bank Stabilization	Santa Clara, California

c. Name of Waterbody: San Francisquito Creek; HUC_8 Coyote (#18050003); direct flow to San Francisco Bay

d. Coordinates:

☐ Unknown (please provide other location descriptions below)

Latitude - 37.440753 Longitude - -122.17952

e. Other Location Description (optional, see instructions):

The Project Area is located along the east bank of San Francisquito Creek in the northwestern portion of the Children's Health Council campus located at 650 Clark Way (APN 142-02-020), in Palo Alto, Santa Clara County, California. The Project Area is approximately 0.70 miles upstream from Route 82 (El Camino Real).

f. Driving Directions to the site (optional, see instructions):

From San Francisco, head south on Interstate 280 for approximately 30 miles, take exist 24 for Sand Hill Road toward Menlo Park, follow signs for Sand Hill Road and continue on for approximately 3 miles, turn left at Clark Way. Clark Way terminates in a parking lot; the Project Area is northwest of the CHC parking lot.

3. Specific NWP(s) you want to use to authorize the proposed activity (see Instructions)

Nationwide Permit 13 - Bank Stabilization

4. Description of the Proposed Activity (see Instructions)

a. Complete description of the Proposed Activity:

The Applicant proposes to rebuild and stabilize approximately 275 linear feet of eroding stream bank, and enhance stream and riparian habitat, along San Francisquito Creek, located in Palo Alto, Santa Clara County, California. The proposed bioengineered crib wall is positioned at the forefront of ongoing erosion of the eastern creek bank, with a variety of native riparian vegetation plantings planned within and above the crib wall to improve habitat for fish, birds and other species. The Project will construct a live log crib wall supported by a geoengineered foundation on the east bank of the creek. The crib wall foundation consists of large boulders, cobble alluvium, and rootwads secured together and embedded within the bank. The crib wall structure consists of wooden logs and will be anchored to the foundation and existing bank with support anchors and rooted vegetation. No bank stabilization work will occur on the west bank. Project work is scheduled to commence in May 1, 2021 and be completed by October 30, 2021, thus minimizing impacts to aquatic species and habitat.

For a complete description of proposed activities, please refer to Section 4 Supplemental Information.

b. Purpose of the Proposed Activity:

The purpose of the project is to rebuild and stabilize slopes, and enhance stream and riparian habitat, along San Francisquito Creek. The Project is mandated by the City of Palo Alto based on comments received from the Santa Clara Valley Water District and San Francisquito Creek Joint Powers Authority.

c. Direct and indirect adverse environmental effects the activity would cause, including the anticipated amount of loss of wetlands and other waters of the U.S. expected to result from the NWP(s) activity:

Construction activities will disturb a total of approximately 0.14 acres of stream area below OHWM within San Francisquito Creek and includes the excavation of 1,080 cubic yards of artificial and native alluvium, grading, and placement of approximately 1,450 cubic yards of boulder/cobble, woody material, and engineered fill in the stream area. No loss of stream area below OHWM will occur as a result of proposed activities. In addition, vegetation clearing and placement of clean fill material is necessary for the purpose of constructing a temporary access route to access the Project Area. Work for the access route will temporarily disturb 0.02 acres below OHWM and includes placement of 158 cubic yards of clean fill material. Riparian vegetation removal will disturb 0.06 acre below TOB and entail the removal of six trees; three coast live oak (Tree #742, #996, and #997), two California buckeyes (Tree # 746 and #991), and one red willow (Tree #987). All trees to be removed are located on the east

For a complete description of project impacts, please refer to part 4. Supplemental Information.

d. Description of any proposed mitigation measures intended to reduce the adverse environmental effects caused by the proposed activity:

The Project is self-mitigating by nature. The project will result in a greater quality of potentially jurisdictional habitat than what is currently present. Disturbed vegetated riparian habitat within the Project Area will be restored with native riparian plantings, which will further stabilize and enhance the ecological functions and values that the removed riparian trees provided to San Francisquito Creek. The enhanced riparian habitat will be of higher quality to the stream corridor, as the banks will be stabilized and tree composition will be more native and diverse. As such, no additional on- or off-site mitigation is proposed.

e. Any other NWP(s), Regional/Programmatic General Permit(s) or Individual Permit(s) used or intended to be used to authorize any part of the proposed activity or any related activity:

None

f. Have sketches been provided containing sufficient detail to provide an illustrative description of the proposed activity?

☒ Yes, Attached ☐ No

☐ N/A; The activity is located in the Los Angeles District boundaries of Arizona and California, See Attachment 1

☒ N/A, The activity is located in the San Francisco District boundaries of California, See Attachment 2

☐ N/A, The activity is located in the Sacramento District boundaries of California, Nevada, or Utah, See Attachment 3

5. Aquatic Resource Delineation (see Instructions)

a. Has a delineation of aquatic resources been conducted in accordance with the current method required by the Corps? ☒ Yes ☐ No

If yes, please attach a copy of the delineation

Note: If no, your PCN is not complete. In accordance with General Condition 32, you may request the Corps delineate the special aquatic sites and other waters on the project site, but there may be a delay. In addition, the PCN will not be considered complete until the delineation has either been submitted to or completed by the Corps, as appropriate.

b. If a delineation has been submitted, would you like the Corps to conduct a jurisdictional determination (preliminary or approved)? ☐ Yes ☒ No

If yes, please complete, sign and return the attached *Appendix 1 – Request for Corps Jurisdictional Determination (JD)* sheet or provide a separate attachment with the information identified in Appendix 1.

6. Compensatory Mitigation (see Instructions)

a. Will the proposed activity result in the loss of greater than 1/10-acre of wetlands? ☐ Yes ☒ No

If yes, describe how you propose to compensate for the loss of each type of wetland:

No wetlands are located within the Project Area.

Note: for the loss of less than 1/10 acre of wetlands, or if no compensatory mitigation is proposed, the Corps may determine on a case-by-case basis that compensatory mitigation is required to ensure that the activity results in only minimal adverse environmental effects.

b. Will the proposed activity result in the loss of streams or other open waters of the U.S.? ☐ Yes ☒ No

If yes, provide a description of any proposed compensatory mitigation for the loss of each type of stream or other open water:

The project will result in not result in any loss to stream or open water habitat. The bioengineered crib wall will be built within the stream banks and will not impeded or reduce any stream function.

Note: if no compensatory mitigation is proposed, the Corps may determine on a case-by-case basis that compensatory mitigation is required to ensure that the activity results in no more than minimal adverse environmental effects.

7. Endangered Species Act (ESA) Compliance (see Instructions)

a. For non-Federal permittees (if Federal permittee, check N/A and skip to 7(d))**:** ☐ N/A

(1) Is there any Federally-listed endangered or threatened species or critical habitat that might be affected or is in the vicinity of the activity? ☒ Yes ☐ No

(2) Is the activity located in designated critical habitat for Federally-listed endangered or threatened species? ☒ Yes ☐ No

If yes to either (1) or (2), include the name(s) of those endangered or threatened species that might be affected by the proposed activity or might utilize the designated critical habitat that might be affected by the proposed activity:

1. Steelhead Central California Coast DPS
2.
3. California red-legged frog
4.
5.
6.

If no to both (1) and (2), proceed to Box 8.

Note: If yes to either (1) or (2), note per General Condition 18(c), you shall not begin work on the activity until notified by the Corps that the requirements of the ESA have been satisfied and that the activity is authorized.

b. Has information sufficient to initiate consultation with the U.S. Fish and Wildlife Service/National Marine Fisheries Service for compliance with Section 7 of the ESA been prepared? ☒ Yes ☐ No

If yes, please attach a copy of the information.

c. Additional information you wish to provide regarding compliance with the ESA, if applicable:

For additional information pertaining to ESA compliance, please refer to Part 10 Section 7 Biological Assessment.

d. For Federal permittees, you must provide documentation demonstrating compliance with ESA as a separate attachment.

8. Historic Properties (see Instructions)

a. For non-Federal permittees (if Federal permittee, check N/A and skip to 7(d))**:** ☐ N/A

(1) Is there a known historic property listed on, determined to be eligible for listing on, or potentially eligible for listing on, the National Register of Historic Places that the NWP may have the potential to affect? ☒ Yes ☐ No

If yes to (1), state which historic property may have the potential to be affected by the proposed activity:

1. CA-SCL-613 (P-43-000608)
2.
3.
4.
5.
6.

OR

☐ A vicinity map indicating the location of the historic property is enclosed

(2) If no to (1), describe the potential for the proposed work to affect a previously unidentified historic property:

Note: If yes to (1), note per General Condition 20(c), you shall not begin the activity until notified by the Corps that the activity has no potential to cause effects or that consultation under Section 106 of the National Historic Preservation Act (NHPA) has been completed.

b. Has information sufficient to initiate consultation with the State Historic Preservation Officer/Tribal Preservation Officer for compliance with Section 106 of the National Historic Preservation Act (NHPA) been prepared?

☒ Yes ☐ No

If yes, please attach a copy of the information.

c. Additional information you wish to provide regarding compliance with the NHPA, if applicable:

A Cultural Resources Report documenting information on cultural and historic properties is included in Part 17.

d. For Federal permittees, you must provide documentation demonstrating compliance with NHPA in a separate attachment.

9. National Wild and Scenic Rivers (see Instructions)

a. Will the proposed activity(s) occur in a component of the National Wild and Scenic River System or a river officially designated by Congress as a "Study River" for possible inclusion in the system while the river is in an official study status?

☐ Yes, in a component of a National Wild and Scenic River System; ☐ Yes, in a "study" river ☒ No

If yes, identify the Wild and Scenic River or the "study river"

N/A

Note: per General Condition 16(b), you shall not begin the NWP activity until notified by the Corps that the Federal agency with direct management responsibility for that river has determined in writing that the proposed NWP activity will not adversely affect the Wild and Scenic River designation or study status. If you have received written notification from the Federal agency, please attach the correspondence.

10. Section 408 Permissions (see Instructions)

a. Will the NWP also require permissions from the Corps pursuant to 33 U.S.C. 408 because it will alter or temporarily or permanently occupy or use a Corps federally authorized Civil Works project? ☐ Yes ☒ No

If yes, have you received Section 408 permission to alter, occupy, or use the Corps project? ☐ Yes ☐ No

If yes, please attach the Section 408 permission

If yes, note per General Condition 31, an activity that requires Section 408 permission is not authorized by NWP until the Corps issues the Section 408 permission to alter, occupy, or use the Corps project, and the Corps issues a written NWP verification.

11. Compliance with NWP General Conditions (see Instructions)		
Check	**General Condition**	**Rationale for Compliance with General Condition**
☒	1. Navigation	No impacts to navigation would occur.
☒	2. Aquatic Life Movements	Project work is scheduled to commence May 1, 2021 and be completed by October 30, 2021, during the dry season, thus minimizing disturbance to aquatic species, habitat and water quality. See Part 14 (Dewatering Plan) and Part 15 (Fish Relocation Plan) for further details to protect aquatic life movement.
☒	3. Spawning Areas	Work would be conducted during the dry season and outside of spawning season for steelhead. Construction of the live log crib wall will enhance and support critical steelhead habitat.
☒	4. Migratory Bird Breeding Areas	Project activities will occur during the nesting bird season (February 1 - August 31). A nesting bird survey will be conducted prior to any vegetation removal or ground disturbance.
☒	5. Shellfish Beds	No concentrated shellfish populations are present in the Project Area.
☒	6. Suitable Material	No unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.) would be used for construction.

☒	7. Water Supply Intakes	No public water supply intakes occur in the Project Area.
☒	8. Adverse Effects from Impoundments	The Project is anticipated to occur during the dry season with little to no flow within the creek. If water impoundment is required, the Project would result in only a temporary impoundment of water or acceleration of water due to the use of a water bypass. A Fish Relocation Plan (Part 15) and Dewatering Plan (Part 16) has been developed to protect aquatic life movement.
☒	9. Management of Water Flows	Water flows would remain unchanged and not restrict or impede the passage of normal or high flows. The proposed bioengineered crib wall will enhance the creek condition and allow the creek to function without further erosion which could destabilize the creek bank.
☒	10. Fills Within 100-Year Floodplains	The Project would comply with applicable FEMA-approved state and local floodplain management requirements.
☒	11. Equipment	See Part 4. Supplemental Information for a list of avoidance and minimization measures that would be incorporated to minimize soil disturbance from construction equipment.
☒	12. Soil Erosion and Sediment Controls	See Part 4. Supplemental Information for a list of avoidance and minimization measures and best management practices that would address soil erosion and sediment control.

☒	13. Removal of Temporary Fills	Temporary fills would be removed in their entirety and affected areas returned to pre-construction elevations.
☒	14. Proper Maintenance	All structures and fill would be properly maintained.
☒	15. Single and Complete Project	The Project would be a single and complete project.
☒	16. Wild and Scenic Rivers	The Project does not occur in a Wild and Scenic River.
☒	17. Tribal Rights	Sensitive cultural resources have been documented on site. A Cultural Resources Assessment Report documenting known sensitive tribal resources is included in Part 17.
☒	18. Endangered Species	See Box 7 above.
☒	19. Migratory Bird and Bald and Golden Eagle Permits	The Project complies with the Migratory Bird Treaty Act and Bald Eagle and Golden Eagle Protection Act. Any work performed during the nesting season will require pre-construction surveys. See avoidance and minimization measures (Section 4) and mitigation measures (Section 5) of Part 4 Supplement Information for additional details.

☒	20. Historic Properties	See Box 8 above.
☒	21. Discovery of Previously Unknown Remains and Artifacts	A Cultural Resources Report documenting information on cultural and historic properties is included in Part 17.
☒	22. Designated Critical Resource Waters	No Critical Resource Waters are in the Project Area.
☒	23. Mitigation	See Boxes 4(d) and 6 above.
☒	24. Safety of Impoundment Structures	No impoundment structures are in the Project Area.
☒	25. Water Quality, including status of Section 401 Water Quality Certification	A Section 401 Water Quality Certification is being submitted concurrently (see Part 2. Regional Water Quality Control Board Application for Section 401 Water Quality Certification).
☒	26. Coastal Zone Management, including status of CZM Consistency Certification from the State of California (for projects in or affecting the Coastal Zone)	The Project does not occur in the coastal zone.

☒	27. Regional and Case-by-Case Conditions	The Project would comply with regional and case-by-case conditions.
☒	28. Use of Multiple Nationwide Permits	The Project would be solely authorized by NWP 13.
☒	29. Transfer of Nationwide Permit Verifications	The Project would not require a transfer of Nationwide Permit Verifications.
☒	30. Compliance Certification	The Applicant would provide a signed certification documenting completion of the authorized activity after completion of the Project.
☒	31. Activities Affecting Structures or Works Built by the United States	See Box 10 above.
☒	32. Pre-Construction Notification	The Project would comply with pre-construction notification requirements

U.S. Army Corps of Engineers

San Francisco District

Attachment 2: Additional PCN Requirements for San Francisco District

This attachment contains additional information required to be submitted with the PCN for proposed activities within the San Francisco District. You must submit the completed attachment, or other attachment containing the required information, for a complete PCN, per San Francisco District Regional Condition A(1). For multiple single and complete projects, provide the information identified below for each single and complete project. If additional space is needed, provide as an attachment to the form, and please reference each section accordingly.

1. Form of PCN (Regional Condition A(1))

Have you submitted a completed South Pacific Division PCN Checklist or an application form (ENG Form 4345) with an attachment providing information on compliance with all of the General and Regional Conditions?

☒ Yes, see attached ☐ No

Note: If you check no, your PCN will be considered incomplete.

2. Avoidance and Minimization (Regional Condition A(1)(a))

Written statement describing how the activity has been designed to avoid and minimize adverse effects, both temporary and permanent, to waters of the U.S.:

The Project was designed to require the least amount of fill as feasible and is concentrated solely within the area where erosion is occurring. In addition, Project construction activities are proposed to occur during the dry season (May 1 to October 30) to minimize potential impacts to fish.

See Part 4. Section 4.4 for a comprehensive list of avoidance and minimization measures that would be incorporated into the Project to minimize temporary and permanent adverse effects to waters of the U.S.

3. Drawings (Regional Condition A(1)(b))

The following drawings are enclosed:

☒ Plan-View drawing clearly depicting the location, size and dimensions of the proposed activity, as well as the location of delineated waters of the U.S. on the site

☒ Cross-Section view drawings clearly depicting the location, size and dimensions of the proposed activity, as well as the location of delineated waters of the U.S. on the Site

The plan-view and cross-section view drawings contain the following

Title block: ☒ Yes ☐ No

Legend and scale: ☒ Yes ☐ No

Amount (in cubic yards) of fill in Corps jurisdiction (including permanent and temporary fills/structures): ☒ Yes ☐ No

Area (in acres) of fill in Corps jurisdiction (including permanent and temporary fill structures): ☒ Yes ☐ No

The ordinary high water mark (non-tidal waters) or mean high water mark and high tide line (tidal waters) shown in feet based on National Geodetic Vertical Datum (NGVD) or other appropriate reference elevation: ☒ Yes ☐ No

Do all drawings follow the South Pacific Division February 2016, *Updated Map and Drawing Standards for the South Pacific Division Regulatory Program*, or most recent update ☒ Yes ☐ No

If no, describe why this requirement is proposed to be waived):

N/A

4. Photographs (Regional Condition A(1)(c))

Have you enclosed numbered and dated pre-project color photographs showing a representative sample of waters proposed to be impacted on the site, and all waters of the U.S. proposed to be avoided on and immediately adjacent to the project site?

☒ Yes ☐ No

Is the compass angle and position of each photograph identified on the plan-view drawing(s) identified in Box 3?

☒ Yes ☐ No

5. Essential Fish Habitat (EFH) (Regional Condition A(2))

☐ **N/A. The proposed activity will not occur in areas designated as EFH.** (skip to Box 6)

☒ **The proposed activity will occur in areas designated as EFH and an EFH assessment and extent of proposed impacts to EFH is enclosed.**

6. Waiver of linear foot limitations (Regional Condition A(7))

(for NWPs 13, 21, 29, 39, 40, 42, 43, 44, 50, 51, 52, and 54)

☒ **The proposed activity would not require a waiver of the linear foot limitations for NWPs 13, 21, 29, 39, 40, 42, 43, 44, 50, 51, 52, or 54.** (skip to Box 7)

a. A narrative description of the stream (including known information on: volume and duration of flow; the approximate length, width, and depth of the waterbody and characteristics observed associated with an Ordinary High Water Mark (e.g. bed and bank, wrack line or scour marks); a description of the adjacent vegetation community and a statement regarding the wetland status of the adjacent areas (i.e. wetland, non-wetland); surrounding land use; water quality; issues related to cumulative impacts in the watershed, and; any other relevant information)**:**

N/A

b. Analysis of the proposed impacts to the waterbody, in accordance with General Condition 32 and Regional Condition B(1):

N/A

c. Measures taken to avoid and minimize losses to waters of the U.S., including other methods of constructing the proposed activity(s):

N/A

d. A compensatory mitigation plan describing how the unavoidable losses are proposed to be offset, in accordance with 33 CFR § 332:

N/A

7. Activities in the San Francisco Bay diked baylands (Regional Condition B(1))

☒ **The proposed activity would not take place in waters or wetlands of the U.S. that are within the San Francisco Bay diked baylands.** (skip to Box 8)

☐ **The proposed activity would take place in waters or wetlands of the U.S. that are within the San Francisco Bay diked baylands.**

Information on how avoidance and minimization of waters or wetlands are taken into consideration to the maximum extent practicable:

N/A

8. Activities in the Santa Rosa Plain (Regional Condition B(2))

☒ **The proposed activity would not take place in waters or wetlands of the U.S. that are within the Santa Rosa Plain.** (skip to Box 9)

☐ **The proposed activity would take place in waters or wetlands of the U.S. that are within the Santa Rosa Plain:**

Information on how avoidance and minimization of waters or wetlands are taken into consideration to the maximum extent practicable:

N/A

9. Activities in Eelgrass Beds (Regional Condition B(3))

☒ **The proposed activity would not take place within or adjacent to Eelgrass Beds.** (skip to Box 10)

☐ **The proposed activity would take place within in adjacent to Eelgrass Beds:**

Extent of the proposed impacts to Eelgrass Beds:

N/A

The following documents are enclosed:

☐ Compensatory Mitigation Plan

☐ Habitat Assessment

10. Nationwide Permit 3 Activities (Regional Conditions C(3))

☒ **The proposed activity would not involve maintenance activities under Nationwide Permit 3.** (skip to Box 11)

a. Excavation equipment in waters of the U.S.

☐ **All excavation equipment associated with the NWP 3 activity will occur from an upland site** (select and Skip to Box 11(b))

☐ The excavation equipment will work from the top of the bank

☐ The excavation equipment will work from road bed of a bridge or culverted crossing

☐ The excavation equipment will work from:

☐ **Excavation equipment will be used within waters of the U.S.**

Explanation as to the need to place excavation equipment in waters of the U.S.:

N/A

Statement of any additional necessary fill (e.g. cofferdams, access road, fill below the ordinary high water mark for a staging area, etc.):

N/A

b. Activities in special aquatic sites

☐ **The proposed maintenance activity would not occur in a special aquatic site.** (skip to Box 12)

☐ **The proposed maintenance activity would occur in a special aquatic site.**

Explanation of why the special aquatic site cannot be avoided:

N/A

Measures to be taken to minimize impacts to the special aquatic site:

N/A

11. Nationwide Permit 11 Activities (Regional Condition C(11))

☒ **The proposed activity would not involve temporary recreational structure(s) under NWP 11.** (skip to Box 12)

☐ **The proposed activity would not involve temporary structure(s) in wetlands or vegetated shallow water areas.** (Skip to Box 12)

☐ **The proposed activity would involve temporary structure(s) in wetlands or vegetated shallow areas:**

Type of habitat affected by the structure(s):

N/A

Areal extent of habitat affected by the structure(s):

N/A

12. Nationwide Permit 13 Activities (Regional Condition C(13))

☐ **The proposed activity would not involve bank stabilization activities under NWP 13.** (skip to Box 13)

a. Vegetation Removal

☒ **The proposed activity would not involve the removal of wetland vegetation or submerged, rooted, aquatic plants over a cumulative area greater than 1/10-acre or 300 linear feet.** (Skip to Box 13(b))

☐ **The proposed activity would involve the removal of wetland vegetation or submerged, rooted, aquatic plants over a cumulative area greater than 1/10-acre or 300 linear feet.**

Type of vegetation to be removed:

The Project will remove vegetation along approximately 275 linear feet of bank along San Francisquito Creek above the OHWM. Vegetation removal includes clearing and grubbing of understory poison oak and herbaceous patches and removal of six riparian trees.

Extent of the proposed removal of vegetation (e.g., areal dimension or number of trees):

Riparian vegetation clearing above OHWM will entail the removal of six trees; three coast live oak (Tree #742, #996, and #997), two California buckeyes (Tree # 746 and #991), and one red willow (Tree #987). All trees to be removed are located on the east bank.

b. Effects of the bank stabilization activity:

Effects of the proposed bank stabilization activity on the stability of the opposite side of the streambank (if it is not part of the stabilization activity):

Based on the geometry and flow line of stream channel within the Project Area, no substantial adverse effects are anticipated on the stability of the opposite side of the streambank. See Part 4. Supplemental Information and Part 13. Hydrology Study for further details

Effects of the proposed bank stabilization activity on adjacent properties upstream and downstream of the activity:

The bank stabilization will ultimately improve flood conditions for adjacent properties upstream and downstream. See Part 4. Supplemental Information and Part 13. Hydrology Study for further details

c. Disposal of excess material:

☐ **The proposed bank stabilization activity would not involve disposal of excess excavated material.** (Skip to Box 12(d))

☒ **The proposed bank stabilization activity would involve the disposal of excess excavated material.**

Location of the proposed disposal site:

All artificial debris removed will be off-hauled to an appropriate disposal site as it is not an appropriate material for backfill within this perennial stream system. Excavated native sediment will be removed from the work area and evaluated for re-use. If reuse is not appropriate, the native material will be off-hauled as well to an appropriate disposal site.

d. Structure or modifications beneficial to fish and wildlife:

☒ **The proposed bank stabilization activity would incorporate structures or modification beneficial to fish and wildlife. See the project description.**

☐ **The proposed bank stabilization activity would not incorporate structure or modification beneficial to fish and wildlife. See the project description.**

Information to demonstrate why incorporation of structures or modifications beneficial to fish and wildlife were not considered practicable:

13. NWP 14 Activities (Regional Condition C(14))

☒ **The proposed activity would not involve linear transportation projects under NWP 14.** (skip to Box 14)

a. Bank stabilization activities

☐ **The proposed linear transportation project would not involve bank stabilization.** (skip to Box 13(b))

☐ **The proposed linear transportation project would involve less than 300 linear feet of bank stabilization.** (skip to Box 13(b))

☐ **The proposed linear transportation project would involve more than 300 linear feet of bank stabilization.**

Effects of the proposed bank stabilization activity on the stability of the opposite side of the streambank (if it is not part of the stabilization activity):

N/A

Effects of the proposed bank stabilization activity on adjacent properties upstream and downstream of the activity:

N/A

☐ **The proposed bank stabilization activity would incorporate structures or modification beneficial to fish and wildlife. See the project description.**

☐ **The proposed bank stabilization activity would not incorporate structures or modification beneficial to fish and wildlife. See the project description.**

Information to demonstrate why incorporation of structures or modifications beneficial to fish and wildlife were not considered practicable:

N/A

b. Previous segments within the same linear transportation project

☐ **NWP 14 has not been used to authorize previous project segments within the same linear transportation project.** (skip to Box 14)

☐ **NWP 14 has been used to authorize previous project segments within the same linear transportation project.**

Justification demonstrating that the cumulative impacts of the proposed and previously authorized segments do not result in more than minimal impacts to the aquatic system:

N/A

14. NWP 23 Activities (Regional Condition C(23))

☒ **The proposed activity would not involve approved categorical exclusions under NWP 23.** (skip to Box 15)

a. Required attachments

The following information is enclosed:

☐ A copy of the Federal Categorical Exclusion (Cat/Ex) document signed by the appropriate federal agency.

☐ A copy of the Categorical Exclusion (Cat/Ex) document signed by a state or local agency representative, as well of copies of all documentation authorizing alternative agency signature.

☐ A copy of the jurisdictional delineation performed by qualified specialists showing the project limits and the location (delineated boundaries) of Corps jurisdiction within the overall project limits.

☐ Maps showing the locations of potentially permanent and temporary project impacts to areas within Corps jurisdiction.

b. Corps authority:

c. Conditions described in the Cat/Ex and/or attachments outlining measures that must be taken prior to, during, or after project construction to minimize impacts to the aquatic environment: (if this information is provided as an attachment, identify here and provide the date/name of the attachment)

N/A

d. Clear and concise description of all project impacts: (if this information is provided as an attachment, identify and provide the date/name of the attachment): N/A

Quantification and description of permanent project impacts to areas within Corps jurisdiction:

N/A

Quantification and description of temporary impacts to areas within Corps jurisdiction:

N/A

Linear extent of Corps jurisdiction affected by the project:

N/A

Other project impacts not described above:

N/A

e. General description of activities covered by the Cat/Ex that do not require Corps authorization but are connected or related to the activities in Corps jurisdiction: (if this information is provided as an attachment, identify here and provide the date/name of the attachment)

N/A

f. Complete description of any proposed mitigation and/or restoration, including, but not necessarily limited to, location of any proposed planting, short- and long-term maintenance, proposed monitoring, success criteria, and contingency plans: (if this information is provided as an attachment, identify here and provide the date/name of the attachment)

N/A

g. Justification of how the project complies with the NWP program, including less than minimal impact to the aquatic environment and compliance with the General Conditions: (if this information is provided as an attachment, identify here and provide the date/name of the attachment)

N/A

h. Federal Highway Administration (FHWA) Cat/Ex projects

☐ **N/A, The activity is not an FHWA Cat/Ex project.** **(skip to Box 14(h))**

Description of how the proposed project meets the description of the Cat/Ex activities published in 23 CFR § 771.117: (if this information is provided as an attachment, identify here and provide the date/name of the attachment)

N/A

i. Final agency determinations regarding compliance with Section 7 of the ESA, EFH under the Magnuson-Stevens Act, and Section 106 of the NHPA: (if this information is provided as an attachment, identify here and provide the date/name of the attachment)

Section 7 of the ESA:

N/A

EFH under the Magnuson-Stevens Act:

N/A

Section 106 of the NHPA:

N/A

15. NWP 27 Activities (Regional Condition C(27))

☒ **The proposed activity would not include aquatic habitat restoration, establishment, or enhancement activities under NWP 27.** (skip to Box 16)

a. Documentation of a review of project impacts to demonstrate that the project would result in a net increase in aquatic function: (if this information is provided as an attachment, identify here and provide the date/name of the attachment)

N/A

b. Review of project impacts on adjacent properties or structures: (if this information is provided as an attachment, identify here and provide the date/name of the attachment)

N/A

c. Cumulative impacts associated with the project: (if this information is provided as an attachment, identify here and provide the date/name of the attachment)

N/A

16. NWP 29 Activities (Regional Condition C(29))

☒ **The proposed activity would not include residential development under NWP 29.** (skip to Box 17)

Description of low impact development concepts proposed to be used: if this information is provided as an attachment, identify here and provide the date/name of the attachment)

N/A

17. NWP 39 Activities (Regional Condition C(35))

☒ **The proposed activity would not include commercial or institutional developments under NWP 39.** (skip to Box 18)

Description of low impact development concepts proposed to be used: (if this information is provided as an attachment, identify here and provide the date/name of the attachment)

N/A

18. NWP 41 Activities (Regional Condition C(41))

☒ **The proposed activity would not include reshaping existing drainage ditches under NWP 41.** (skip to Box 19)

Explanation of the project's benefit to water quality and a statement demonstrating the need for the project: (if this information is provided as an attachment, identify here and provide the date/name of the attachment)

Projects benefit to water quality:

N/A

Need for the project:

N/A

19. NWP 42 Activities (Regional Condition C(42))

☒ **The proposed activity would not include recreational facilities under NWP 42.**

☒ **No buildings are proposed to be constructed in waters of the U.S., including wetlands associated with NWP 42.**

☐ **Buildings are proposed to be constructed in waters of the U.S., including wetlands associated with NWP 42.**

Information to demonstrate there is no on-site practicable alternative that is less environmentally damaging. (if this information is provided as an attachment, identify here and provide the date/name of the attachment)

Compliance with San Francisco Regional Conditions

This checklist is intended to assist prospective permittees with documenting compliance with all San Francisco District Regional Conditions, as required by Regional Condition B(1). This checklist does not include the full text of each regional condition. Please refer to the *San Francisco District Regional Conditions* (http://www.spn.usace.army.mil/Missions/Regulatory/RegulatoryOverview/Nationwide.aspx) when completing this checklist.

Please check the box to indicate you have read and have/will comply with the Regional Condition and provide a rationale on how you have/will comply with the Regional Condition.

Check	Regional Condition	Rationale for Compliance
☒	**A(1). Additional PCN Requirements:**	See Boxes 1 through 4
☒	**A(2). Designated EFH:** Permittee shall submit a PCN for activities in areas designated as EFH. The PCN shall include an EFH assessment and extent of proposed impacts	See Box 5
☒	**A(3). Tribal Lands:** Permittee shall submit a PCN for activities located on Tribal Lands.	A PCN will be submitted if sacred lands are identified on the Project Area.
☒	**A(4). Lead Federal Agency:** Must submit documentation for compliance with Endangered Species Act, Magnuson-Stevens Fishery Conservation and Management Act, and National Historic Preservation Act if the Corps designates another Federal agency as the lead for compliance with these laws.	Documentation to be submitted concurrently.
☒	**A(5). Linear Transportation Crossings.** For activities in waters of the U.S. that are suitable habitat for Federally-listed fish species, including designated critical habitat, permittee shall design new linear transportation crossings to ensure passage of all life stages and/or spawning of fish is not hindered. In these area, the permittee shall employ bridge designs that span the stream or river, or designs that use a bottomless arch culvert with a natural stream bed, unless determined to be impracticable by the Corps.	Project does not include linear transportation or stream crossing components.
☒	**A(6). Compensatory Mitigation:** Permittee must complete the construction of compensatory mitigation before or concurrent with construction of authorized activity and submit proof of purchase of mitigation bank or in-lieu fee program credits prior to commencement of construction of the authorized activity.	Project is considered self-mitigating;therefore, compensatory mitigation is not required. Further detail is provided in Part 4. Supplemental Information.
☒	**A(7). Waiver of linear foot limit for NWPs 13, 21, 29, 39, 40,42, 43, 44, 50, 51, 52, and 54:** Request for waiver must contain ☐ Narrative description of the stream; ☐ Analysis of the proposed impacts to the waterbody; ☐ Measures taken to avoid and minimize losses to waters of the U.S. ☐ Compensatory mitigation plan describing how the unavoidable losses are proposed to be offset.	See Box 6.

Check	Regional Condition	Rationale for Compliance
☒	**B(1). <u>San Francisco Bay diked baylands:</u>** PCN is required for any activity permitted by NWP if it will take place in waters or wetlands of the U.S. within the San Francisco Bay diked baylands. The notification shall explain how avoidance and minimization of losses of waters or wetlands are taken into consideration to the maximum extent practicable (see Box 7).	The Project would not impact San Francisco Bay diked baylands.
☒	**B(2). <u>Santa Rosa Plain:</u>** PCN is required for any activity permitted by NWP if it will take place in the Santa Rosa Plain. The notification will explain how avoidance and minimization of losses of waters or wetlands are taken into consideration to the maximum extent practicable (see Box 8).	The Project is not located on the Santa Rosa Plain.
☒	**B(3). <u>Eelgrass Beds:</u>** PCN is required for any activity permitted by NWP if it will take place within or adjacent to Eelgrass Beds. The PCN must contain a compensatory mitigation plan, habitat assessment, and extent of proposed project impacts (see Box 9).	The Project would not impact eelgrass beds.
☒	**C(3)(1). <u>NWP 3, Maintenance:</u>** To the extent practicable, excavation equipment shall work from an upland site. If it is not practicable to work from an upland site, or if working from the upland site would cause more environmental damage than working in the stream channel, the excavation equipment can be located within the stream channel but must minimize disturbance. Notification must contain (see Box 10(a)) ☐ Explanation as to the need to place excavation equipment in waters of the U.S. ☐ Statement of any additional necessary fill	N/A. Project does not utilize this Nationwide Permit.
☒	**C(3)(2). <u>NWP 3, Maintenance:</u>** If the activity is proposed in a special aquatic site, the notification shall contain (See Box 10(b)): ☐ Explanation of why the special aquatic site cannot be avoided ☐ Measures taken to minimize impacts to the special aquatic site.	N/A. Project does not utilize this Nationwide Permit.
☒	**C(11)(1). <u>NWP 11, Temporary Recreational Structures:</u>** Notification is required if any temporary structures proposed in wetlands or vegetated shallow water areas. The notification shall contain (see Box 11): ☐ Type of habitat. ☐ Areal extent affected by the structure(s).	N/A. Project does not utilize this Nationwide Permit.
☒	**C(12)(1). <u>NWP 12, Utility Line Activities:</u>** Excess material from a trench associated with utility line construction shall be disposed of at an upland site away from any wetlands or other waters of the U.S.	N/A. Project does not utilize this Nationwide Permit.
☒	**C(12)(2). <u>NWP 12, Utility Line Activities:</u>** NWP does not authorize the construction of substation facilities.	N/A. Project does not utilize this Nationwide Permit.

Check	Regional Condition	Rationale for Compliance
☒	**C(13)(1). <u>NWP 13, Bank Stabilization:</u>** Notification is required for all activities stabilizing greater than 300 linear feet of channel. Where the proposed removal of wetland vegetation or submerged, rooted, aquatic plants is over a cumulative area greater than 1/10-acre or 300 linear, the Corps shall be notified. The notification shall: ☒ Include the type of vegetation of the proposed removal (see Box 12(a)); ☒ Include the extent (e.g. areal dimension or number of trees) of the proposed removal (see Box 12(a)); ☒ Address the effect of the bank stabilization on the stability of the opposite side of the streambank (if it is not part of the stabilization activity) (see Box 12(b)); ☒ Address the effect of the bank stabilization on adjacent property upstream and downstream (see Box 12(b)).	The Project will rebuild and stabilize approximately 275 linear feet of eroding stream bank, and enhance stream and riparian habitat, along San Francisquito Creek, located in Palo Alto, Santa Clara County, California.
☒	**C(13)(2). <u>NWP 13, Bank Stabilization:</u>** Permit allows excavating a toe trench in waters of the U.S., and, if necessary, to use the material for backfill behind the stabilizing structure. Excess material is to be disposed of in a manner that will have only minimal impacts to the aquatic environment. The notification shall include location of the disposal site (see Box 12(c)).	All material excavated out from the stream bank will be stockpiled above the TOB in designated staging areas or hauled off-site. Based on the composition of the excavated material, it will either be hauled off-site and disposed of at a proper facility, or it will be sorted and reused as alluvium backfill within the crib wall.
☒	**C(13)(3). <u>NWP 13, Bank Stabilization:</u>** For man-made banks, roads, or levees damage by storms or high flow, the one cubic yard per running foot limit is counted only for that additional fill which encroaches (extends) beyond the pre-flood or pre-storm shoreline condition of the waterway. It is not counted for the fill that would be placed to reconstruct the original dimensions of the eroded, man-made shoreline.	The proposed bioengineered crib wall is positioned at the forefront of ongoing erosion along the San Francisquito Creek bank. Additional fill proposed by the Project does not extend beyond the pre-storm shoreline condition of the waterway.
☒	**C(13)(4). <u>NWP 13, Bank Stabilization:</u>** For natural berms and banks, the one cubic yard per running foot limit applies to any added armoring.	The proposed bank would be a bioengineered crib wall composed of a matrix of woody material. No riprap or other armoring will be installed along the bank.
☒	**C(13)(5). <u>NWP 13, Bank Stabilization:</u>** To the maximum extent practicable, new or additional bank stabilization must incorporate structures or modifications beneficial to fish and wildlife. Where these structures or modifications are not used, the applicant shall demonstrate why they were not considered practicable (see Box 12(d)).	The proposed bioengineered crib wall incorporates rootwads into the design which provide fish refugia and a variety of native riparian vegetation plantings planned within and above the crib wall to improve habitat for fish, birds, and other species.
☒	**C(14)(1). <u>NWP 14, Linear Transportation Projects:</u>** Notification is required for all projects filling greater than 300 linear feet of channel. For activities involving greater than 300 linear feet of bank stabilization, the project proponent shall (see Box 13(a)): ☐ Address the effect of the bank stabilization on the stability of the opposite side of the streambank (if it is not part of the stabilization activity) ☐ Address the effect of the bank stabilization on adjacent property upstream and downstream.	N/A. The Project does not utilize this Nationwide Permit.

Check	Regional Condition	Rationale for Compliance
☒	**C(14)(2). <u>NWP 14, Linear Transportation Projects:</u>** This permit does not authorize construction of new airport runways and taxiways.	N/A. The Project does not utilize this Nationwide Permit.
☒	**C(14)(3). <u>NWP 14, Linear Transportation Projects:</u>** If the NWP has been used to authorize previous project segments within the same linear transportation project, justification must be provided demonstrating that the cumulative impacts do not result in more than minimal impacts. (See Box 13(b))	See Box 13(b).
☒	**C(14)(4). <u>NWP 14, Linear Transportation Projects:</u>** To the maximum extent practicable, new or additional bank stabilization for the crossing must incorporate structure or modifications beneficial to fish. Where these structures are not used, applicant shall demonstrate why they were not considered practicable. (see Box 13(a))	N/A. The Project does not utilize this Nationwide Permit.
☒	**C(23)(1). <u>NWP 23. Approved Categorical Exclusions:</u>** Use of this NWP requires notification. The notification shall include: ☐ A copy of the Cat/Ex document signed by the appropriate Federal agency. If the Cat/Ex is signed by a state and local agency, then copies of all documentation authorizing alternative agency signature shall be provided (see Box 14(a)); ☐ Written description of Corps authority (see Box 14(b)); ☐ List of conditions described in Cat/Ex and/or attachment outlining measures to minimize impacts (See Box 14(c)); ☐ Copy of the jurisdictional delineation showing project limits and location of Corps jurisdiction within the overall project limits (see Box 14(a)); ☐ Maps showing locations of permanent and temporary impacts (see Box 14(a)); ☐ Clear and concise description of all project impacts (see Box 14(d)); ☐ General description of activities covered by the Cat/Ex that do not require Corps authorization but are connected or related to the activities in Corps jurisdiction (see Box 14(e)); ☐ Complete description of any proposed mitigation and/or restoration (see Box 14(f)); ☐ Written justification of how the project complies with the NWP Program (see Box 14(g)); ☐ For Federal Highway Administration Cat/Ex project, the notification should describe how the proposed project meets the description of the Cat/Ex activities published in 23 CFR § 771.117 (see Box 14(h)).	N/A. The Project does not utilize this Nationwide Permit.

Check	Regional Condition	Rationale for Compliance
☒	**C(23)(2). <u>NWP 23. Approved Categorical Exclusions:</u>** Only activities specifically identified in the Cat/Ex project description will be covered by NWP 23. If other activities not described in the Cat/Ex project description will be performed, these activities must receive separate NWP authorizations.	N/A. The Project does not utilize this Nationwide Permit.
☒	**C(23)(3). <u>NWP 23. Approved Categorical Exclusions:</u>** Notification must include a copy of the signed Cat/Ex document and final agency determination regarding compliance with Section 7 ESA, EFH under the Magnuson-Stevens Act, and Section 106 NHPA (see Box 14(i)).	N/A. The Project does not utilize this Nationwide Permit.
☒	**C(27)(1). <u>NWP 27. Aquatic Habitat Restoration, Establishment, and Enhancement Activities.</u>** Notification must include: ☐ Documentation of a review of project impacts to demonstrate that at the conclusion of the work that the project would result in a net increase in aquatic functions (see Box 15(a)); ☐ Review of project impacts on adjacent properties or structures (see Box 15(b)); ☐ Discussion of cumulative impacts associated with the project (see Box 15(c)).	N/A. The Project does not utilize this Nationwide Permit.
☒	**C(29)(1). <u>NWP 29. Residential Developments.</u>** When discharge of fill results in the replacement of waters of the U.S. with impervious surfaces, the development shall incorporate low impact development concepts (LID) to the extent practicable. A description of LID concepts proposed shall be included with the permit application (see Box 16).	N/A. The Project does not utilize this Nationwide Permit.
☒	**C(29)(2). <u>NWP 29. Residential Developments.</u>** Use of this NWP is prohibited within the San Francisco Bay diked baylands.	N/A. The Project does not utilize this Nationwide Permit.
☒	**C(33)(1). <u>NWP 33. Temporary Construction, Access, and Dewatering.</u>** Access roads shall be the minimum width necessary and shall be designed to minimize changes to the hydraulic flow characteristics of the stream and degradation of water quality. The following Best Management Practices shall be followed to the maximum extent practicable: ☐ Road shall be property stabilized and maintained during and following construction to prevent erosion; ☐ Construction of the road fill shall occur in a manner that minimizes the encroachment of trucks, tractors, bulldozers, or other heavy equipment within waters of the United States (including adjacent wetlands) that lie outside the lateral boundaries of the fill itself.	N/A. The Project does not utilize this Nationwide Permit.
☒	**C(33)(2). <u>NWP 33. Temporary Construction, Access, and Dewatering.</u>** Vegetative disturbance in waters of the U.S. shall be kept to a minimum.	N/A. The Project does not utilize this Nationwide Permit.

Check	Regional Condition	Rationale for Compliance
☒	**C(33)(3). NWP 33. Temporary Construction, Access, and Dewatering.** Borrow material shall be taken from upland sources whenever feasible.	N/A. The Project does not utilize this Nationwide Permit.
☒	**C(33)(4). NWP 33. Temporary Construction, Access, and Dewatering.** Stream channelization is not authorized.	N/A. The Project does not utilize this Nationwide Permit.
☒	**C(35)(1). NWP 35. Maintenance Dredging of Existing Basins.** Use of this NWP will require notification to the Corps. The notification information should be provided on the Consolidated Dredging-Dredged Material Reuse/Disposal Application. This application and instructions for its completion can be found at: http://www.spn.usace.army.mil/Missions/Dredging-Work-Permits/Application/. The information must include the location of the proposed upland disposal site. A jurisdictional delineation of the proposed upland disposal site prepared in accordance with the current method required by the Corps may also be required.	N/A. The Project does not utilize this Nationwide Permit.
☒	**C(35)(2). NWP 35. Maintenance Dredging of Existing Basins.** The U.S. Coast Guard will be notified by the permittee at least 14 days before dredging commences if the activity occurs in navigable waters of the U.S. (Section 10 waters).	N/A. The Project does not utilize this Nationwide Permit.
☒	**C(35)(3). NWP 35. Maintenance Dredging of Existing Basins.** The permittee will be required to submit the following information to the Corps: ☐ Dredge operation plan for approval: no earlier than 60 calendar days and no later than 20 calendar days before proposed commencement of dredging: ☐ Pre-Dredge Survey: no earlier than 60 calendar days and no later than 20 calendar days before proposed commencement of dredging; ☐ Solid Debris Management Plan: no earlier than 60 calendar days and no later than 20 calendar days before proposed commencement of dredging ☐ Post-Dredge Survey: within 30-days of last disposal activity. A copy of the post-dredge survey should be sent to the National Ocean Service for chart updating. ☐ The permittee or dredge contractor shall inform the Corps when (1) a dredge episode commences, (2) dredging is suspended, (3) when dredging is restarted, and (4) when dredging is complete. Each notification should include the Corps file number.	N/A. The Project does not utilize this Nationwide Permit.

Check	Regional Condition	Rationale for Compliance
☒	**C(39)(1). <u>NWP 39. Commercial and Institutional Developments.</u>** When discharge of fill results in the replacement of waters of the U.S. with impervious surfaces, the development shall incorporate low impact development concepts (LID) to the extent practicable. A description of LID concepts proposed shall be included with the permit application (see Box 17).	N/A. The Project does not utilize this Nationwide Permit.
☒	**C(39)(2). <u>NWP 39. Commercial and Institutional Developments.</u>** Use of this NWP is prohibited within the San Francisco Bay diked baylands.	N/A. The Project does not utilize this Nationwide Permit.
☒	**C(40)(1). <u>NWP 40. Agricultural Activities.</u>** This NWP does not authorize discharge of fill into the channel of a perennial or intermittent watercourse that could impede high flows. This limitation does not apply to watercourses that flow only when there is an irregular, extraordinary flood event.	N/A. The Project does not utilize this Nationwide Permit.
☒	**C(41)(1). <u>NWP 41. Reshaping Existing Drainage Ditches.</u>** Compensatory mitigation may be required if the Corps determines there will be a detrimental impact to aquatic habitat.	N/A. The Project does not utilize this Nationwide Permit.
☒	**C(41)(2). <u>NWP 41. Reshaping Existing Drainage Ditches.</u>** Notification to the Corps is required if the applicant proposes to re-grade, discharge, install channel lining, or redeposit fill material.	N/A. The Project does not utilize this Nationwide Permit.
☒	**C(41)(3). <u>NWP 41. Reshaping Existing Drainage Ditches.</u>** The notification shall include an explanation of the projects benefit to water quality and a statement demonstrating the need for the project. (see Box 18)	See Box 18.
☒	**C(42). <u>Recreational Facilities.</u>** If buildings are proposed to be built in waters of the U.S., including wetlands, the applicant must demonstrate that there is no on-site practicable alternative that is less environmentally damaging. (see Box 19)	See Box 19.

Part 2. Regional Water Quality Control Board Application for Section 401 Water Quality Certification

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STATE OF CALIFORNIA – CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY
SAN FRANCISCO BAY REGIONAL WATER QUALITY CONTROL BOARD
1515 CLAY STREET, SUITE 1400
OAKLAND, CALIFORNIA 94612

APPLICATION FOR 401 WATER QUALITY CERTIFICATION AND/OR REPORT OF WASTE DISCHARGE

(FORM R2C502-E)

1. APPLICANT'S NAME	4. AUTHORIZED AGENT'S NAME AND TITLE (an agent is not required)
Terry Boyle	Bianca Clarke
2. APPLICANT'S ADDRESS	**5. AGENT'S ADDRESS**
Children's Health Council 650 Clark Way Palo Alto, California 94304	Wra, Inc. 2169-G East Francisco Blvd San Rafael, California 94901
3. APPLICANT'S PHONE & FAX NOS. (email optional)	**6. AGENT'S PHONE & FAX NOS.** (email optional)
650-688-3602 Tboyle@Chconline.Org	415-524-7255 Clarke@Wra-Ca.Com

7. STATEMENT OF AUTHORIZATION

I hereby authorize Bianca Clarke, WRA, Inc. to act on my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this permit application.

07/09/2020

APPLICANT'S SIGNATURE (This must be signed by the Applicant, not the authorized agent) **DATE**

PROJECT OR ACTIVITY INFORMATION

8. PROJECT NAME OR TITLE (See Instructions.)
San Francisquito Creek Bank Stabilization Project

9. NAME OF AFFECTED WATERBODY(IES) (See instructions.)	10. PROJECT STREET ADDRESS (if applicable)
San Francisquito Creek	650 Clark Way

11. LOCATION OF PROJECT

Santa Clara	Palo Alto	Region 2 – San Francisco Bay
COUNTY	CITY/TOWN (or unincorporated)	REGIONAL WATER BOARD REGION

12. OTHER LOCATION DESCRIPTIONS (watershed, latitude & longitude, river mile, etc. Attach map. See instructions.)
37.440753, -122.17952

13. DIRECTIONS TO THE SITE
From San Francisco, head south on Interstate 280 for 30 miles, take exist 24 for Sand Hill Road toward Menlo Park, follow signs for Sand Hill Road and continue on for approximately 3 miles, turn left at Clark Way. Clark Way terminates in a parking lot; the Project Area is northeast of the CHC parking lot.

14. PROJECT PURPOSE (Describe the reason or purpose for the overall project. See instructions.)
The purpose of the project is to rebuild and stabilize slopes, and enhance stream and riparian habitat, along San Francisquito Creek. The Project is mandated by the City of Palo Alto based on comments received from the Santa Clara Valley Water District (SCVWD) and San Francisquito Creek Joint Powers Authority (SFJPA). Erosion of the channel banks on the Children's Health Council property accelerated during the 2016 – 2017 rainy season, resulting in the loss of approximately 50 horizontal feet of the creek bank and 7,500 square feet of an outdoor learning area, which poses a danger to CHC students and staff if left unmanaged. The channel banks in the area of accelerated erosion are approximately 30 feet high, with vertical faces and under-

cut portions of bank.

15. DESCRIPTION OF ACTIVITY AND ENVIRONMENTAL IMPACTS (Provide a full, technically accurate description of the entire activity and associated environmental impacts. See instructions.)

The Applicant proposes to rebuild and stabilize approximately 275 linear feet of eroding stream bank, and enhance stream and riparian habitat, along San Francisquito Creek, located in Palo Alto, Santa Clara County, California. Work is being completed in compliance with the City of Palo Alto requirements and based on comments from the SCVWD and SFJPA. The proposed bioengineered crib wall is positioned at the forefront of ongoing erosion of the creek bank, with a variety of native riparian vegetation plantings planned within and above the crib wall to improve habitat for fish, birds and other species. The Project will construct a live log crib wall supported by a geoengineered foundation on the east bank of the creek. The crib wall foundation consists of large boulders, cobble alluvium, and rootwads secured together and embedded within the bank. The crib wall structure consists of wooden logs and will be anchored to the foundation and existing bank with support anchors and rooted vegetation. Slopes on and above the crib wall will be graded and planted with native trees, shrubs, and grasses.

Construction activities will disturb a total of approximately 0.14 acres of stream area below OHWM within San Francisquito Creek and includes the excavation of 1,080 cubic yards of artificial and native alluvium, grading, and placement of approximately 1,450 cubic yards of boulder/cobble, woody material, and engineered fill in the stream area. No loss of stream area below OHWM will occur as a result of proposed activities. In addition, vegetation clearing and placement of clean fill material is necessary for the purpose of constructing a temporary access route to access the Project Area. Any imported material that is used will be clean and possess no contamination threat to existing archaeological sites. Work for the access route will temporarily disturb 0.02 acres below OHWM and includes placement of 158 cubic yards of clean fill material.

Riparian vegetation removal will disturb 0.06 acre below TOB and entail the removal of six trees; three coast live oak (Tree #742, #996, and #997), two California buckeyes (Tree # 746 and #991), and one red willow (Tree #987). All trees to be removed are located on the east bank. In addition, understory poison oak patches and herbaceous cover will be cleared and grubbed. Disturbed vegetated riparian habitat within the Project Area will be restored with native riparian plantings, which will further stabilize and enhance the ecological functions and values that the removed riparian trees provided to San Francisquito Creek. The enhanced riparian habitat will be of higher quality to the stream corridor, as the banks will be stabilized and tree composition will be more native and diverse.

For a complete project description and calculation of environmental impacts, please refer to Part 4. Supplemental Information, Part 5. Figures, Part 12. Project Plans, and Part 16. Habitat Mitigation and Monitoring Plan.

16. AVOIDANCE OF IMPACTS (Describe efforts to avoid and minimize impacts to waters of the State. See instructions.)

Disturbances to San Francisquito Creek resulting from bank stabilization are unavoidable and location-dependent (see Part 12. Project Plans and Part 13. Hydrology Study). Standard best management practices will be implemented to minamize temporary impacts to jurisdictional features. Work is planned to be conducted during the dry season to minimize potential impacts to aquatic resources. For a complete discussion of avoidance measures, please refer to Part 4. Supplemental Information.

17. ENVIRONMENTAL DOCUMENTS (list any non-CEQA environmental documents that have been prepared for the project and/or the project site. Provide the date of the document and the name of the individual, firm, or agency that prepared it. Provide a copy of delineations and endangered species surveys. See instructions.)

Tree Survey (Part 7)

Hydrology Study (Part 13)

Dewatering Plan (Part 14)

Fish Relocation Plan (Part 15)

Habitat Mitigation and Monitoring Plan (HMMP; Part 16)

DREDGE & FILL INFORMATION

18. The following items must be completed for each action where fill or other material will be temporarily (T) or permanently (P) discharged to a wetland or other waterbody, and where material will be dredged from a waterway (add additional pages as necessary). Provide a map showing the location of each action (See instructions):

Map Location Number	LOCATION (show on plan & indicate waterbody)	REASON FOR ACTION (See instructions)	AMOUNT AND TYPE OF MATERIAL (in cubic yards, see instructions)	SURFACE AREA OF FILL (in acres and/or linear feet; specify **(T)** or **(P)**; see instructions)

C-2.0	Along length of Creek below OHWM within Project Area	Excavation of eroded sediment	1,370 CY - artificial and native alluvium	275 LF (0.34 acre) (P)
C-2.0	Along length of Creek below OHWM within Project Area	Construction of bioengineered crib wall	2,500 CY - includes boulder/cobble, 13 root-wads, and engineered fill	275 LF (0.34 acre) (P)
C-2.0	SE region of Project Area	Placement of clean fill for temporary access route	158 CY - clean fill	0.02 acre (T)

MITIGATION

19. MITIGATION (Describe the size, type, and functions, and values of the proposed mitigation. Describe success criteria, monitoring, and long-term funding, management, and protection of the mitigation site. Attach a Mitigation Plan if needed. See instructions and contact Regional Board staff for additional assistance.)

The Project is self-mitigating by nature. As such, on-site mitigation is proposed and on-site riparian habitat will be replaced and expanded; therefore, no additional off-site mitigation is proposed.

Impacted riparian habitat within the Project Area will be restored with riparian plantings, which are expected to stabilize and enhance the ecological functions and values that the removed riparian trees provided to San Francisquito Creek. The enhanced riparian habitat will be of higher quality to the stream corridor, as the banks will be stabilized and tree composition will be more native and diverse.

The Habitat Mitigation and Monitoring Plan (Part 16) discusses the proposed restoration and mitigation actions for the Project.

CEQA

20. CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA) Documents: Indicate the status of CEQA documents prepared for the project (see instructions).

TYPE OF DOCUMENT	STATUS	DATE COMPLETED (or expected to be complete)	TYPE OF DOCUMENT	STATUS	DATE COMPLETED (or expected to be complete)
Initial Study	In Preparation	**12/1/20**	Notice of Preparation	-Choose One-	
Draft Environmental Impact Report	-Choose One-		Final Environmental Impact Report	-Choose One-	
Negative Declaration	-Choose One-		Mitigated Negative Declaration	-Choose One-	
Notice of Categorical Exemption Exemption Number:	-Choose One-		Notice of Statutory Exemption Exemption Number:	-Choose One-	
Other (describe)	-Choose One-				
Notice of Determination*	-Choose One-		*Note: A Notice of Determination or Notice of Exemption from the Lead Agency is required before a certification or waiver can be issued.		

Lead Agency: City of Palo Alto **Contact:** TBD **Telephone:** TBD

State Clearing House Number: __TBD_____

ADDITIONAL INFORMATION

21. HAS ANY PORTION OF THE WORK BEEN INITIATED? **YES** ☐ **NO** ☒

IF YES, DESCRIBE THE INITIATED WORK, and explain why it was initiated prior to obtaining a permit. Indicate whether any enforcement action has been taken against the project.

22. **HAS A FEDERAL AGENCY OR THE APPLICANT PROVIDED PUBLIC NOTICE OF THIS APPLICATION FOR WATER QUALITY CERTIFICATION?**

Federal Agency:	**YES** ☐	**NO** ☒	**Date:**	**Type of Notification:**	**Agency Name and Contact:**
Applicant:	**YES** ☐	**NO** ☒	**Date:**	**Type of Notification:**	**Media Name and Contact:**

IF PUBLIC NOTICE HAS NOT BEEN MADE, provide the name, address, and phone number (if available) of adjacent property owners, lessees, etc., and any other parties known to be interested in the project:

23. **OTHER PERMITS** (List other local, state or federal licenses, permits, and agreements that will be required for any construction, operation, maintenance, or other actions associated with the project. Attach copies of all draft or final documents. See instructions.)

AGENCY	CONTACT (with phone number)	TYPE OF APPROVAL	PERMIT OR ID NUMBER	DATE APPLIED	STATUS	DATE OF ACTION
US Corps of Engrs.	Greg Brown, 415-503-6761	404 NWP 13	TBD		In Review	
Ca Dept Fish Game	Kristin Garrison, 707-944-5534	1602 LSAA	TBD		In Review	
US Fish Wildlife	Joseph Terry, 916-943-6721	ESA Section 7 BA	TBD		In Review	
-Choose One-					-Choose One-	
-Choose One-					-Choose One-	
City Grading Permit		Local			-Choose One-	
Other or Local Agency					-Choose One-	
Other or Local Agency					-Choose One-	
Other or Local Agency					-Choose One-	

24. **OTHER PROJECTS** (List and describe other projects implemented or planned that are related to the proposed project, or that may impact the same waterbody. See instructions. Add additional sheets if necessary.)

PROJECT NAME	DESCRIPTION	WATERBODY AND WATERSHED	DATE IMPLEMENTED/PLANNED
Children's Health Council Creek Bank Stabilization Project, Phase I	Installation of sheer pin wall above TOB of San Francisquito Creek in order to provide emergency stabilization of the property at 650 Clark Way	San Francisquito Creek	Spring 2019

25. Application is hereby made for a permit or permits to authorize the work described in this application. I certify, under penalty of perjury, that this application is complete and accurate to the best of my knowledge. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.

07/06/20 — SIGNATURE OF APPLICANT — DATE

Bianca Clarke — SIGNATURE OF AGENT — 5/29/20 — DATE

The application must be signed by the person who desires to undertake the proposed activity (Applicant) or a duly authorized agent if the statement in Block 7 has been filled out and signed.

Attach fee deposit (see Instructions page 7) and any additional documents and submit this application to:

SFBRWQCB
Attention: 401 Water Quality Certification
1515 Clay Street, Suite 1400
Oakland, CA 94612

Note: This form, FORM R2C502-E, was designed for electronic use as a Microsoft Word document or template.
For assistance using this form or to relay suggestions on how it may be improved, please call 510-622-2330.
If you would like a standard, non-electronic form, please call 510-622-2300 and request
401 Application FORM R2C502 – Non-electronic version.

FY 18/19 Water Quality Certification Dredge and Fill Application Fee Calculator

Scroll down to see instructions below and use this calculator to estimate Water Quality Certification application fees

This calculator is publicly available for informational purposes only for applications received on or after November 5, 2018. Applicants may use the calculator to generate estimates for project budgeting. The State Water Board does not guarantee the accuracy of estimates generated by the calculator. The final fee amount will be determined by Water Boards staff in accordance with California Code of Regulations, Title 23, section 2200(a)(3). The State Water Board reserves the right to modify the calculator at any time. **Click here** for a link to the current regulations.

Important note for federal dischargers: This calculator may not be applicable to federal dischargers.

Please contact the State Water Board WQC manager with any questions

Combination Project: *Check box for combination deep water dredging and fill projects; which are subject to both Category A and B fees.* ☐

	Discharge Size	Rounded Discharge Size	Application Fee	Category A Project Fee Due prior to certification; do not submit with application	Annual Fee
Category A Fill & Excavation Discharges (Fee Code 84)					
Discharge Area Acres x $14,489	0.34	**0.34** *Rounded to two decimal places*	**$1,638**	**$3,288**	**$1,638**
Category B* Dredging Discharges (Fee Code 86)					***Expected annual fee***
Expected Annual Dredge Quantity Cubic Yards x $0.358		**0** *Rounded to whole number*	**$0**	**-**	**$0**

****Category B Projects are billed annually and based on the quantity of material dredged during the previous fiscal year***

Flat Fee Categories - Check ONE applicable box		Application Fee		Annual Fee
Category C (Fee Code 85)				
Sand Mining Dredging Discharges	☐	**$0**		**$0**
Category D (Fee Code 85)				
Ecological Restoration and Enhancement Projects	☐	**$0**	**-**	**$0**
Category E (Fee Code 87)				
Low Impact Discharges	☐	**$0**	**-**	**$0**
Category F (Fee Code 85)				
Emergency Projects authorized by a General Order	☐	**$0**	**-**	**$0**

Amended Orders - Check applicable box

Step 5 below		
(1) All Category (D) Ecological and Restoration and Enhancement Projects, regardless of amendment type.	☐	**Annual fee applicable per discharge category above.**
(2) Administrative amendments including, but not limited to, ownership changes, typographic edits, or time extensions that do not result in a temporal loss of resource function. Amendments in this category require no technical analysis or additional compensatory mitigation.	☐	
(3) Amendment results in change(s) in impact character, location, or volume of the discharge; or a time extension that results in temporal loss of resource function, according to the following criteria: -Amendment increases the active certification's impact quantity by less than 50 percent, **and** -Amendment does not require a change to the mitigated aquatic resource type.	☐	
(4) Amendment requires a supplemental CEQA analysis, **or** Amendment results in change(s) in impact character, location, or volume of the discharge, or a time extension that results in a temporal loss of resource function, according to the following criteria: -Amendment increases the active certification's impact quantity by more than 50 percent, **or** -Amendment requires a change to the mitigated aquatic resource type.	☐	

Total Fees	
Application Fee Due with application	$1,638
Project Fee (Category A Only) Due prior to certification	$3,288
Certification Total Sum of Application and Project Fees	$4,926
Annual Fee Invoiced annually	$1,638

General instructions

Terms defining the measurement of a "discharge":

Discharge of **"dredged material"** is measured by the volume of material removed in deep water dredging activities;
Discharge of **"fill material"** is measured by the physical area of placement of fill material into a waterbody;
Discharge of **"excavation material"** is measured by the physical area within a waterbody where earth-moving activities occur.

Generally, fees are determined by the size or volume of discharge to a water body. Fees for fill and/or excavation projects are based on discharge area in acres. Fees for deep water dredging are based on the volume of dredged material removed in cubic yards. For further explanation, see (A) and (B) below. However, your project may qualify for a flat fee category. If so, the project fee will be based on the fee for that category instead of size or volume (see (C) through (G) below). Amended orders may or may not be subject to fees depending on the complexity of analysis required. Follow the steps below to determine the fee associated with your project. Please contact Water Boards staff with further questions regarding how to use the calculator, **click here** for a link to the staff directory.

Step 1 Determine the Fee Category for your project:

Fee Based on Fill or Excavation Discharge Size Within the Waterbody

(A) Do your project activities add fill material (soil, rocks, concrete, culverts(s), pier pilings, etc.) or excavate soil or other materials within a waterbody?
Fill refers to replacing any portion of a water with dry land, or to changing the bottom elevation or grade of any portion of a water. Fill material includes rock, sand, clay, plastics, construction debris, wood chips, overburden from mining, or other construction activities, and materials used to create any structure or infrastructure within waters (culverts, pilings, etc.).

Excavation refers to removing sediment or soil in shallow waters or under no-flow conditions where impacts to beneficial uses are best described by the area of the excavation. It typically is done for purposes other than navigation. Examples include earth-moving work such as trenching for utility lines; channel reconstruction; embankment construction; removing sediment to increase channel capacity; and other flood control and drainage maintenance activities (e.g. debris removal, vegetation management and removal, detention basin maintenance and erosion control of slopes along open channels and other drainage facilities).

Fees Based on Discharge of Dredged Material

(B) Is your project deep water dredging? (except Sand Mining - see (C) below)
Dredging generally refers to removing sediment in deeper water to increase depth and typically occur to facilitate navigation. The impacts to beneficial uses are best described by the volume of the discharge removed. For fee purposes, this category also includes aggregate extraction within stream channels where the substrate is composed of course sediment (e.g., gravel) and is replenished by normal winter flows (e.g., point bars), where natural flood disturbance precludes establishment of significant riparian vegetation, and where extraction timing, location and volume will not cause changes in channel structure (except as required by regulatory agencies for habitat improvement) or impair the ability of the channel to support beneficial uses. Dredge volumes are expressed in cubic yards.

Fee Based on Flat Fee Categories

Does your project qualify for one of the following flat fee categories? **To qualify for a flat fee category, the entirety of all project activities must be included within a single flat fee category**, i.e., the project cannot include other components involving activities not included within the flat fee category.

(C) Sand Mining Dredging Discharges
Aggregate extraction in marine waters where source material is free of pollutants and the dredging operation will not violate any basin plan provisions.

(D) Ecological Restoration and Enhancement Projects
Projects undertaken for the primary purpose of restoring or enhancing the beneficial uses of water. This schedule does not apply to projects required under a regulatory mandate or to projects that are not primarily intended for ecological restoration or enhancement (e.g., land development). This category does not include mitigation banking, or in-lieu fee programs, or projects implemented in response to an enforcement action.

(E) Low Impact Discharges
Projects may be classified as low impact discharges if they meet all of the following criteria:
1. The discharge size is less than all of the following: (a) for fill, 0.1 acre, AND 300 linear feet, and (b) for dredging, 25 cubic yards.
2. The discharger demonstrates that: (a) all practicable measures will be taken to avoid impacts; (b) where unavoidable temporary impacts take place, waters and vegetation will be restored to pre-project conditions as quickly as practicable; and (c) where unavoidable permanent impacts take place, there will be no net loss of wetland, riparian area, or headwater functions, including onsite habitat, habitat connectivity, floodwater retention, and pollutant removal.
3. The discharge will not do any of the following: (a) directly or indirectly destabilize a bed of a receiving water; (b) contribute to significant cumulative effects; (c) cause pollution, contamination, or nuisance; (d) adversely affect candidate, threatened, or endangered species; (e) degrade water quality or beneficial uses; (f) be toxic; or (g) include “hazardous” or “designated” material.

(G) Emergency Projects Authorized by a Water Board General Order
RGP 8 Corps' Sacramento District
RGP 5 Corps' San Francisco District
RGP 63 Corps' Los Angeles District

Amended Orders (go to Step 4)

Step 2

If you have determined that your project qualifies for a flat fee category (C through G) check the applicable box to calculate fees.

Step 3

A. Is your project a fill/excavation project?

If your project is a fill/excavation project, calculate your fee based on the size of the discharge area in acres. For projects with multiple impact sites, sum the individual discharge quantities and enter the total in the calculator. For projects impacting multiple water features sum discharge quantities for all features. In addition, fees are based on the sum of both permanent and temporary impacts. The size of the discharge area shall be rounded to two decimal places (0.01 acre = 436 square feet). Category A discharges are subject to the sum of the Application fee and Project fee; the Application fee is due at the time of application and the project fee is due prior to issuance of the certification; additional annual fees are assessed from the date of certification until project completion.

B. Is your project a dredging project? Your dredging fee will be based on the actual amount of material dredged from the waterbody. Therefore, annual active discharge invoices are sent for the previous fiscal year's dredging amount. Invoice amounts will be based on the fee schedule current for that fiscal year. Please submit your application fee amount as shown in the calculator above. You may estimate your upcoming annual active discharge fee using the current fee calculator. However, this will only be an estimate because fees are subject to change annually as approved by the State Water Board.

Combination fill/excavation and dredging Projects (A and B)
Does your dredging project also include a discharge of fill material? These projects typically include dredging material from one part of a waterbody and depositing the dredged material into a different location in the waterbody. These projects are subject to both Category A and Category B fees.

Step 4

Are you requesting an amendment to a previously issued water quality certification or WDR? Fees for amended orders are based on the increased quantity of discharge and the level of technical analysis required evaluate project changes, therefore Water Board staff will determine which category your amendment is subject. Water Board staff will determine the fee for amendments based on the fee schedule and will request the applicant to submit the appropriate fee.

Fees based on amendments are categorized as follows:

(1) All Category (D) Ecological and Restoration and Enhancement Projects, regardless of amendment type. **No fee required**

(2) Administrative amendments including, but not limited to, ownership changes, typographic edits, or time extensions that do not result in a temporal loss of resource function. Amendments in this category require no technical analysis or additional compensatory mitigation. **No fee required**

(3) Amendment results in change(s) in impact character, location, or volume of the discharge; or a time extension that results in temporal loss of resource function, according to the following criteria:

-Amendment increases the active certification's impact quantity by **less than 50 percent**, and
-Amendment does not require a change to the mitigated aquatic resource type.

Additional standard fee assessed per increased amount of discharge(s). The minimum fee is $1,638. For category A or B projects, enter discharge quantities for increased impacts quantities. For flat fee categories, select the appropriate category.

(4) Amendment requires a supplemental CEQA analysis, or Amendment results in change(s) in impact character, location, or volume of the discharge, or a time extension that results in a temporal loss of resource function, according to the following criteria:

-Amendment increases the active certification's impact quantity by **more than 50 percent**, or
-Amendment requires a change to the mitigated aquatic resource type.

Additional standard fee assessed per increased amount of discharge(s). The minimum fee is $1,638. For category A or B projects, enter discharge quantities for all project impacts, including quantities previously certified. For flat fee categories, select the appropriate category.

Dischargers that have met the project fee cap will be assessed the minimum fee for each amendment of previously-issued WDR or water quality certification.

Step 5

See **Total Fees** for a breakdown of fees owed.

Step 6

Fee Types & Due Dates

Projects are subject to fees at three separate times throughout the life of a project:

1) Application Fee: Amount due with the initial application.

2) Project Fee: Amount due prior to certification (applies to Category A only).

3) The Annual Fee amount is invoiced annually: All projects are subject to an Annual Fee each fiscal year or portion of a fiscal year that the certification is active (from the effective date of the order until the regional board or state board issues a Notice of Project Complete Letter to the discharger). The Water Boards fiscal year begins on July 1 and ends on June 30. Dischargers will be invoiced their first Annual Fee beginning in November/December of the year following the Effective Date of certification. Dischargers will be invoiced for an Annual Fee each year until the project is completed. The annual fee for category (B) dredging discharges will be invoiced after the annual dredge volume has been determined.

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Part 3. California Department of Fish and Wildlife Application for Section 1602 Lake and Streambed Alteration Agreement

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FOR DEPARTMENT USE ONLY				
Date Received	*Amount Received*	*Amount Due*	*Date Complete*	*Notification No.*
	$	*$*		
Assigned to:				

NOTIFICATION OF LAKE OR STREAMBED ALTERATION

Complete EACH field, unless otherwise indicated, following the instructions and submit ALL required enclosures, attachments, and fee(s) to the CDFW regional office that serves the area where the project will occur. Attach additional pages to notification, if necessary.

1. APPLICANT PROPOSING PROJECT

Name	Mr. Terry Boyle
Business/Agency	Children's Health Concil
Mailing Address	650 Clark Way
City, State, Zip	Palo Alto, California 94304
Phone Number	650-688-3602
Email	tboyle@chconline.org

2. CONTACT PERSON (*Complete only if different from applicant.*)

Name	Bianca Clarke
Business/Agency	WRA, Inc.
Mailing Address	2169-G Francisco Blvd E
City, State, Zip	San Rafael, California 94901
Phone Number	415-524-7255
Email	clarke@wra-ca.com

While an applicant is legally responsible for complying with Fish and Game Code section 1602 et seq., an applicant may designate and authorize an agent (e.g., lawyer, consultant, or other individual) to act as a Designated Representative. The Designated Representative is authorized to sign the notification and any agreement on behalf of the Applicant.

Do you authorize the Contact Person above to represent you as your Authorized Designated Representative?

☑ Yes, I authorize.	☐ No, I do not authorize.

3. PROPERTY OWNER (*Complete only if different from applicant*)

Name	
Mailing Address	
City, State, Zip	
Phone Number	
Email	

4. PROJECT NAME AND AGREEMENT TERM

A. Project Name	San Francisquito Creek Bank Stabilization Project, Phase II			
B. Agreement Term Requested	☑ Regular (*5 years or less*) ☐ Long-term (*greater than 5 years)*			
C. Project Term	Beginning (*year*)	2021	Ending (*year*)	2025

D. Seasonal Work Period

Season(s)*	Start Date (*month/day*)	End Date (*month/day*)	E. Number of Work Days
1	05/01	10/30	127
2	05/01	10/30	127
3	05/01	10/30	128
4	05/01	10/30	127
5	05/01	10/30	128

** Continue on additional page(s) if necessary*

5. AGREEMENT TYPE

Check the applicable box. If boxes B – F are checked, complete the specified attachment.

A.	☑ Standard *(Most construction projects, excluding the categories listed below)*
B.	☐ Gravel/Sand/Rock Extraction (*Attachment A*) *Mine I.D. Number:* _____
C.	☐ Timber Harvesting (*Attachment B*) *THP Number:* _____
D.	☐ Water Diversion/Extraction/Impoundment (*Attachment C*) *SWRCB Number:* _____
E.	☐ Routine Maintenance (*Attachment D*)
F.	☐ Cannabis Cultivation (*Attachment E*)
G.	☐ CDFW Grant Programs *Agreement Number:* _____
H.	☐ Master
I.	☐ Master Timber Operations

6. FEES

See the current fee schedule to determine the appropriate notification fee. Itemize each project's estimated cost and corresponding fee. ***Note: CDFW may not process this notification until the correct fee has been received.***

	A. Project Name	B. Project Cost	C. Project Fee
1	San Francisquito Creek Bank Stabilization Project, Phase II	$822,000	$5,430.50
2			
3			
4			
5			
6			
7			
8			
9			
10			
		D. Base Fee *(if applicable)*	
		E. TOTAL FEE*	$5,430.50

** Check, money order, and Visa or MasterCard (select Environmental Fees from Menu) payments are accepted.*

7. PRIOR NOTIFICATION AND ORDERS

A. Has a notification previously been submitted to, or a Lake or Streambed Alteration Agreement previously been issued by, CDFW for the project described in this notification?

☐ Yes (*Provide the information below*) ☑ No

Applicant	Notification Number	Date

B. Is this notification being submitted in response to a court or administrative order or notice, or a notice of violation (NOV) issued by CDFW?

☐ Yes ☑ No (*Enclose a copy of the order, notice, or NOV. If the applicant was directed to notify CDFW verbally rather than in writing, identify the person who directed the applicant to submit this notification, the agency he or she represents, and describe the circumstances relating to the order.*)

Name of person who directed notification	Agency

Describe circumstances relating to order

☐ *Continued on additional page(s)*

8. PROJECT LOCATION

A. Address or description of project location.
(*Include a map that marks the location of the project with a reference to the nearest city or town, and provide driving directions from a major road or highway.*)

The Project Area is located along the east bank of San Francisquito Creek in the northwestern portion of the Children's Health Council campus located at 650 Clark Way (APN 142-02-020), in Palo Alto, Santa Clara County, California. The Project Area is approximately 0.70 miles upstream from Route 82 (El Camino Real).

From San Francisco, head south on Interstate 280 for approximately 30 miles, take exist 24 for Sand Hill Road toward Menlo Park, follow signs for Sand Hill Road and continue on for approximately 3 miles, turn left at Clark Way. Clark Way terminates in a parking lot; the Project Area is northwest of the CHC parking lot.

☐ *Continued on additional page(s)*

B. River, stream, or lake affected by the project.	San Francisquito Creek
C. What water body is the river, stream, or lake tributary to?	San Francisco Bay
D. Is the river or stream segment affected by the project listed in the state or federal Wild and Scenic Rivers Acts?	☐ Yes ☑ No ☐ Unknown
E. County	Santa Clara County

F. USGS 7.5 Minute Quad Map Name	G. Township	H. Range	I. Section	J. ¼ Section
Palo Alto	T6S	R3W	n/a	

☐ *Continued on additional page(s)*

K. Meridian (check one) ☐ Humboldt ☑ Mt. Diablo ☐ San Bernardino

L. Assessor's Parcel Number(s)

142-02-020	

☐ *Continued on additional page(s)*

M. Geographic coordinates (*Provide the latitude and longitude coordinates for the property where the project(s) will take place. CDFW utilizes decimal degrees and WGS 84 datum. Access Google Maps Help if you need assistance in finding your coordinates.)*

Latitude/Longitude	*Latitude:* 37.440691	*Longitude:* -122.179399
	Latitude: ##.#####	*Longitude:* -###.#####
	Latitude: ##.#####	*Longitude:* -###.#####
	Latitude: ##.#####	*Longitude:* -###.#####
	Latitude: ##.#####	*Longitude:* -###.#####

9. PROJECT CATEGORY

WORK TYPE	NEW CONSTRUCTION	REPLACE EXISTING STRUCTURE	REPAIR-MAINTAIN-OPERATE EXISTING STRUCTURE
Bank stabilization – bioengineering/recontouring	☑	☐	☐
Bank stabilization – rip-rap/retaining wall/gabion	☐	☐	☐
Boat dock/pier	☐	☐	☐
Boat ramp	☐	☐	☐
Bridge	☐	☐	☐
Channel clearing/vegetation management	☐	☐	☐
Culvert	☐	☐	☐
Debris basin	☐	☐	☐
Dam	☐	☐	☐
Filling of wetland, river, stream, or lake	☐	☐	☐
Geotechnical survey	☐	☐	☐
Habitat enhancement – revegetation/mitigation	☑	☐	☐
Levee	☐	☐	☐
Low water crossing	☐	☐	☐
Road/trail	☐	☐	☐
Sediment removal: pond, stream, or marina	☑	☐	☐
flood control	☐	☐	☐
Storm drain outfall structure	☐	☐	☐
Temporary stream crossing	☐	☐	☐
Utility crossing: horizontal directional drilling	☐	☐	☐
jack/bore	☐	☐	☐
open trench	☐	☐	☐
Water diversion without facility	☐	☐	☐
Water diversion with facility	☐	☐	☐
Other *(specify)*:	☐	☐	☐

10. PROJECT DESCRIPTION

A. Describe the project in detail. Include photographs of the project location and immediate surrounding area.

- Written description of all project activities with detailed step-by-step description of project implementation.
- Include any structures (e.g., rip-rap, culverts) that will be placed or modified in or near the stream, river, or lake, and any channel clearing.
- Specify volume, and dimensions of all materials and features (e.g., rip rap fields) that will be used or installed.
- If water will be diverted or drafted, specify the purpose or use and include Attachment C.
- Enclose diagrams, drawings, design plans, construction specifications, and maps that provide all of the following: site specific construction details; dimensions of each structure and/or extent of each activity in the bed, channel, bank or floodplain; overview of the entire project area (i.e., "bird's-eye view") showing the location of each structure and/or activity, significant area features, stockpile areas, areas of temporary disturbance, and where the equipment/machinery will access the project area.
  - A helpful resource to assist in the development of quality PDF maps in Google Earth. See Using Google Earth to Map your Property (PDF).

The Project proposes to rebuild and stabilize approximately 275 linear feet of eroding stream bank, and enhance stream and riparian habitat, along San Francisquito Creek, located in Palo Alto, Santa Clara County, California. The proposed bioengineered crib wall is positioned at the forefront of ongoing erosion of the creek bank, with a variety of native riparian vegetation plantings planned within and above the crib wall to improve habitat for fish, birds and other species. The Project will construct a live log crib wall supported by a geoengineered foundation on the east bank of the creek. The crib wall foundation consists of large boulders, cobble alluvium, and rootwads secured together and embedded within the bank. The crib wall structure consists of wooden logs and will be anchored to the foundation and existing bank with support anchors and rooted vegetation. Slopes on and above the crib wall will be graded and planted with native trees, shrubs, and grasses. Project work is scheduled to commence May 1, 2021 and be completed by October 30, 2021, during the dry season, thus minimizing disturbance to aquatic species, habitat and water quality. Any work during subsequent years of construction will adhere to these same additional work windows. Anticipated project outcomes include a stabilized stream bank using bioengineered techniques; enhanced stream and riparian habitat to provide flow refugia, stream shading and other benefits for fish and aquatic life and riparian canopy for birds; and reduced input of fine sediment to San Francisquito Creek.

For a complete Project description, see Part 4. Supplemental and Part 12. Project Plans.

☑ *Continued on additional page(s)*

B. Specify the equipment and machinery that will be used to complete the project.

Construction equipment used to complete the Project may include general use service vehicles (i.e. pickup trucks), excavators, haul trucks, dewatering equipment (i.e. pumps, generators, piping), trailers, and assorted power and hand tools. All construction and equipment will be staged above the TOB and outside the limit of grading.

☐ *Continued on additional page(s)*

C. Will water be present during the proposed work period (specified in box 4.D) in the stream, river, or lake (specified in box 8.B).	☑ Yes ☐ No (*Skip to box 11*)
D. Will the project require work in the wetted portion of the channel?	☑ Yes (*Enclose a plan to divert water around work site*) ☐ No

11. PROJECT IMPACTS

A. Describe impacts to the bed, channel, and bank of the river, stream, or lake, and the associated riparian habitat. Specify the dimensions of the modifications in length (linear feet) and area (square feet or acres) and the type and volume of material (cubic yards) that will be moved, displaced, or otherwise disturbed, if applicable.

Construction activities will disturb a total of approximately 0.14 acres of stream area below OHWM within San Francisquito Creek and includes the excavation of 1,080 cubic yards of artificial and native alluvium, grading, and placement of approximately 1,450 cubic yards of boulder/cobble, woody material, and engineered fill in the stream area. No loss of stream area below OHWM will occur as a result of proposed activities. In addition, vegetation clearing and placement of clean fill material is necessary for the purpose of constructing a temporary access route to access the Project Area. Any imported material that is used will be clean and possess no contamination threat to existing archaeological sites. Work for the access route will temporarily disturb 0.02 acres below OHWM and includes placement of 158 cubic yards of clean fill material.

Riparian vegetation removal will disturb 0.08 acre up to the riparian drip line and entail the removal of six trees; three coast live oak (Tree #742, #996, and #997), two California buckeyes (Tree # 746 and #991), and one red willow (Tree #987). All trees to be removed are located on the east bank. In addition, understory poison oak patches and herbaceous cover will be cleared and grubbed. Disturbed vegetated riparian habitat within the Project Area will be restored with native riparian plantings, which will further stabilize and enhance the ecological functions and values that the removed riparian trees provided to San Francisquito Creek. Approximately 0.15 acre of riparian revegetation planting will occur. The enhanced riparian habitat will be of higher quality to the stream corridor, as the banks will be stabilized and tree composition will be more native and diverse.

For a complete project description and calculation of environmental impacts, please refer to Part 4. Supplemental Information, Part 5. Figures, Part 12. Project Plans, and Part 16. Habitat Mitigation and Monitoring Plan.

☐ *Continued on additional page(s)*

B. Will the project affect any vegetation? ☑ Yes (*Complete the tables below*) ☐ No *(Include aerial photo with date supporting this determination)*

Vegetation Type	Temporary Impact	Permanent Impact
Mixed riparian woodland	Linear feet: 275.00 Total area: 0.08	Linear feet: 275.00 Total area: 0.08
	Linear feet: _____ Total area: _____	Linear feet: _____ Total area: _____

Tree Species	Number of Trees to be Removed	Trunk Diameter (range)
Quercus agrifolia	3	4 to 14.1 dbh
Aesculus californica	2	4 to 11.0 dbh (one multi-trunk)
Salix laevigata	1	4 dbh

☑ *Continued on additional page(s)*

C. Are any special status animal or plant species, or habitat that could support such species, known to be present on or near the project site?

☑ Yes *(List each species and/or describe the habitat below)* ☐ No ☐ Unknown

No special-status wildlife species or special-status plants have been observed within the Project Area. However, the Project Area is within known steelhead habitat. See Part 9. Special Status Species Table for a full list of special-status species and their potential to occur within the Project Area.

☑ *Continued on additional page(s)*

D. Identify the source(s) of information that supports a "yes" or "no" answer above in Box 11.C.

See discussion in Part 4. Supplemental and Part 9. Special Status Species Table for species determinations

☑ *Continued on additional page(s)*

E. Has a biological study been completed for the project site?

☑ Yes (*Enclose the biological study*) ☐ No

Note: A biological assessment or study may be required to evaluate potential project impacts on biological resources.

F. Has one or more technical studies (e.g., engineering, hydrologic, geological, or geomorphological) been completed for the project or project site?

☑ Yes *(Enclose the study(ies))* ☐ No

Note: One or more technical studies may be required to evaluate potential project impacts to a lake or streambed.

G. Have fish or wildlife resources or waters of the state been mapped or delineated on the project site?

☑ Yes (*Enclose the mapped results*) ☐ No

Note: Check "yes" if fish and wildlife resources or waters of the state on the project site have been mapped or delineated. "'Wildlife' means and includes all wild animals, birds, plants, fish, amphibians, reptiles and related ecological communities, including the habitat upon which the wildlife depends." (Fish & G. Code, § 89.5.) If "yes" is checked, submit the mapping or delineation. If the mapping or delineation is in digital format (e.g., GIS shape files or KMZ), you must submit the information in this format for CDFW to deem your notification complete. If "no" is checked, or the resolution of the mapping or delineation is insufficient, CDFW may request mapping or delineation (in digital or non-digital format), or higher resolution mapping or delineation for CDFW to deem the notification complete.

12. MEASURES TO PROTECT FISH, WILDIFE, AND PLANT RESOURCES

A. Describe the techniques that will be used to prevent sediment, hazardous, or other deleterious materials from entering watercourses during and after construction.

Best management practices to prevent sediment from entering watercourses are described in Part 4. Supplemental Information. Erosion control measures will be utilized throughout all phases of operation where sediment runoff from exposed slopes threaten to enter all waters of the U.S. Erosion control structures will be monitored for effectiveness and will be repaired or replaced as needed. Appropriate erosion control measures will be installed around any stockpiles of soil or other materials that could be mobilized by rainfall or runoff. No construction-related materials or wastes will be allowed to enter into or be placed where they may be washed by rainfall or runoff into the aquatic features. All such debris and waste will be picked up daily and properly disposed of at an appropriate facility.

☑ *Continued on additional page(s)*

B. Describe project avoidance and/or minimization measures to protect fish, wildlife, and plant resources.

Best management practices to protect fish, wildlife, and plant resources are described in Part 4. Supplemental Information and Part 10. Section 7 Biological Assessment. All equipment that may have come in contact with invasive plants or seeds will be carefully cleaned before arriving on the site and before removal from the site to prevent spread of these plants. Construction disturbance or removal of vegetation will be restricted to the minimum footprint necessary to complete the work. Project activities will avoid impacts to riparian vegetation to the greatest extent possible. Staging and storage areas for equipment, materials, fuels, and lubricants, will be located outside of the creek channel banks and outside. Environmental awareness training program for all crews working on the site to include education on sensitive resources such as protected wildlife with the potential to occur within the Project Area, water quality, and environmental protection measures. Additional measures will be taken to protect steelhead, California red-legged frog, and nesting birds. These measures include surveys, monitoring, limitation of work windows, worker awareness training, and other practices described in Part 4. Supplemental Information and Part 10. Biological Assessment.

☑ *Continued on additional page(s)*

C. Describe any project mitigation and/or compensation measures to protect fish, wildlife, and plant resources.

The Project is self-mitigating by nature. As such, on-site mitigation is proposed and on-site riparian habitat will be replaced and expanded; therefore, no additional off-site mitigation is proposed. Impacted riparian habitat within the Project Area will be restored with riparian plantings, which are expected to stabilize and enhance the ecological functions and values that the removed riparian trees provided to San Francisquito Creek. The enhanced riparian habitat will be of higher quality to the stream corridor, as the banks will be stabilized and tree composition will be more native and diverse.

The Habitat Mitigation and Monitoring Plan (Part 16) discusses the proposed restoration and mitigation actions for the Project.

☑ *Continued on additional page(s)*

13. PERMITS

List any local, State, and federal permits required for the project and check the corresponding box(es). Enclose a copy of each permit that has been issued.

A. U.S. Army Corps of Engineers Section 404 NWP 13 ☑ Applied ☐ Issued

B. RWQCB Section 401 Water Quality Certification ☑ Applied ☐ Issued

C. U.S. Fish and Wildlife Service Section 7 Biological Assessment ☑ Applied ☐ Issued

D. Unknown whether ☐ local, ☐ State, or ☐ federal permit is needed for the project. (*Check each box that applies*)

☐ *Continued on additional page(s)*

14. ENVIRONMENTAL REVIEW

A. Has a CEQA lead agency been determined?	☑ Yes (*Complete boxes B, C, D, E, and F*) ☐ No (*Skip to box 14.G*)		
B. CEQA Lead Agency	City of Palo Alto		
C. Contact Person	Claire Hodgkins, Planner	D. Phone Number	650-329-2116

E. Has a draft or final document been prepared for the project pursuant to CEQA and/or NEPA?

☐ Yes (*Check the box below for each CEQA or NEPA document that has been prepared and enclose a copy of each.*)

☑ No (*Check the box below for each CEQA or NEPA document listed below that will be or is being prepared.*)

☐ Notice of Exemption	☐ Mitigated Negative Declaration	☐ NEPA document (*type*):
☑ Initial Study	☐ Environmental Impact Report	
☐ Negative Declaration	☐ Notice of Determination *(Enclose)*	
☐ THP/ NTMP	☐ Mitigation, Monitoring, & Reporting Plan	

F. State Clearinghouse Number (*if applicable*)	TBD

G. If the project described in this notification is not the "whole project" or action pursuant to CEQA, briefly describe the entire project (Cal. Code Regs., tit. 14 § 15378).

N/A

☐ *Continued on additional page(s)*

H. Has a CEQA filing fee been paid pursuant to Fish and Game Code section 711.4?

☐ Yes (*Enclose proof of payment*) ☑ No (*Briefly explain below the reason a CEQA filing fee has not been paid)*

Note: The CEQA filing fee is in addition to the notification fee. If a CEQA filing fee is required, the Lake or Streambed Alteration Agreement may not be finalized until paid.

Preparation is pending.

15. SITE INSPECTION

Check one box only.

☐ In the event CDFW determines that a site inspection is necessary, I hereby authorize a CDFW representative to enter the property where the project described in this notification will take place at any reasonable time, and hereby certify that I am authorized to grant CDFW such entry.

☑ I request CDFW to first contact (*insert name*) Terry Boyle at (*insert phone number or email address*) 650-688-3602, tboyle@chconline.org to schedule a date and time to enter the property where the project described in this notification will take place. I understand that this may delay CDFW's determination as to whether a Lake or Streambed Alteration Agreement is required and/or CDFW's issuance of a draft agreement pursuant to this notification.

16. DIGITAL FORMAT

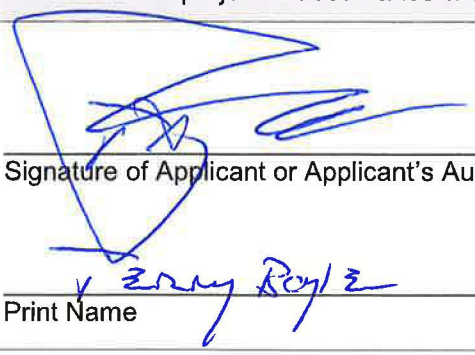
Is any of the information included as part of the notification available in digital format (i.e., CD, DVD, etc.)?

☑ Yes (Please enclose the information via digital media with the completed notification form.)

☐ No

17. SIGNATURE

I hereby certify that to the best of my knowledge the information in this notification is true and correct and that I am authorized to sign this notification as, or on behalf of, the applicant. I understand that if any information in this notification is found to be untrue or incorrect, CDFW may suspend processing this notification or suspend or revoke any draft or final Lake or Streambed Alteration Agreement issued pursuant to this notification. I understand also that if any information in this notification is found to be untrue or incorrect and the project described in this notification has already begun, I and/or the applicant may be subject to civil or criminal prosecution. I understand that this notification applies only to the project(s) described herein and that I and/or the applicant may be subject to civil or criminal prosecution for undertaking any project not described herein unless CDFW has been separately notified of that project in accordance with Fish and Game Code section 1602 or 1611.



Signature of Applicant or Applicant's Authorized Representative

07/06/20
Date

Terry Boyle
Print Name

Part 4. Supplemental Project Information

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Table of Contents

1.0 INTRODUCTION

The following provides supplemental information in support of applications for an United States (U.S.) Army Corps of Engineers (Corps) Pre-construction Notification (PCN) form for Nationwide Permits (NWP) 13 – *Bank Stabilization*, (Part 1), a Regional Water Quality Control Board (RWQCB) CWA Section 401 Water Quality Certification (WQC; Part 2), and a California Department of Fish and Wildlife (CDFW) California Fish and Game Code (CFGC) Section 1602 Notification of Streambed Alteration Agreement (SAA; Part 3) for the San Francisquito Creek Bank Stabilization Phase II Project (Project) proposed by the Children's Health Council (CHC; Applicant), located in the City of Palo Alto, Santa Clara County, California. CHC is a provider of education and clinical services to children and teens with autism, ADHD, anxiety and depression, and other learning differences. CHC consists of two on-site schools, a therapy center, clinics for underserved families, community education center, outdoor learning area/playground, and serves approximately 150 students daily.

The banks of San Francisquito Creek at the margins of Children's Health Council are at high risk for erosion, and are identified as a high priority for stabilization in the San Francisquito Creek Joint Powers Authority (JPA) Bank Stabilization and Revegetation Master Plan. Erosion of the channel banks on the CHC property accelerated during the 2016 – 2017 rainy season, resulting in the loss of approximately 50 horizontal feet of the creek bank and 7,500 square feet of the outdoor learning area, which poses a danger to CHC students if left unmanaged. The channel banks in the area of accelerated erosion are approximately 30 feet high, with vertical faces and undercut portions of bank.

Phase I of emergency bank stabilization work was completed in spring 2019. Phase I work included installation of a reinforced concrete "shear pins" and steel tie-backs set above the top-of-bank (TOB) outside of Corps, RWQCB, and CDFW jurisdiction. The shear pins are a line-of-last-defense against bank retreat and loss of property into the creek, but do not protect the existing character of creek from erosive forces. Phase II, and the subject this application, includes construction of an in-channel living crib wall structure, designed to protect the toe of the existing bank, prevent future bank failure, and provide salmonid habitat. This current phase of the Project is mandated by the City of Palo Alto based on comments received from the Santa Clara Valley Water District and JPA on the original shear pin stabilization project. These applications are being submitted in compliance with the City requirements, which states:

> *"Subsequent Project for In-channel Erosion Control…The property owner or its designee shall file a formal application with the City of Palo Alto…and with all other applicable agencies…no later than February 2019 with the goal of obtaining all applicable permits no later than 2020 and completing all in-channel work by 2021."*[a]

The Applicant proposes bank stabilization along approximately 275 linear feet of San Francisquito Creek through crib wall stabilization and riparian plantings. The purpose of the project is to stabilize slopes along San Francisquito Creek and to provide salmonid habitat. The Project is

[a] City and environmental regulatory permit submittal is occurring in 2020.

currently moving toward a final construction design and regulatory permits are being requested from the Corps, the RWQCB, and the CDFW.

This Permit Application Package is comprised of the following elements to request permits from the agencies listed above:

- PCN form for Corps Nationwide Permits 13 – *Bank Stabilization*, is included in Part 1
- An application for CWA Section 401 WQC from the San Francisco RWQCB is included in Part 2;
- A Notification of CDFW Section 1602 SAA from CDFW is included in Part 3.
- The following supporting documentation, in Parts 4 through 17:
    - Supplemental Information (Part 4), Project Figures (Part 5), Project Area Photographs (Part 6), Tree Survey Results (Part 7), Observed Species List (Part 8), Special-status Species Table (Part 9), Section 7 Biological Assessment (Part 10), California Environmental Quality Act (CEQA) Documentation (Part 11), Project Plans (Part 12), Hydrological Study (Part 13), Dewatering Plan (Part 14), Fish Relocation Plan (Part 15), Habitat Mitigation Monitoring Plan (HMMP; Part 16), and Cultural Resources Report (Part 17).

2.0 PROJECT OVERVIEW, EXISTING CONDITIONS, AND PROJECT DESCRIPTION

****This section provides a more detailed description of information provided in:**

- **Boxes 2.e, 4.a, and 4.b in Attachment 1, and Box 7 in Attachment 2 of U.S. Army Corps of Engineers Application for the Section 404 Preconstruction Notification;**
- **Box 9, 10, 11, 12, 13, 14, 15, and 24 of the San Francisco Bay Regional Water Quality Control Board Application for Section 401 Certification; and**
- **Boxes 8 and 10 of the Section 1602 California Department of Fish and Game Notification of Lake or Streambed Alteration**

2.1 Existing Conditions

2.1.1 Location, Land Use, Topography, and Soils

The Project Area is located on the east bank of San Francisquito Creek on a portion of the 4.3-acre CHC property located at 650 Clark Way (Assessor Parcel Number (APN) 142-02-020), owned by Stanford University (Project Area; Part 5, Figure 1). The Project Area is located on the north border of Santa Clara County near San Mateo County, positioned between Sand Hill Road and residential neighborhoods. The surrounding land uses to the Project Area are primarily residential neighborhoods along with apartment buildings, a retirement community complex, City-owned open space, and CHC.

The Project Area totals approximately 0.69 acre and is located within the northwest grounds of CHC. The dominant feature in the Project Area is San Francisquito Creek and its associated riparian corridor. The riparian corridor within the Project Area is in a semi-natural state. Portions of the creek bank are dominated by native and non-native woody species with an herbaceous

of the creek bank are dominated by native and non-native woody species with an herbaceous understory. An approximately 100-foot section of the creek bank exposed by erosion events is partially vegetated primarily with non-native upland species. The creek maintains meandering flow throughout the Project Area. Scattered willows and facultative shrubs are present within the creek bed, below Ordinary High-water Mark (OHWM).

San Francisquito Creek is a United States Geological Survey (USGS) named perennial stream that flows through the Project Area in a northerly direction. The creek is the Project Area's most prominent natural feature, with all adjacent drainage flowing to it. The creek is positioned within an approximately 30-foot deep by 60-foot wide fluvial terrace. The current condition of the east bank of San Francisquito Creek consists of an incised channel and an approximately 20- to 30-foot high vertical bank. Above the TOB buried below the surface is the constructed shear pin wall (Phase I). Below the reinforced shear pin wall, the creek bank is comprised of a mixture of native soil, exposed brick, and unconsolidated sand-gravel alluvium. Evidence of mass wasting of bank material is evident at the bank's toe of slope. In areas of erosion, the creek banks are sparsely vegetated. Toe scour is evident along much of the Project Area, indicating that current flows are continually eroding the creek bank. The combination of height and steepness of the bank, sparse vegetation, evidence of recent incision and toe erosion, and unconsolidated nature of bank material strongly suggests that the bank will continue to retreat laterally unless it is adequately reinforced.

The Project Area contains one mapped soil type, Urban land-Still complex, 0 to 2 percent slopes, which is not considered a hydric soil (NRCS 2019). Elevations within the Project Area range from approximately 59 to 90 feet above mean sea level (msl).

2.1.2. Biological Communities, Non-wetland Waters, and Wetlands

The Project Area contains landscaped and developed areas, areas of ruderal and weedy vegetation, San Francisquito Creek, mixed riparian woodland[b]. Photographs of the site are included in Part 6. Acreages of existing jurisdictional resources and sensitive biological communities that occur within the Project Area are discussed below in Table 1 and depicted in Part 5. Figure 2. Descriptions of the communities present in the Project Area are provided below.

Landscaped/Developed

The Project Area contains approximately 0.32 acre of landscaped/developed area. These areas are located in the east portion of the Project Area and outside and above TOB. Landscaped/Developed areas include the existing outdoor learning area/playground, a paved parking lot turnaround, gravel access pathways (associated with Phase I), fencing, and landscaped areas. Landscaped areas contain a mixture of ornamental and native tree species including pear (*Pyrus* sp.), coast redwood (*Sequoia sempervirens*), and coast live oak (*Quercus agrifolia*).

[b] Mixed riparian woodland refers to area above OHWM up to the riparian drip line. However, the discussion of riparian drip line is not synonymous with mixed riparian woodland.

Unvegetated/Ruderal

Approximately 0.15 acre of unvegetated/ruderal area occurs below TOB within the Project Area. Unvegetated/Ruderal areas occur in large swathes along the creek bank where erosion has occurred. These areas are either bare and devoid of vegetative cover or dominated by upland species including French broom (*Genista monspessulana*), poison oak (*Toxicodendron diversilobum*), short-podded mustard (*Hirschfeldia incana*), and non-native grasses including slim oat (*Avena barbata*) and ripgut brome (*Bromus diandrus*).

Perennial Stream (San Francisquito Creek)

San Francisquito Creek is a perennial stream that occupies approximately 275 linear feet (0.14 acre) of the Project Area. The creek is confined within an approximately 30-foot deep by 60-foot wide fluvial terrace. Within the Project Area, San Francisquito Creek flows south to north. The creek bed in undisturbed portions of channel contains cobbles mixed with gravel, sand, and silts. Disturbed portions of the creek bed contain eroded brick from a historic foundation buried in the creek bank, and native material eroded from the bank. The creek contains well-developed meanders and point bar complexes upstream and downstream of the Project Area. During the rainy season, the creek channel varies between 10 to 20 feet wide and approximately 3 feet deep. During summer months or times of low precipitation, the channel becomes shallow and narrow (approximately 1 to 2 feet wide); occasionally drying completely with the exception of pockets of standing water.

Woody species observed on the banks of San Francisquito Creek include, polished willow (*Salix laevigata*), coast live oak, tree of heaven (*Ailanthus altissima*), and California bay (*Umbellularia californica*). Portions of the creek bank slumped into the creek are primarily denude of vegetation or contain sparse cover of tree tobacco (*Nicotiana glauca*), French broom, and native and non-native forb species including Bermuda buttercup (*Oxalis pes-caprae*), stinging nettle (*Urtica dioica*), and poison hemlock (*Conium maculatum*). The OHWM was mapped based on evidence of bed and bank indicators, scouring, and/or sediment sorting. The TOB was mapped based on geomorphic position within the landscape, extent of erosion, and break in slope.

Mixed Riparian Woodland

Approximately 0.0.08 acre of mixed riparian woodland was mapped along the east edge of San Francisquito Creek. The riparian area is dominated by sharply sloping areas and consist of woody species including coast live oak, California bay, California buckeye (*Aesculus californica*), silver wattle (*Acacia dealbata*), and blue gum (*Eucalyptus globulus*). The understory consists of non-native woody species including tree tobacco and non-native grasses and forbs including ripgut brome, slim oat, Bermuda buttercup, and periwinkle (*Vinca major*). The lateral extent of riparian habitat was estimated using the outward drip line of vegetation that is clearly dependent on or strongly influenced by water within San Francisquito Creek.

Table 1. Existing Jurisdictional and Biological Communities within the Project Area.

Feature	Biological Community	Acreage
Non-wetland waters	San Francisquito Creek	0.14
Riparian	Mixed Riparian Woodland	0.08
N/A	Unvegetated/Ruderal	0.15

2.2 Project Description

2.2.1. Project Overview

The Applicant proposes to rebuild and stabilize approximately 275 linear feet of eroding stream bank, and enhance stream and riparian habitat, along San Francisquito Creek, located in Palo Alto, Santa Clara County, California. The proposed bioengineered crib wall is positioned at the forefront of ongoing erosion of the creek bank, with a variety of native riparian vegetation plantings planned within and above the crib wall to improve habitat for fish, birds and other species. The Project will construct a live log crib wall supported by a geoengineered foundation on the east bank of the creek. The crib wall foundation consists of large boulders, cobble alluvium, and rootwads secured together and embedded within the bank. The crib wall structure consists of wooden logs and will be anchored to the foundation and existing bank with support anchors and rooted vegetation. Slopes on and above the crib wall will be graded and planted with native trees, shrubs, and grasses. Project work is scheduled to commence May 1, 2021 and be completed by October 30, 2021, during the dry season, thus minimizing disturbance to aquatic species, habitat and water quality. Any work required in subsequent years will adhere to these same seasonal work windows. Anticipated project outcomes include a stabilized stream bank using bioengineered techniques; enhanced stream and riparian habitat to provide flow refugia, stream shading and other benefits for fish and aquatic life and riparian canopy for birds; and reduced input of fine sediment to San Francisquito Creek.

2.2.2. Bank Stabilization

Work on the crib wall is located downslope of the shear pin wall constructed during Phase I (completed spring 2019). Crib wall work will start once the work area is established with appropriate exclusion fencing, implementation of species avoidance and minimization measures, vegetation removal, and construction of the temporary access route into the work area, and dewatering operations (if streamflow, pooled water or groundwater inflow is present) are completed. Species-specific measures include but are not limited to fish salvage and relocation and are discussed in greater detail in Section 4.2 and 4.3. A temporary access pathway will be constructed to allow construction equipment and construction personnel ingress and egress from within the work area and is discussed further in 2.2.3. A detailed dewatering and fish relocation plan are included in Part 14 and 15 respectively of this permit application package. All work will occur within the top of bank and riparian drip line, with some work also occurring below the OHWM.

Creek stabilization work will entail the excavation mostly of native sediment with some amounts of eroded brick, all below the TOB. All artificial debris removed will be off-hauled to an appropriate

disposal site as it is not an appropriate material for backfill within this perennial stream system. Excavated native sediment will be removed from the work area and evaluated for re-use. If reuse is not appropriate, the native material will be off-hauled as well to an appropriate upland disposal site.

Once the east bank of San Francisquito Creek is excavated, a new channel bank will be rebuilt in approximately the same elevation and location as the existing bank with the bioengineered crib wall. Work includes grading, placement of boulder and cobble fill, placement, anchoring, and pinning of rootwads and crib logs, placement of engineered fill, and native seeding and planting within the riparian area. Clean boulder, cobble, and engineered fill material will be imported and placed below TOB. Any imported material that is used will be clean and possess no contamination threat to existing archaeological sites. The boulder grade control will serve as the foundation of the crib wall and prevent the channel from undercutting the crib wall. Above the foundation, a "Lincoln-log" style structure crib wall will be embedded into the creek bank. The structure will consist of stacked 1.5-foot diameter logs, either Douglas fir (*Pseudotsuga menziesii*), coast redwood, or another native riparian tree if determined necessary (no eucalyptus will be used), at a 1:1 slope along the bank. The structure will be secured together with threaded rebar and helical anchors in the bank. The first log level of the crib wall will use tie-back logs, which are logs set into the bank, braced to resist the force of the streamflow. In addition, the first level of the crib wall will also include 13 rootwads, spaced approximately 10 feet apart. The rootwads provide additional streambank protection and interstitial space for fish habitat. Rootwads are strategically located at existing pools in the creek to help reduce water velocities during high flow events and to provide habitat and flow refugia for steelhead (Part 13. Hydrology Study). Engineered fill material, consisting of clean gravel and cobble sized material, will be placed within and behind the crib wall cavities. The upper channel bank, area above the crib wall, will be back filled and graded to a maximum slope of 2:1 up to the existing vertical face below TOB. A portion of the exposed vertical face below TOB will remain intact and undisturbed to potential cultural resource impacts. Further details regarding archaeological concerns can be found in Part 17 and 18 of this regulatory permit application package.

Following completion of final grading and work on the lower and upper channel bank, riparian areas within the limit of grading will be seeded and replanted with native woody and herbaceous vegetation to replace removed riparian vegetation. Replanting includes three distinct native riparian planting areas and schedules (Part 12 Project Plans, Sheet C-4.0). The lowest portion of the crib wall (Riparian Area 1) will be planted with arroyo willow (*Salix lasiolepis*) and sandbar willow (*Salix exigua*) stakes placed within the lower crib wall cavities. The remaining slopes above will be planted with native riparian shrub and tree species and hydroseeded with a native riparian seed mix (Riparian Areas 2 and 3). Further details concerning replanting of riparian habitat can be found in Part 12. Project Plans and Part 16. Habitat Mitigation and Monitoring Plan (HMMP) of this regulatory permit application package.

2.2.3. Site Access and Staging

To accomplish the bank stabilization work, a temporary access route will be constructed in the south portion of the Project Area. The access route will connect to the CHC parking lot and is located in an area with relatively gradual slopes, which provides the only feasible route of entry to minimize impacts to the creek banks, channel and avoid conflicting with an existing cultural resources conservation easement on the property immediately to the north, adjacent to the site.

Vegetation removal will be required to facilitate access road construction and will consist of removing native and non-native shrubs and understory vegetation. Clearing will entail removal of six trees; three coast live oak (Tree #742, #996, and #997), two California buckeye (Tree # 746 and #991), and one red willow (*Salix laevigata*; Tree #987). No paving is proposed for the temporary access route.

All material excavated from the stream bank will be stockpiled above the TOB in designated staging areas or hauled off-site. Based on the composition of the excavated material, it will either be hauled off-site and disposed of at a proper facility, or it will be sorted and reused as alluvium backfill within the crib wall.

2.2.4 Equipment

Construction equipment used to complete the Project may include general use service vehicles (i.e. pickup trucks), excavators, haul trucks, dewatering equipment (i.e. pumps, generators, piping), trailers, and assorted power and hand tools. All construction and equipment will be staged above the TOB and outside the limit of grading. Operation of some pieces of smaller construction equipment within the channel will be necessary to complete crib wall construction.

3.0 PROJECT DISTURBANCE

****This section provides a more detailed description of information provided in:**

- **Box 4.c in Attachment 1, and Box 15 in Attachment 2 of U.S. Army Corps of Engineers Application for the Section 404 Preconstruction Notification;**
- **Box 11 of the Section 1602 California Department of Fish and Game Notification of Lake or Streambed Alteration; and**
- **Box 4 of the Central Valley Regional Water Quality Control Board Application for Section 401 Certification**

The Project will disturb non-wetland waters, unvegetated/ruderal area, and riparian habitat within the Project Area. The Project Area also provides potential habitat for special-status wildlife species and species under the Migratory Bird Treaty Act. Potential disturbance to these habitats and species, as well as proposed avoidance and minimization and recommended mitigation measures, are provided in the following sections.

As described in Table 1 in Section 2.1.2, the Project Area contains 0.14 acres of non-wetland waters (wetted channel), 0.15 acres of unvegetated/ruderal area, and 0.08 acres of mixed riparian woodland (includes riparian drip line beyond TOB). Project disturbance from construction activities is summarized in Table 2 (below) and is shown on Figure 6 in Part 5. Figures.

Table 2. Project Activities within Jurisdictional Areas

Activity	**Wetted Channel Area below OHWM**		**Unvegetated/Ruderal Area Above OHWM**		**Vegetated Riparian Area Above OHWM (up to riparian drip line)**	
	Temporary (ac. / sq. ft. / cy)	**Permanent (ac. / sq. ft. / cy)**	**Temporary (ac. / sq. ft. / cy)**	**Permanent (ac. / sq. ft. / cy)**	**Temporary (ac. / sq. ft. / cy)**	**Permanent (ac. / sq. ft. / cy)**
Bioengineered Bank Stabilization	-	0.14 / 6,140 / 1,450	-	0.15 / 6,534 / 735	-	0.08 / 3,485 / 315
Access Road Construction	0.02 / 819 / 158	-	0.01 / 614 / 150	-	0.01 / 553 / 141	-
Riparian Revegetation Planting	-	0.04 / 1,516 / -	-	0.1 / 4,211 / -	-	0.01 / 546 / -

3.1 Wetted Channel Area

Construction activities will disturb a total of approximately 0.14 acre (6,140 square feet) of streambed below OHWM within San Francisquito Creek and includes the excavation of 1,080 cubic yards of artificial and native alluvium, grading, and placement of approximately 1,450 cubic yards of boulder/cobble, woody material, and engineered fill in the streambed. However, no loss of stream area below OHWM will occur. In addition, vegetation clearing and placement of clean fill material is necessary for the purpose of constructing a temporary access route to access the Project Area. Work for the temporary access route will disturb 0.02 acre (819 square feet) of vegetation and includes the temporary placement of 158 cubic yards of clean fill material. Upon completion of the Project, fill material used for the temporary access route will be off-hauled from the site to an appropriate disposal site, grades restored to match surrounding areas, and the area revegetated with riparian species.

3.2 Unvegetated/Ruderal Area

Crib wall work within the unvegetated/ruderal area includes 0.15 acre (6,534 square feet) of permanent disturbance to the bare/eroded portions of San Francisquito Creek. Disturbance includes excavation of 189 cubic yards of artificial fill and native fill material, grading, and placement of approximately 735 cubic yards of fill for the crib wall structure and backfill material. The temporary access road extends into the unvegetated/ruderal area and will disturb approximately 0.01 acre (614 square feet; includes area above OHWM and below TOB) and require the placement of approximately 150 cubic yards of clean fill.

3.3 Vegetated Riparian Area

Crib wall work within vegetated riparian area includes 0.08 acre (3,485 square feet) of permanent disturbance as a result of the placement of bioengineered bank stabilization materials, excavation of 101 cubic yards of artificial and native fill material, grading, and placement of approximately

315 cubic yards of fill for the crib wall structure and backfill material. The temporary access road will also extend into the riparian area and will disturb 0.01 acre (553 square feet, includes area above OHWM and below TOB) requiring placement of approximately 191 cubic yards of clean fill.

Riparian vegetation removal will disturb 0.06 acre below TOB[c] and entails the removal of six trees; three coast live oak (Tree #742, #996, and #997), two California buckeyes (Tree # 746 and #991), and one red willow (Tree #987). All trees to be removed are located on the east bank. In addition, understory poison oak patches and herbaceous cover will be cleared and grubbed. Details of all trees inventoried are included in the Tree Survey Report included in Part 7 of this permit application package. Tree species proposed for removal are depicted on Sheet C-4.0 in Part 9. Project Plans.

Riparian habitat disturbed in the Project Area will be restored immediately following final grading activities. Riparian revegetation totals approximately 0.15 acre (6,360 square feet). Riparian revegetation is discussed further in Section 2.2.2 above and described in further detail is Part 16. HMMP. In accordance with the City of Palo Alto's Tree Technical Manual, Ordinance-sized trees will be protected with tree protection fencing and signage before construction activities commence; protection fencing and signage will remain in place for duration of work. Tree replacement will occur at a minimum of a 3:1 ratio for the number of trees removed, with new native tree species planted to add greater diversity to the riparian cover within the Project Area.

3.4 Special-Status Plant Species

No special-status plant species were observed in the Project Area during biological surveys conducted on February 6, 2018 and November 1, 2019. Based on existing site conditions (i.e. prolific disturbance from eroding creek bank), abundance of non-native invasive species along the creek bank and riparian habitat, and absence of species from focused surveys conducted during the blooming period or when species would have been easily identifiable vegetatively, no special-status plant species occur within the Project Area or have the potential to occur. No follow-up surveys are recommended.

3.5 Special-Status Wildlife Species

No special-status wildlife species have been observed within the Project Area. One special-status species, Central Coast California (CCC) Distinct Population Segment (DPS) steelhead (*Oncorhynchus mykiss irideus*), is known to be present within San Francisquito Creek. Nine special-status wildlife species are present or have been determined to have a moderate or high potential to occur in the Project Area. The nine special-status wildlife species determined present or with moderate or high potential to occur in the Project Area are discussed in greater detail in Part 9. Special-status species table, and listed below:

- San Francisco dusky-footed woodrat (*Neotoma fuscipes annectens*, SSC);
- Allen's hummingbird (*Selasphorus sasin*, BCC);
- California thrasher (*Toxostoma redivivum*¸ BCC);
- white-tailed kite (*Elanus leucurus*, CFP);
- Nuttall's woodpecker (*Picoides nuttallii*, BCC);

[c] 0.08 acre up to riparian drip line.

- oak titmouse (*Baeolophus inornatus*, BCC);
- Californian (Brewster's) yellow warbler (*Setophaga (Dendroica) petechia brewsteri*, SSC, BCC);
- California red-legged frog (CRLF; *Rana aurora draytonii*, FT, SSC, RP);
- CCC DPS steelhead (*Oncorhynchus mykiss irideus*, FT)

Based on potential for wildlife species occurrence within the Project Area, specific avoidance and minimization measures have been incorporated in the Project design. Details of avoidance and minimization measures are discussed in further detail in Section 4 below.

3.6 Protected Trees

Riparian vegetation clearing will entail the removal of six (6) trees; two mature coast live oaks (Tree #742 and #996) and four saplings including two California buckeyes (Tree # 746 and #991), one coast live oak (Tree #997), and one red willow (Tree #987). Mature coast live oak trees are protected by the local Tree Protection Ordinance (Ordinance). In accordance with the City of Palo Alto's Tree Technical Manual, Ordinance-sized trees will be protected with tree protection fencing and signage before construction activities commence; protection fencing and signage will remain in place for duration of work. All Ordinance-sized trees to be preserved will be protected with 6-foot high chain link fencing. All trees to be removed are located on the east bank. Tree replacement will occur at a minimum 3:1 ratio for the total number of trees removed within and adjacent to the Project Area. Details of tree protection measures are included in Part 9. Project Plans. Details of all trees inventoried are included in the Tree Survey Report included in Part 7 of this permit application package. Tree species proposed for removal are depicted on Sheet C-4.0 in Part 9. Project Plans.

4.0 AVOIDANCE AND MINIMIZATION MEASURES

****This section provides a more detailed description of information provided in:**

- **Boxes 11.11 and 11.12 in Attachment 1, Box 2 in Attachment 2 of U.S. Army Corps of Engineers Application for Section 404 Preconstruction Notification for Nationwide Permit;**
- **Box 16, 19, and 20 of the San Francisco Regional Water Quality Control Board Application for Section 401 Certification; and**
- **Box 12 and 14 of the Section 1602 California Department of Fish and Game Notification of Lake or Streambed Alteration**

This section provides a discussion of avoidance and minimization measures and best management practices (BMPs) that would be incorporated into the Project to minimize adverse environmental effects and ensure that disturbance would be reduced to less than significant levels under CEQA. Measures listed below pertain to sensitive habitat protection and avoidance, water quality protection and erosion control, and special-status species. Additionally, general construction BMPs are provided in this section. A summary of special-status with potential to occur within the Project Area is provided in Part 9. A detailed discussion of federal special-status plant and wildlife species disturbance and avoidance and minimization measures is provided in Part 10. Section 7 Biological Assessment.

4.1 Non-Wetland Waters and Riparian Habitat

The Project will result in permanent and temporary disturbance to waters and riparian habitat. Implementation of the measures below, will result in the minimization of disturbance to the greatest extent possible.

- The Project will be timed to occur during the dry season (May 1 to October 30).
- Construction disturbance or removal of vegetation will be restricted to the minimum footprint necessary to complete the work. The work area will be delineated with high visibility fencing, markers, or silt fencing to minimize impacts to habitat beyond the work limit. Fencing will be maintained throughout Project construction and removed upon completion.
- Any disturbed areas shall be restored with a combination of native seed mix, or appropriate plantings at the conclusion of the Project.
- Dust control will be used as needed to minimize airborne dust.
- Staging, maintenance, and parking areas shall be located outside of stream channel banks. Any petroleum or similar substances shall be staged outside of the channel within a contained area.
- Prior to the start of construction, the contractor shall prepare a hazardous materials management/fuel spill containment plan. This plan should include procedures to be used in the event of spills as well as information regarding the disposal of any spilled materials.
- Refueling or maintenance of equipment (stationary or otherwise) within the TOB shall only occur when secondary containment sufficient to eliminate escape of all potential fluids is in place.
- Stationary equipment such as motors, pumps, and generators, located adjacent to aquatic features will be positioned over drip pans.
- All activities performed near aquatic features will have spill kits available for use in the case of an accidental spill.
- Vehicles will be decontaminated before and after working on the Project (e.g. all soils and petroleum fluids shall be cleaned from the equipment).
- Any equipment or vehicles operated adjacent to aquatic features will be checked and maintained daily to prevent leaks.
- Appropriate BMPs will be installed around any stockpiles of soil or other materials which could be mobilized to prevent runoff from entering aquatic habitats.
- No construction debris or wastes will be placed where they may be washed into any aquatic features. All such debris and waste will be picked-up regularly and will be disposed of at an appropriate facility.
- Any food waste that may attract scavengers shall be deposited in closed containers and removed from the work area daily.
- Upon completion of work, all construction related materials will be removed from the Project Area including any soils used to construct ramps or temporary access points.

4.2 Special-Status Plant Species

No special-status plant species were observed in the Project Area during biological surveys. Based on existing site conditions (i.e. eroding creek bank), abundance of non-native invasive species along the creek bank and riparian habitat, and absence of species from focused surveys,

no special-status plant species occur within the Project Area. No mitigation or follow-up surveys are recommended.

4.3 Special-Status Wildlife Species

Dusky-footed woodrat

Prior to the initiation of Project work within the creek or banks of San Francisquito Creek, a qualified biologist will conduct a preconstruction survey for dusky-footed woodrat nests. If a dusky-footed woodrat nest is found during surveys, the qualified biologist will relocate it outside of the Project Area, out of harm's way. Individuals encountered during this action will be allowed to move out of the area under its own power.

Nesting Birds

Completing work outside of the nesting season is not possible given the constraints related to flow in San Francisquito Creek. A qualified wildlife biologist will conduct a nesting bird survey no more than 14 days prior to the start of Project activities. If no active nests are identified during the surveys, no disturbances will occur to birds and work will progress without restriction. If active nests are identified, a no-disturbance buffer around the nest will be implemented to avoid disturbances to nesting birds. Buffers will be determined by a qualified biologist, and typically range from 25 feet to 500 feet depending on the species and protection status of that species. Once an active nest is determined to no longer be active, because of young fledging or predation, the buffer around the nest will be removed and work will progress without restriction.

California Red-legged Frog

Due to the timing and limited duration of the Project, CRLF is not readily expected to occur within the Project Area. To further ensure potential impacts to CRLF is minimized, additional measures are proposed below to specifically minimize adverse effects to individual CRLF.

- The qualifications of any biologists who will lead CRLF relocation efforts will be submitted to the NMFS or USFWS (respectively) for review and written approval at least thirty (30) calendar days prior to initiation of the Project (Service-approved Biologist). A Service-approved Biologist will be onsite during all activities that may result in take of CRLF.
- All construction personnel will participate in a worker environmental awareness program. Under this program, a Service-approved Biologist (either in person or via a pre-recorded presentation) will instruct all construction personnel about (1) the description and status of the species found on-site; (2) the importance of their associated habitats; (3) a list of measures being taken to reduce impacts on these species during work, and (4) procedures to follow if a protected species is encountered. Once completed workers shall sign a list verifying the completion of training. The list of trained personnel shall be available on-site until completion of the Project.
- The contact information for a Designated Representative who will assure compliance with any measures implemented for the Project will be submitted to the USFWS and NMFS at least 30 days prior to the start of work.
- CDFW and USFWS shall be allowed to inspect the site at any point during the Project with a request for access.
- Non-native predators (e.g. bullfrogs) will not be relocated.

- Within 24 hours prior to the start of construction, a Service-approved Biologist will conduct a preconstruction survey for CRLF within 150 feet upstream and downstream of the Project Area.
- The Service-approved Biologist will have stop work authority for all Project activities to protect CRLF and shall be given the authority to communicate with the USFWS if they exercise such authority.
- If CRLF are detected during preconstruction surveys, or during the course of work, any work in the vicinity that may threaten CRLF will stop. The Service-approved Biologist will then determine the best course of action based on the situation at hand. If possible, the CRLF will be monitored and allowed to leave the area of its own volition. However, if the CRLF is unlikely to fully relocate out of the Project Area on their own in a reasonable timeframe, or if they cannot leave the area without exposure to other risks (e.g. predation); the individual(s) will be captured and relocated in accordance with the process outlined below.
    - Before beginning a relocation, the Service-approved Biologist will assure any equipment used for the relocation has been properly cleaned and decontaminated. If using their hands to capture CRLF, they will either don sterile gloves, or assure their hands are free from toxic substances such as insect repellant, sunscreen, or other chemicals.
    - Using a dip net, wetted, or gloved hands, the Service-approved Biologist will catch the CRLF and place it into a clean container (e.g. bucket with a lid).
    - If multiple frogs of similar age class are captured, they may be put into the same container. However, frogs of varying age class will be segregated into separate containers to avoid predation.
    - Once all CRLF have been captured, the Service-approved Biologist will relocate the animals to the nearest suitable habitat. Release locations will be at least 100-feet from the Project Area.
    - After relocation, all equipment will be sterilized according to the industry standards to prevent the spread of disease.
    - The Service-approved Biologist will contact the USFWS within 24 hours following any relocation to report the relocation of CRLF.
- Any vegetation that could conceal CRLF shall be removed under the supervision of a Service-approved Biologist. If vegetation is too dense to be adequately surveyed (e.g. tall grasses, or blackberry), the Service-approved Biologist may request that vegetation is cut to a height of 6-12 inches (and cut vegetation removed) prior to conducting a survey. If no CRLF are found, the vegetation shall be cut to ground level before work with tracked or wheeled equipment is initiated.
- All construction activities will cease one half hour before sunset and shall not begin prior to one half hour after sunrise.
- Construction activities shall not occur during rain events or within 24 hours of events which have delivered >0.25 inches of rain, until a Service-approved biologist resurveys and clears the work site.
- Erosion control structures shall not include monofilament netting or similar materials that may entangle CRLF.
- Any open holes or trenches shall be covered or have escape ramps installed to prevent CRLF from becoming entrapped.
- Work shall be restricted to daylight hours only (sunrise to sunset).

- No pets will be permitted within the Project Area.
- Any pipes or similar materials required for the Project will be stored in upland areas, and elevated or covered to prevent entrance by CRLF.

CCC DPS Steelhead

Additional avoidance measures for steelhead are required beyond the measures listed in Section 4.1 only if water is present at the time work is initiated. Flow in San Francisquito Creek is anticipated to be low, or entirely absent in the dry season when the proposed Project will occur. If the Project Area is naturally dry, as is typical for the proposed work window, then no dewatering will be required and subsequent fish specific measures would not be applicable.

- The qualifications of any biologists who will lead the fish rescue and relocation will be submitted to the NMFS or USFWS (respectively) for review and written approval at least thirty (30) calendar days prior to initiation of the Project (Service-approved Biologist). A Service-approved Biologist will be onsite during all activities that may result in take of steelhead.
- All construction personnel will participate in a worker environmental awareness program. Under this program, a Service-approved Biologist (either in person or via a pre-recorded presentation) will instruct all construction personnel about (1) the description and status of the species found on-site; (2) the importance of their associated habitats; (3) a list of measures being taken to reduce impacts on these species during work, and (4) procedures to follow if a protected species is encountered. Once completed workers shall sign a list verifying the completion of training. The list of trained personnel shall be available on-site until completion of the Project.
- The contact information for a Designated Representative who will assure compliance with any measures implemented for the Project will be submitted to the USFWS and NMFS at least 30 days prior to the start of work.
- CDFW, USFWS or NMFS shall be allowed to inspect the site at any point during the Project with a request for access.
- Non-native predators (e.g. bullfrogs) will not be relocated.
- A dewatering plan (Part 15) and fish relocation plan (Part 15) has been developed. The plans outline the methods to be used (e.g., types of cofferdam to be deployed, method of fish collection such as electrofishing, seining, etc.), criteria for relocation site selection, data to be collected, decontamination procedures, and reporting procedures that will be followed.
- If habitat is available, any captured steelhead will be relocated immediately downstream of the Project Area. If suitable habitat is not available, any steelhead will be released at the perennial pool below Searsville Dam.
- If a fish rescue is required, a Service-approved biologist will lead the fish rescue to capture and relocate any steelhead from within the Project Area prior to the start of work.
- A bypass will be installed to route flows around the work area either via diversion into another portion of the extant channel which is outside of the Project Area footprint, or via a pipe, hose, or similar structure.
- Any pumps used for the Project shall be screened according to NMFS criteria for salmonid streams until the area has been cleared by a Service-approved biologist.

- Any water actively pumped out of the Project Area (e.g. removal of groundwater seepage) will (at minimum) pass through a gravel bucket or filter sock to lower turbidity before waters are allowed to reenter the live stream.
- Any pumps used in areas not cleared of fish shall be screened according the NMFS Screening Criteria for waters containing salmonids (NMFS 1997). Once an area has been cleared, no additional screening shall be required.

5.0 REFERENCES

[CDFW] California Department of Fish and Wildlife. 2019a. California Natural Diversity Data Base (CNDDB) RareFind 5. Natural Heritage Division, California Department of Fish and Game. Sacramento, California. Public Database. Available online at: https://www.wildlife.ca.gov/data/cnddb. Most recently accessed: December 2019.

[CNPS] California Native Plant Society. 2019. Inventory of Rare and Endangered Plants (online edition, v8-03 0.39). California Native Plant Society, Sacramento, California. Available online at: www.cnps.org/inventory. Most recently accessed: December 2019.

[USFWS] U.S. Fish and Wildlife Service. 2019, IPaC - Information for Planning and Consultation. Available online at: https://ecos.fws.gov/ipac/. Most recently accessed: November 2019.

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Part 5. Project Figures

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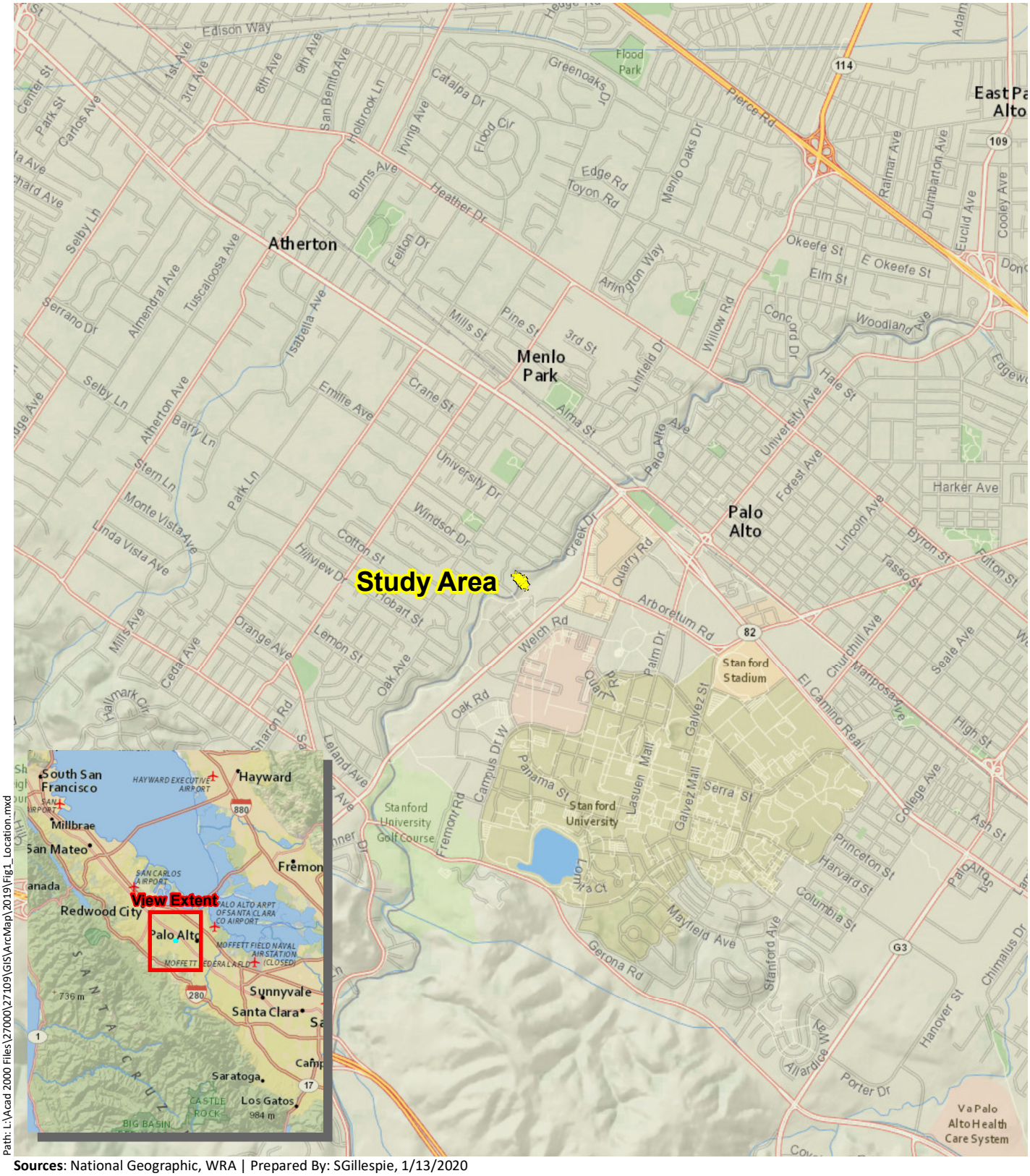

Sources: National Geographic, WRA | Prepared By: SGillespie, 1/13/2020

Figure 1. Project Area Regional Location Map

Children's Health Council
Creek Bank Restoration
Palo Alto, California

0 0.5 1 Miles

N

wra
ENVIRONMENTAL CONSULTANTS

Sources: Esri Streaming - NAIP 2016 | Prepared By: SGillespie, 3/9/2020

Figure 2. Biological Communities within the Project Area

Children's Health Council
Creek Bank Restoration
Palo Alto, California

0 50 100 Feet

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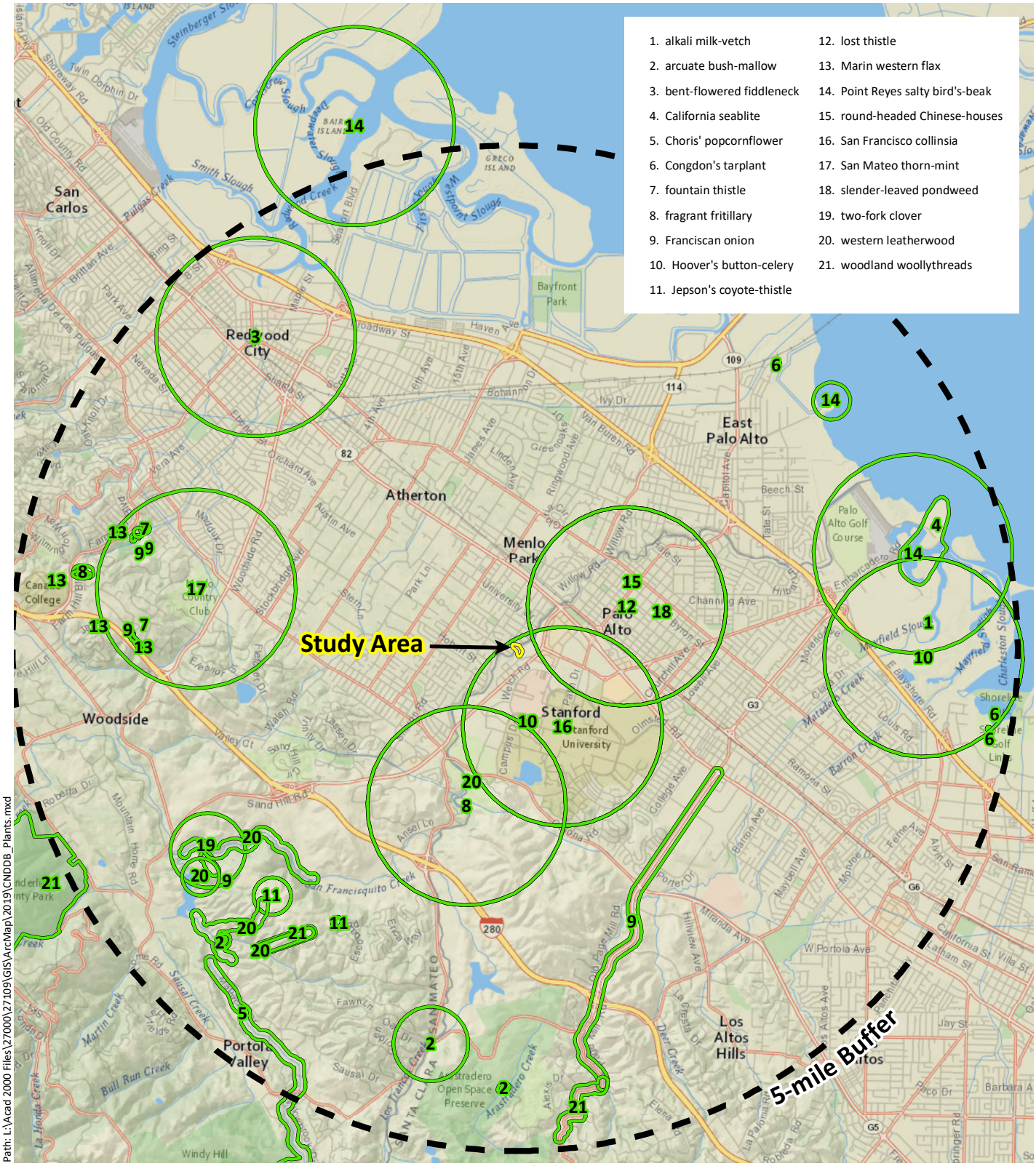
ENVIRONMENTAL CONSULTANTS



Sources: National Geographic, CNDDB Oct 2019, WRA | Prepared By: SGillespie, 1/14/2020

Figure 3. Special-Status Plant Species within 5-miles of the Study Area

Children's Health Council
Creek Bank Restoration
Palo Alto, California

0 1 2 Miles

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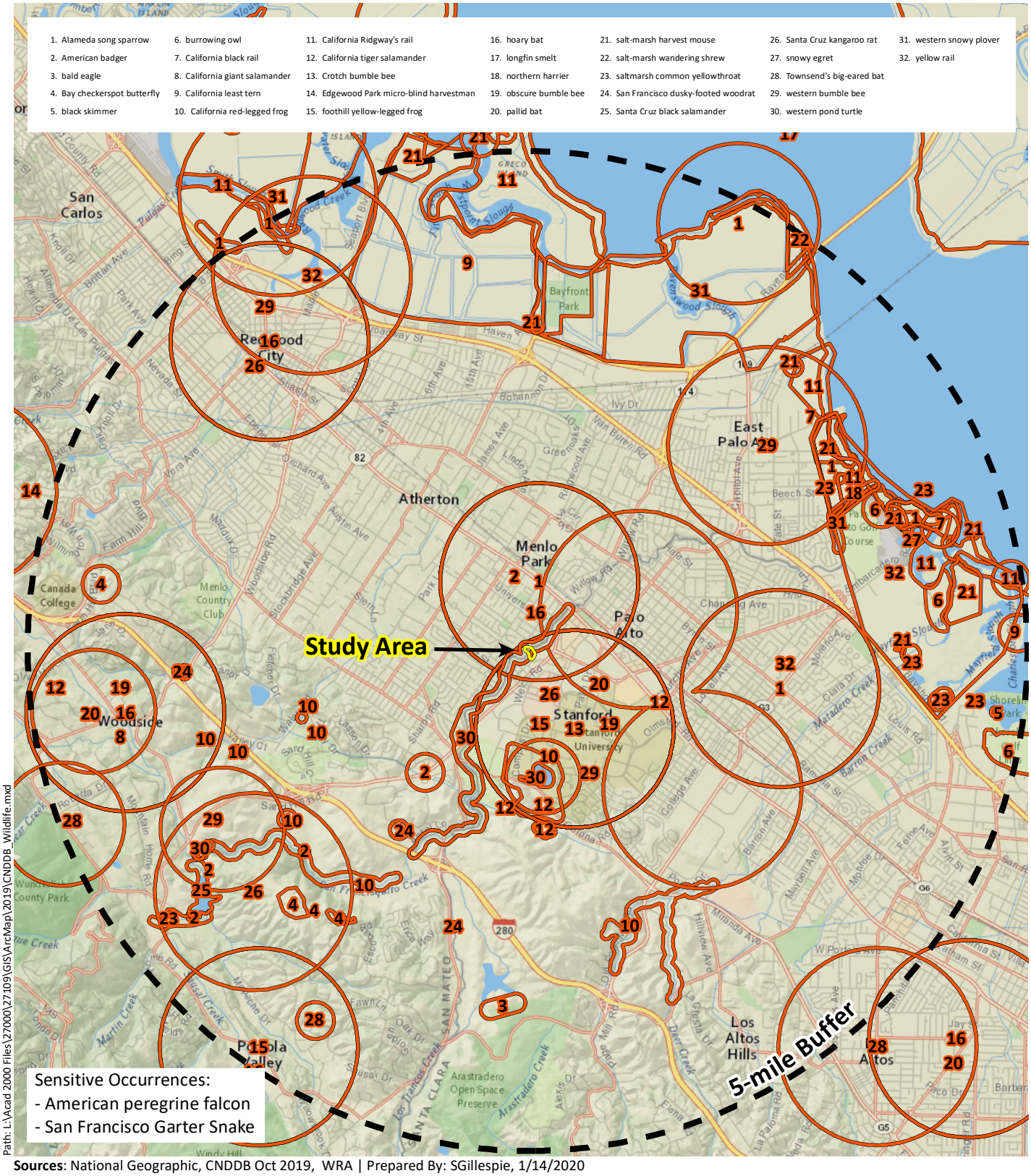

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Sources: National Geographic, CNDDB Oct 2019, WRA | Prepared By: SGillespie, 1/14/2020

Figure 4. Special-Status Wildlife Species within 5-miles of the Study Area

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Path: L:\Acad 2000 Files\27000\27109\GIS\ArcMap\2019\FigX_TreeSurvey.mxd

Sources: Esri Streaming - NAIP 2016 | Prepared By: SGillespie, 3/9/2020

Figure 5. Tree Survey

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Palo Alto, California

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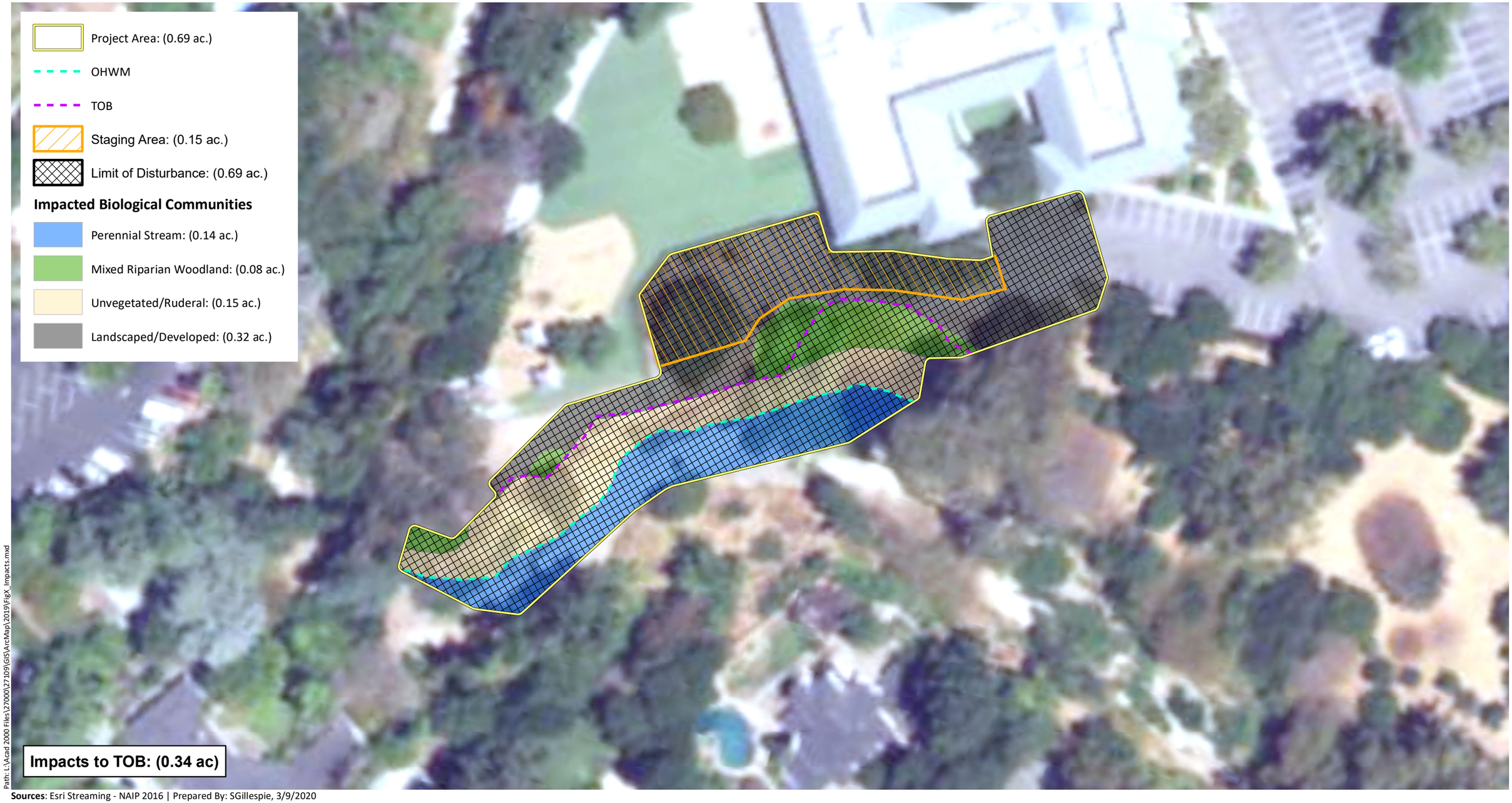

Sources: Esri Streaming - NAIP 2016 | Prepared By: SGillespie, 3/9/2020

Figure 6. Project Area Impacts

Children's Health Council
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Palo Alto, California

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Part 6. Project Area Photographs

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Photograph 1. Photograph looking upstream at the approximately 30-foot tall near vertical bank failure along San Francisquito Creek. Evidence of slumped debris and matted or destroyed vegetation can be seen on the east bank. The crib wall will be installed along the east bank to protect against future erosion and provide long-term stabilization. Photograph taken February 22, 2019.

Photograph 2. Photograph depicts flow of stream immediately downstream of Project Area. Photograph taken March 21, 2019.

Photograph 3. View looking downstream, northwest, along top of bank of creek. Photograph depicts installation of Phase I concrete shear pin wall set back from the top of bank. Photograph taken March 21, 2019.

Photograph 4. View looking upstream, southeast, along top of bank of the creek within the Project Area. Photograph depicts completed Phase I sheer pin wall construction. Photograph taken May 13, 2019.

Photograph 5. Photograph of point bar stream feature immediately downstream of bank failure. Photograph taken February 22, 2019.

Photograph 6. Photograph looking downstream depicting acceleration of bank failure during 2016-2017 rainy season. Photograph taken March 23, 2017.

Photograph 7. Photograph of overhanging woody vegetation downstream of the Project Area. Photograph taken March 21, 2019.

Photograph 8. View of approximate location of temporary access route. Photograph located upstream of erosion event. Photograph taken March 21, 2018.

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Part 7. Tree Survey

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December 2, 2019

Terry Boyle
Chief Financial Officer
Children's Health Council
650 Clark Way
Palo Alto, CA 94304

Re: Tree Survey/Tree Preservation Report, San Francisquito Creek Bank Restoration Project, Palo Alto, Santa Clara County, CA.

Dear Mr. Boyle:

This letter summarizes the methods and results of an arborist survey performed on February 6, 2018, and November 1, 2019 at the site of the San Francisquito Creek Bank Restoration Project (Project) located at 650 Clark Way in Palo Alto, Santa Clara County, California (Project Area). The survey was conducted by ISA-Certified Arborist, Scott Yarger (ISA #WE-9300A) for the purpose of assessing a potential hazard tree that is proposed for removal as part of the creek bank stabilization. This report was prepared in accordance with the City of Palo Alto requirement for a tree survey letter report to be submitted when an application request for tree removal is submitted. The survey also documented the presence of all trees within and directly adjacent to the Project Area (including protected and non-protected), as defined by Chapter 8.10, "Tree Preservation and Management Regulations" (Tree Ordinance). Lastly, this letter provides Best Management Practices (BMPs) for managing protected trees during construction, to prevent injury from construction-related activities, and to ensure that trees not proposed for removal are preserved in their current state.

The purpose of the Project is to stabilize a portion of the eastern San Francisquito Creek bank that runs adjacent to Children's Health Council (CHC) property, a school that specializes in providing education and clinical services to children and teens with learning differences. The project is needed to prevent further loss of outdoor learning areas used by CHC's students. Phase 1 of the Project which was completed in 2019, included construction of a system of shear pins and a tie beam, along the top of the eroding bank, to prevent further erosion. The shear pins consist of a cast-in-drilled-hole (CIDH) pier reinforced with a wide flange steel beam or a circular cage of reinforcing steel.

Phase 2 of the Project will rebuild and stabilize approximately 275 linear feet of bank along San Francisquito Creek between the top of the eroding bank and the channel of the creek. The Project will construct a live log crib wall supported by a geoengineered foundation on the east bank of the creek. The crib wall foundation consists of large boulders, cobble alluvium, and rootwads secured together and embedded within the bank. The crib wall structure consists of wooden logs and will be anchored to the foundation and existing bank with support anchors and rooted vegetation. Slopes on and above the crib wall will be graded and planted with native trees, shrubs, and

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grasses. Project work is scheduled to commence in May 1, 2021 and be completed by October 15, 2021, thus minimizing impacts to aquatic species and habitat.

Regulatory Background

The City of Palo Alto Municipal code regulates the protection of specific trees on public and private properties in the City in order to preserve and protect the economic, aesthetic, and environmental values mature trees provide to the citizens of Palo Alto. A "tree" is defined by the Tree Ordinance as: "any woody plant which has a trunk four inches or more in diameter at four and one-half feet above natural grade level." A "protected tree" is defined as: any coast live oak (*Quercus agrifolia*) or valley oak (*Quercus lobata*) measuring 11.5 inches in diameter (36 inch circumference) when measured at breast height (4.5 feet above grade; "DBH"), or any coast redwood (*Sequoia sempervirens*) measuring 18 inches DBH (57 inches circumference). Additional protections are afforded to "heritage trees" which receive designation by a vote of the City council, and "street trees" which are situated in the City right-of-way.

A tree removal permit from the City of Palo Alto is required to remove, damage, or relocate or to conduct ground disturbance work within the "dripline area" of a protected tree on private property. "Dripline area" is defined per the Tree Ordinance as, "a radial area surrounding a tree trunk location equal to ten times the tree's DBH," (i.e. a 12-inch DBH coast live oak would have a radial dripline area of 120 inches or 10 feet). Additional regulations and guidelines governing the protection of trees during construction, removal of protected trees, replacement of permitted tree removal, and format and content of tree reports required as tree removal permit applications is provided in the City's Tree Protection Manual.

Tree removal permit applications for protected tree removals require payment of a $145.00 review process fee, and may include conditions of approval including tree replacement plantings or payment of in-lieu fees. The size and number of replacement trees are determined by the Tree Technical Manual and are based on the canopy size of the tree, with smaller size trees typically requiring replacement at a two to one ratio (trees replaced for trees removed), and the largest size trees requiring replacement at up to a six to one ratio. However, if the City authorizes removal of a protected tree because it is "dead, dangerous, or a nuisance, no tree replacement is required."

Methods

On February 6, 2018, and November 1, 2019, ISA-Certified Arborist, Scott Yarger, traversed the Project Area and vicinity on foot to evaluate, identify and inventory all trees as defined per the Tree Ordinance. Locations of surveyed trees were recorded using a handheld GPS unit with sub-meter accuracy. Each tree was given an aluminum tree tag with unique identification number. Several surveyed trees had been previously surveyed as indicated by old aluminum tree tags. If the tree had been previously surveyed, the old tree tag number was recorded. Information including species, DBH, dripline radius, approximate height, health, structure, and overall condition ratings were recorded. In cases where an irregular bulge or one or more scaffold branches were located at breast height, the diameter was measured below the irregular feature in order to best represent the size of the tree.

As described above, this letter report was prepared in accordance with the City's Tree Protection Manual for inclusion in a tree removal application for tree removal, not in connection with a development project. As a conservative measure, the survey included all "trees" as defined by the Tree Ordinance within the Project Area.

General notes on the condition of the protected trees were taken, including health, structure, and overall condition. Assessment of the health, structure, and overall condition of each tree was conducted according to the narratives listed in Table 1.

Table 1. Rating narratives for tree assessment

Health	
Good	Tree is free from symptoms of disease and stress
Fair	Tree shows some symptoms of disease or stress including twig and small branch dieback, evidence of fungal / parasitic infection, thinning of crown, or poor leaf color
Poor	Tree shows symptoms of severe decline
Structure	
Good	Tree is free from major structural defects.
Fair	Tree shows some structural defects in branches but overall structure is stable.
Poor	Tree shows structural failure of a major branch or co-dominant trunk, or structural insecurity such as major heart rot or cavities which could affect the tree's overall stability.
General Condition	
Good	Tree shows condition of foliage, bark, and overall structure characteristic of the species and lacking obvious defect, or disease
Fair	Tree shows condition of foliage, bark, and overall structure characteristic of the species with some evidence of stress, defect, or disease
Poor	Tree shows condition of foliage, bark, and overall structure uncharacteristic of the species and/or with obvious evidence of stress, defect, decline or disease.

Results

A total of 26 trees were identified within the Project Area and immediately surrounding area, including four trees which are of large enough and of a qualifying species to be considered protected per the Tree Ordinance. A complete list of all trees surveyed is presented in Attachment A. A map showing the location of each tree in relation to Project activities is provided in Attachment B. Tree protection buffers (i.e. driplines), for protected trees proposed for removal as measured in accordance with the Tree Ordinance as a radius 10 times the trunk diameter are shown on Attachment B. Representative photographs of trees proposed for removal as well as trees that will be preserved are provided in Attachment C. Protected trees within the Project Area were composed of one species, coast live oak (*Quercus agrifolia*). Other tree species surveyed within this Project Area included California bay (*Umbellularia californica*), blue gum (*Eucalyptus globulus*), California buckeye (*Aesculus californica*), coast redwood (*Sequoia sempervirens*), red willow (*Salix laevigata*), blue elderberry (*Sambucus nigra* ssp. *caerulea*), bigleaf maple (*Acer macrophyllum*), and silver wattle (*Acacia dealbata*).

The largest surveyed tree was a very large, overmature, multi-trunk California bay (tree #747) which measured approximately 118.2 inches aggregate DBH. The largest single-trunk tree, was an approximately 65-inch DBH blue gum (tree #743).

The overall condition, health, and structure of trees inventoried during this assessment ranged from poor to good, with most trees ranking fair in all categories. A total of six trees are proposed for removal to facilitate construction of the Project. Two of the trees proposed for removal are large enough in size and of qualifying species to be considered ordinance-protected, therefore requiring a tree removal permit from the City of Palo Alto to remove. The two ordinance-protected trees proposed for removal include tree #724, a 14.1-inch DBH coast live oak tree which is located on the precipice of the eroding creek bank. It has been severely undermined by erosion, and has broken and exposed roots including the taproot, and significant structural roots expsed. Failure of this tree would exacerbate erosion, and it would pose a safety hazard if left in place.

The second ordinance-protected tree proposed for removal is a 12.6-inch DBH coast live oak (tree #996) which is located at toe of slope at the bottom of the eroding creekbank along the downstream limit of the proposed crib wall. This tree is similar to tree #724 in that it is generally healthy and in good condition, with poor structure, which is undermined by the eroding creek bank. The remaining non-protected trees proposed for removal include two California buckeyes (tree #746 and #991), one small shrubby red willow (tree #987) within the creek bed, and one 4-inch DBH coast live oak (tree #997), which is growing along the eroding creek bank.

Trees ranking poor in structure included the large, overmature, non-protected California bay trees (trees #747, #748, and #749). Each of the bay trees that rated poor in structure had extensive heart rot, evident by numerous cavities and the presence of artist's conk (*Ganoderma applanatum*) fungal fruiting bodies. The heart rot in these trees was extensive, and was observed throughout the crown. Large tree cavities in basal trunks and scaffold branches were host to numerous beehives, and previous limb failures and crown dieback was observed in these trees.

Trees that ranked "good" in all categories included, one protected coast live oak tree (tree #754), a dominant, mature tree with good form, vigor and structure, located in a tree island in the parking lot turnaround, and two non-protected coast redwood trees (trees #752, and #753) located in the interior of the school playfield. As shown in Attachment B, construction activity will occur within the dripline of the protected coast live oak tree, tree #754. Recommended BMPs to preserve this protected tree during construction are provided below.

The observed maladies and considerations of severity, along with species characteristics guided the assignment of the structural condition, health, and overall condition score for each tree. The overall condition, structural condition, health of inventoried trees was found to be generally fair. Table 2 below summarizes the assessment results of all inventoried trees in the Project Area.

Table 2. Tree Assessment Results Summary

Criteria Assessed/Rating	Condition	Health	Structure
Good	7 (27%)	9 (35%)	4 (15%)
Fair	16 (62%)	17 (65%)	12 (46%)
Poor	3 (11%)	0 (0%)	10 (39%)

Summary and Recommendations

The Project Area four trees which are considered protected under the Tree Ordinance, all of which are coast live oak trees (trees #742, #751, #754, and #996). The Project Area contains 22 non-protected trees. The proposed Project would remove just two protected coast live oak trees (trees #742, and #996), and four non-protected trees (trees #746, #987, #991, and #997), and would preserve the remaining 20 trees. Trees proposed for removal are not viable for preservation due hazardous growing conditions along the rapidly eroding creek bank or location within the limit of grade of the Project. A tree removal permit shall be obtained for the removal of the two protected coast live oak trees. It is my professional judgement that both of the protected trees proposed for removal tree are in risk of failure and, as outlined in Section 3.10 "When Tree Replacement is Required" of the Tree Technical Manual, tree replacement is not required for a tree removal that is authorized by the City because it is, "dead, dangerous, or a nuisance." If left in place with or without the project, the trees proposed for removal has the potential to fail, causing accelerated erosion of the creek bank on-site and debris-related flooding off-site. Therefore, the trees is considered dangerous and no replacement is proposed.

A complete list of all trees surveyed within the Project Area is presented in Attachment A. A figure displaying the locations of all surveyed trees, tree removals and preserved trees, as well as tree protection fencing is presented in Attachment B. Representative photographs of trees proposed for removal as well as trees that will be preserved are provided in Attachment C. Tree Hazard Evaluation Forms for the two protected trees proposed for removal, trees #742, and #996 are provided in Attachment D.

Tree Protection and Preservation Plan

Construction-related ground disturbance can have negative impacts to tree health and longevity via mechanical injury to roots, trunks, or branches, soil compaction, and changes in existing grade for instance. In accordance with Section 2, "Protection of Trees During Construction" of the City of Palo Alto Tree Technical Manual, a "Tree Protection and Preservation Plan is required if any activity is proposed within the dripline of a Protected or Designated Tree." The only protected tree which is proposed for preservation is protected coast live oak tree #754. This section provides a Tree Protection and Preservation Plan (Plan) which assesses potential impacts to tree #754, and recommends avoidance and minimization measures to reduce potential construction-related impacts to a less than significant level.

Tree #754 is a mature, healthy tree with good form, vigor and structure, located in a tree island in the parking lot turnaround. The entirety of the tree dripline area (as defined above as 10 times the trunk diameter) is located within the limit of disturbance. However, the tree is unlikely to be significantly impacted, as it is outside of the limit of grade. Construction activities intersecting with the tree's dripline area are limited to vehicle access and staging on existing asphalt surrounding the tree.

However, as described above, Projects including construction activities within protected tree driplines area required to implement tree protection measures outlined in Section 2, "Protection of Trees During Construction" of the City of Palo Alto Tree Technical Manual. In order to avoid and minimize damage to protected trees which are designated for preservation and not proposed for direct impact by project activities, the Project shall follow all tree protection guidelines outlined in Section 2, "Protection of Trees During Construction" as excerpted and adapted to site

specifications below. Tree protection measures that are deemed not applicable due to construction specifications are omitted from this Plan.

Pre-construciton Requirements

A. Site Plan. All trees to be preserved shall be shown on site plans. In addition, for protected trees, the site plans shall show the trunk diameter, dripline and tree protection zone (TPZ) to be enclosed with specified fencing as a bold dashed line. The TPZ is herein defined as equal to the tree's dripline area (i.e. a radial distance from the tree trunk equal to ten times the trunk diameter).

B. Verification of Tree Protection. The project arborist or contractor shall verify in writing that all preconstruction protection measures have ben met. Written verification must be submitted to and approved by the Planning Department prior to grading permit issuance.

C. Pre-construction Meeting. The demolition, grading and underground contractors, construction superintendent and other pertinent personnel are required to meet with the project arborist at the site prior to beginning work to review procedures, tree protection measures and to establish haul routes, staging areas, contacts, watering, etc.

D. Protective Tree Fencing for Protected Trees. Fenced enclosures shall be erected around trees to be protected to achieve three primary goals, (1) to keep the foliage crowns and branching structure clear from contact by equipment, materials and activities; (2) to preserve roots and soil conditions in an intact and non-compacted state and; (3) to identify the tree protection zone (TPZ) in which no soil disturbance is permitted and activities are restricted, unless otherwise approved.

   As described above, the only protected tree designated for preservation that is within the limit of work is tree #754. Since this tree is located in a planting strip/tree island within the parking lot turnaround, it is already protected from intrusion by the existing curb. Therefore installation of a temporary chainlink tree protection fence at the edge of the curb will provide sufficient protection.

   Tree fencing shall be erected before demolition, grading or construction begins and remain in place until final inspection of the project permit. A warning sign shall be prominently displayed on each fence. The sign shall be a minimum of 8.5 x 11-inches and clearly state: WARNING - Tree Protection Zone - This fence shall not be removed and is subject to a penalty according to Palo Alto Municipal Code Section 8.10.110.9.

   Although not ordinance protected, as a conservative measure, temporary tree protection fencing should be installed along the southern dripline of the clump of mature bay trees to prevent inadvertent damage from heavy machinery access

Damage to Trees, and Periodic Inspections

Adherence to the above recommended and required tree protection measures will ensure that significant damage to protected trees to be preserved will not occur. However, any damage to trees incidental during construction shall be reported to the project arborist, job superintendent or

City arborist within 6 hours of the damage so that appropriate damage mitigation in compliance with the Tree Technical Manual can be implemented in a timely manner.

The City may require monthly inspections by the project arborist or landscape architect to verify tree protection measures for protected trees are being implemented in accordance with this plan and the City's Tree Technical Manual.

Please feel free to contact me or Brian Bartell if you have any questions or concerns.

Sincerely yours,

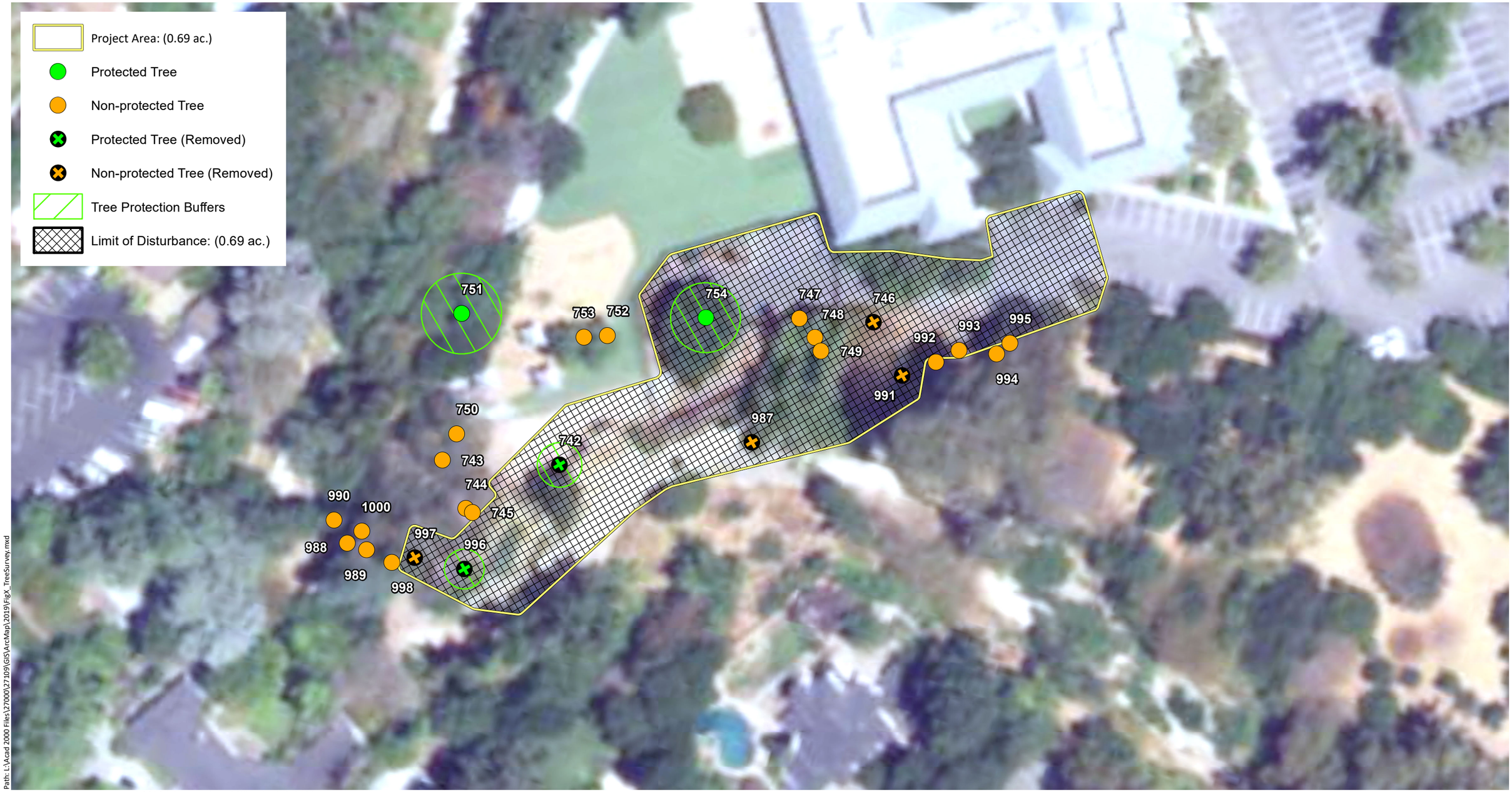
Scott Yarger
ISA-Certified Arborist WE-9300A
yarger@wra-ca.com

Enclosures:

Attachment A – Tree Survey Table
Attachment B – Tree Removal and Protection Plan
Attachment C – Representative Photographs
Attachment D – Tree Hazard Evaluation Forms

Attachment A. Children's Health Council San Francisquito Creek Bank Restoration Project Tree Survey. February 2018 & November 2019.

Tag_ID	Species	Common Name	Multistem	Ordinance Protected Tree	Tree Impact	DBH_1	DBH_2	DBH_3	DBH_4	DBH_5	Total DBH (inches)	Dripline Area (feet)	Estimated Height (feet)	Condition	Health	Structure
742	*Quercus agrifolia*	Coast live oak	No	Yes	Remove	14.1	0.0	0.0	0.0	0.0	14.1	11.8	30	Fair	Good	Poor
743	*Eucalyptus globulus*	Blue gum	No	No	Preserve	50.0	0.0	0.0	0.0	0.0	50	41.7	60	Fair	Fair	Fair
744	*Quercus agrifolia*	Coast live oak	No	No	Preserve	4.0	0.0	0.0	0.0	0.0	4	3.3	8	Good	Good	Fair
745	*Quercus agrifolia*	Coast live oak	Yes	No	Preserve	6.2	1.5	0.0	0.0	0.0	7.7	6.4	1	Good	Good	Fair
746	*Aesculus californica*	California buckeye	Yes	No	Remove	8.9	10.3	10.5	4.8	5.1	39.6	33.0	25	Good	Good	Fair
747	*Umbellularia californica*	California bay	Yes	No	Preserve	33.2	34.0	32.0	19.0	0.0	118.2	98.5	34	Fair	Fair	Poor
748	*Umbellularia californica*	California bay	Yes	No	Preserve	23.1	35.0	0.0	0.0	0.0	58.1	48.4	45	Fair	Fair	Poor
749	*Umbellularia californica*	California bay	Yes	No	Preserve	28.0	14.0	14.5	10.0	12.0	78.5	65.4	45	Fair	Fair	Poor
750	*Eucalyptus globulus*	Blue gum	No	No	Preserve	19.3	0.0	0.0	0.0	0.0	19.3	16.1	35	Fair	Fair	Fair
751	*Quercus agrifolia*	Coast live oak	Yes	Yes	Preserve	20.0	10.1	12.0	0.0	0.0	42.1	35.1	40	Good	Good	Fair
752	*Sequoia sempervirens*	Coast redwood	No	No	Preserve	16.1	0.0	0.0	0.0	0.0	16.1	13.4	35	Good	Good	Good
753	*Sequoia sempervirens*	Coast redwood	No	No	Preserve	14.8	0.0	0.0	0.0	0.0	14.8	12.3	35	Good	Good	Good
754	*Quercus agrifolia*	Coast live oak	No	Yes	Preserve	22.1	0.0	0.0	0.0	0.0	22.1	18.4	30	Good	Good	Good
987	*Salix laevigata*	Red willow	Yes	No	Remove	4.0	1.0	1.0	0.0	0.0	6	5.0	8	Fair	Fair	Poor
988	*Acacia dealbata*	Silver wattle	No	No	Preserve	5.5	0.0	0.0	0.0	0.0	5.5	4.6	11	Poor	Fair	Poor
989	*Acacia dealbata*	Silver wattle	Yes	No	Preserve	4.5	4.0	0.0	0.0	0.0	8.5	7.1	12	Poor	Fair	Poor
990	*Acer macrophyllum*	Bigleaf maple	Yes	No	Preserve	8.0	7.0	7.0	6.1	0.0	28.1	23.4	35	Poor	Fair	Poor
991	*Aesculus californica*	California buckeye	Yes	No	Remove	11.9	11.3	0.0	0.0	0.0	23.2	19.3	28	Fair	Fair	Fair
992	*Ailanthus altissima*	Tree of Heaven	No	No	Preserve	6.1	0.0	0.0	0.0	0.0	6.1	5.1	30	Fair	Fair	Fair
993	*Sambucus nigra* ssp. *caerulea*	Blue elderberry	Yes	No	Preserve	5.5	2.6	1.0	1.0	1.0	11.1	9.3	12	Fair	Fair	Poor
994	*Eucalyptus globulus*	Blue gum	Yes	No	Preserve	65.0	0.0	0.0	0.0	0.0	65	54.2	70	Fair	Fair	Good
995	*Eucalyptus globulus*	Blue gum	No	No	Preserve	51.5	0.0	0.0	0.0	0.0	51.5	42.9	70	Fair	Fair	Fair
996	*Quercus agrifolia*	Coast live oak	No	Yes	Remove	12.6	0.0	0.0	0.0	0.0	12.6	10.5	33	Fair	Good	Poor
997	*Quercus agrifolia*	Coast live oak	No	No	Remove	4.0	0.0	0.0	0.0	0.0	4	3.3	12	Fair	Fair	Fair
998	*Acacia dealbata*	Silver wattle	No	No	Preserve	6.1	0.0	0.0	0.0	0.0	6.1	5.1	45	Fair	Fair	Fair
1000	*Acacia dealbata*	Silver wattle	No	No	Preserve	9.7	0.0	0.0	0.0	0.0	9.7	8.1	40	Fair	Fair	Fair



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Sources: Esri Streaming - NAIP 2016 | Prepared By: SGillespie, 3/9/2020

Attachment B. Tree Removal Protection Plan

Children's Health Council
Creek Bank Restoration
Palo Alto, California

0 50 100 Feet

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Photograph 1. Photograph depicting protected coast live oak tree (tree #742), which is proposed for removal. The eroding creek bank, exposed roots, and slight lean can be seen at left.

Photograph 2. Photograph depicting tree #742, which is proposed for removal. The tree is outwardly asymptomatic of pests or disease, but is severely undercut by the eroding creek bank, making preservation infeasible.

Photograph 3. Tree #754, a protected coast live oak tree designated for preservation.

Photograph 4. Tree #996, a protected coast live oak tree, which is significantly undercut by the eroding creek bank. Tree #998 is proposed for removal, as it is within the limit of grade, and is not feasible to preserve.

A Photographic Guide to the Evaluation of Hazard Trees in Urban Areas

TREE HAZARD EVALUATION FORM 2nd Edition

Site/Address: 650 Clark Way, Palo Alto, CA

Map/Location: (see letter report)

Owner: public ____ private X unknown ____ other ____

Date: 2/6/18 Inspector: Scott Yaeger ISA#WE-9306A TRAQ

Date of last inspection: N/A

HAZARD RATING:

Failure Potential	+	Size of part	+	Target Rating	=	Hazard Rating
4	+	2	+	1	=	7

____ Immediate action needed

____ Needs further inspection

____ Dead tree

TREE CHARACTERISTICS

Tree #: 724 **Species:** Coast live oak

DBH: 14.1 in. **# of trunks:** 1 **Height:** 30 ft. **Spread:** 10 ft. r.

Form: ☒ generally symmetric ☐ minor asymmetry ☐ major asymmetry ☐ stump sprout ☐ stag-headed

Crown class: ☒ dominant ☐ co-dominant ☐ intermediate ☐ suppressed

Live crown ratio: 90 % **Age class:** ☐ young ☒ semi-mature ☐ mature ☐ over-mature/senescent

Pruning history: ☐ crown cleaned ☐ excessively thinned ☐ topped ☐ crown raised ☐ pollarded ☐ crown reduced ☐ flush cuts ☐ cabled/braced ☒ none ☐ multiple pruning events Approx. dates: ____

Special Value: ☐ specimen ☐ heritage/historic ☐ wildlife ☐ unusual ☐ street tree ☐ screen ☐ shade ☒ indigenous ☒ protected by gov. agency

TREE HEALTH

Foliage color: ☒ normal ☐ chlorotic ☐ necrotic **Epicormics?** Y (N)

Foliage density: ☒ normal ☐ sparse **Leaf size:** ☐ normal ☐ small

Annual shoot growth: ☐ excellent ☒ average ☐ poor **Twig Dieback?** Y N

Woundwood development: ☐ excellent ☒ average ☐ poor ☐ none

Vigor class: ☐ excellent ☒ average ☐ fair ☐ poor

Growth obstructions:

☐ stakes ☐ wire/ties ☐ signs ☐ cables

☐ curb/pavement ☐ guards

☒ other Rapidly eroding creek bank

Major pests/diseases: Tree is asymptomatic but is undercut with exposed taproot and structural roots at risk of failing.

SITE CONDITIONS

Site Character: ☐ residence ☐ commercial ☐ industrial ☐ park ☐ open space ☐ natural ☐ woodland\forest

Landscape type: ☐ parkway ☐ raised bed ☐ container ☐ mound ☐ lawn ☐ shrub border ☐ wind break

Irrigation: ☒ none ☐ adequate ☐ inadequate ☐ excessive ☐ trunk wettled

Recent site disturbance? (Y) N ☐ construction ☒ soil disturbance ☐ grade change ☐ line clearing ☐ site clearing

% dripline paved: (0%) 10-25% 25-50% 50-75% 75-100% **Pavement lifted?** Y N

% dripline w/ fill soil: (0%) 10-25% 25-50% 50-75% 75-100%

% dripline grade lowered: (0%) 10-25% 25-50% 50-75% 75-100%

Soil problems: ☐ drainage ☐ shallow ☐ compacted ☐ droughty ☐ saline ☐ alkaline ☐ acidic ☐ small volume ☐ disease center ☒ history of fail ☐ clay ☐ expansive ☐ slope ____° aspect: ____

Obstructions: ☐ lights ☐ signage ☐ line-of-sight ☐ view ☐ overhead lines ☐ underground utilities ☐ traffic ☐ adjacent veg. ☐ ____

Exposure to wind: ☒ single tree ☐ below canopy ☐ above canopy ☐ recently exposed ☐ windward, canopy edge ☐ area prone to windthrow

Prevailing wind direction: Unknown Occurrence of snow/ice storms ☒ never ☐ seldom ☐ regularly

TARGET

Use Under Tree: ☐ building ☐ parking ☐ traffic ☐ pedestrian ☒ recreation ☐ landscape ☐ hardscape ☐ small features ☐ utility lines

Can target be moved? Y (N) **Can use be restricted?** (Y) N

Occupancy: ☒ occasional use ☐ intermittent use ☐ frequent use ☐ constant use

TREE DEFECTS

ROOT DEFECTS:

Suspect root rot: Y (N) **Mushroom/conk/bracket present:** Y (N) **ID:** _____

Exposed roots: [X] severe ☐ moderate ☐ low **Undermined:** [X] severe ☐ moderate ☐ low

Root pruned: N/A distance from trunk **Root area affected:** >50 % **Buttress wounded:** Y (N) **When:** _____

Restricted root area: ☐ severe ☐ moderate [X] low **Potential for root failure:** [X] severe ☐ moderate ☐ low

LEAN: ~5 deg. from vertical ☐ natural ☐ unnatural ☐ self-corrected **Soil heaving:** (Y) N

Decay in plane of lean: Y (N) **Roots broken** (Y) N **Soil cracking:** (Y) N

Compounding factors: Channel incision - rapidly eroding creek bank **Lean severity:** ☐ severe ☐ moderate [X] low

CROWN DEFECTS: Indicate presence of individual defects and rate their severity (s = severe, m = moderate, l = low)

DEFECT	ROOT CROWN	TRUNK	SCAFFOLDS	BRANCHES
Poor taper	N/A	N/A	N/A	N/A
Bow, sweep				
Codominants/forks				
Multiple attachments				
Included bark				
Excessive end weight				
Cracks/splits				
Hangers				
Girdling				
Wounds/seam				
Decay				
Cavity				
Conks/mushrooms/bracket				
Bleeding/sap flow				
Loose/cracked bark				
Nesting hole/bee hive				
Deadwood/stubs				
Borers/termites/ants				
Cankers/galls/burls				
Previous failure				

HAZARD RATING

Tree part most likely to fail: Roots - whole tree

Inspection period: _____ annual _____ biannual _____ other _____

Failure Potential + Size of Part + Target Rating = Hazard Rating

4 + 2 + 1 = 7

Failure potential: 1 - low; 2 - medium; 3 - high; 4 - severe
Size of part: 1 - <6" (15 cm); 2 - 6-18" (15-45 cm); 3 - 18-30" (45-75 cm); 4 - >30" (75 cm)
Target rating: 1 - occasional use; 2 intermittent use; 3 - frequent use; 4 - constant use

HAZARD ABATEMENT

Prune: ☐ remove defective part ☐ reduce end weight ☐ crown clean ☐ thin ☐ raise canopy ☐ crown reduce ☐ restructure ☐ shape

Cable/Brace: _____ **Inspect further:** ☐ root crown ☐ decay ☐ aerial ☐ monitor

Remove tree: (Y) N **Replace?** Y N **Move target:** Y N **Other:** _____

Effect on adjacent trees: [X] none ☐ evaluate

Notification: [X] owner ☐ manager [X] governing agency **Date:** See letter report

COMMENTS

The tree is at severe risk of failure due to broken and exposed structural roots resulting from a rapidly eroding creek bank. Preservation is not feasible

A Photographic Guide to the Evaluation of Hazard Trees in Urban Areas

TREE HAZARD EVALUATION FORM 2nd Edition

Site/Address: 650 Clark Way, Palo Alto, CA

Map/Location: (see letter report)

Owner: public ___ private X unknown ___ other ___

Date: 11/1/19 Inspector: Scott Yaeger ISA #WE-9908A

Date of last inspection: N/A

HAZARD RATING:

3 (Failure Potential) + 2 (Size of part) + 1 (Target Rating) = 6 (Hazard Rating)

___ Immediate action needed

___ Needs further inspection

___ Dead tree

TREE CHARACTERISTICS

Tree #: 996 Species: Coast live oak

DBH: 12.6 # of trunks: 1 Height: 33ft Spread: 10ft dia.

Form: ☐ generally symmetric ☒ minor asymmetry ☐ major asymmetry ☐ stump sprout ☐ stag-headed

Crown class: ☒ dominant ☐ co-dominant ☐ intermediate ☐ suppressed

Live crown ratio: 90 % **Age class:** ☐ young ☒ semi-mature ☐ mature ☐ over-mature/senescent

Pruning history: ☐ crown cleaned ☐ excessively thinned ☐ topped ☐ crown raised ☐ pollarded ☐ crown reduced ☐ flush cuts ☐ cabled/braced ☒ none ☐ multiple pruning events Approx. dates: ___

Special Value: ☐ specimen ☐ heritage/historic ☐ wildlife ☐ unusual ☐ street tree ☐ screen ☐ shade ☒ indigenous ☒ protected by gov. agency

TREE HEALTH

Foliage color: ☒ normal ☐ chlorotic ☐ necrotic **Epicormics?** Y (N)

Foliage density: ☒ normal ☐ sparse **Leaf size:** ☐ normal ☐ small

Annual shoot growth: ☐ excellent ☒ average ☐ poor **Twig Dieback?** Y N

Woundwood development: ☐ excellent ☒ average ☐ poor ☐ none

Vigor class: ☐ excellent ☒ average ☐ fair ☐ poor

Growth obstructions:

☐ stakes ☐ wire/ties ☐ signs ☐ cables

☐ curb/pavement ☐ guards

☒ other eroding creek bank

Major pests/diseases: Tree has poor structure with corrected lean growing in highly erosive creek bank.

SITE CONDITIONS

Site Character: ☐ residence ☐ commercial ☐ industrial ☐ park ☐ open space ☐ natural ☐ woodland\forest

Landscape type: ☐ parkway ☐ raised bed ☐ container ☐ mound ☐ lawn ☐ shrub border ☐ wind break

Irrigation: ☒ none ☐ adequate ☐ inadequate ☐ excessive ☐ trunk wettled

Recent site disturbance? (Y) N ☐ construction ☒ soil disturbance ☐ grade change ☐ line clearing ☐ site clearing

% dripline paved: (0%) 10-25% 25-50% 50-75% 75-100% **Pavement lifted?** Y N

% dripline w/ fill soil: (0%) 10-25% 25-50% 50-75% 75-100%

% dripline grade lowered: (0%) 10-25% 25-50% 50-75% 75-100%

Soil problems: ☐ drainage ☐ shallow ☐ compacted ☐ droughty ☐ saline ☐ alkaline ☐ acidic ☐ small volume ☐ disease center ☒ history of fail ☐ clay ☐ expansive ☐ slope ___° aspect: ___

Obstructions: ☐ lights ☐ signage ☐ line-of-sight ☐ view ☐ overhead lines ☐ underground utilities ☐ traffic ☐ adjacent veg. ☐ ___

Exposure to wind: ☒ single tree ☐ below canopy ☐ above canopy ☐ recently exposed ☐ windward, canopy edge ☐ area prone to windthrow

Prevailing wind direction: unknown **Occurrence of snow/ice storms** ☒ never ☐ seldom ☐ regularly

TARGET

Use Under Tree: ☐ building ☐ parking ☐ traffic ☐ pedestrian ☒ recreation ☐ landscape ☐ hardscape ☐ small features ☐ utility lines

Can target be moved? Y (N) **Can use be restricted?** (Y) N

Occupancy: ☒ occasional use ☐ intermittent use ☐ frequent use ☐ constant use

TREE DEFECTS

ROOT DEFECTS:

Suspect root rot: Y (N) **Mushroom/conk/bracket present:** Y N **ID:** _____

Exposed roots: ☐ severe ☒ moderate ☐ low **Undermined:** ☒ severe ☐ moderate ☐ low

Root pruned: N/A distance from trunk **Root area affected:** 50 % **Buttress wounded:** Y (N) **When:** _____

Restricted root area: ☐ severe ☐ moderate ☒ low **Potential for root failure:** ☒ severe ☐ moderate ☐ low

LEAN: _____ deg. from vertical ☐ natural ☐ unnatural ☒ self-corrected **Soil heaving:** (Y) N

Decay in plane of lean: Y (N) **Roots broken** (Y) N **Soil cracking:** (Y) N

Compounding factors: Rapidly eroding creek bank **Lean severity:** ☐ severe ☒ moderate ☐ low

CROWN DEFECTS: Indicate presence of individual defects and rate their severity (s = severe, m = moderate, l = low)

DEFECT	ROOT CROWN	TRUNK	SCAFFOLDS	BRANCHES
Poor taper	N/A	N/A	N/A	N/A
Bow, sweep				
Codominants/forks				
Multiple attachments				
Included bark				
Excessive end weight				
Cracks/splits				
Hangers				
Girdling				
Wounds/seam				
Decay				
Cavity				
Conks/mushrooms/bracket				
Bleeding/sap flow				
Loose/cracked bark				
Nesting hole/bee hive				
Deadwood/stubs				
Borers/termites/ants				
Cankers/galls/burls				
Previous failure				

HAZARD RATING

Tree part most likely to fail: Roots - Whole tree

Inspection period: _____ annual _____ biannual _____ other _____

Failure Potential + Size of Part + Target Rating = Hazard Rating

3 + 2 + 1 = 6

Failure potential: 1 - low; 2 - medium; 3 - high; 4 - severe
Size of part: 1 - <6" (15 cm); 2 - 6-18" (15-45 cm); 3 - 18-30" (45-75 cm); 4 - >30" (75 cm)
Target rating: 1 - occasional use; 2 intermittent use; 3 - frequent use; 4 - constant use

HAZARD ABATEMENT

Prune: ☐ remove defective part ☐ reduce end weight ☐ crown clean ☐ thin ☐ raise canopy ☐ crown reduce ☐ restructure ☐ shape

Cable/Brace: _____ **Inspect further:** ☐ root crown ☐ decay ☐ aerial ☐ monitor

Remove tree: (Y) N **Replace?** Y N **Move target:** Y N **Other:** _____

Effect on adjacent trees: ☒ none ☐ evaluate

Notification: ☐ owner ☐ manager ☒ governing agency **Date:** See letter report

COMMENTS

Tree is at risk of failure due to lean and undermined roots, and rapidly eroding creek bank. preservation is not feasible due to location in limit of grade of bank stabilization improvements (ie. crib wall).

Part 8. Observes Species List

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Table A-1. Plant species observed in the Study Area, February 6, April 30, 2018, and November 1, 2019

Scientific name	Common name	Life form	Origin	Rare Status[1]	Invasive Status[2]	Wetland indicator[3]
Acacia dealbata	Silver wattle	tree, shrub	non-native (invasive)	-	Moderate	-
Acer macrophyllum	Bigleaf maple	tree	native	-	-	FAC
Aesculus californica	Buckeye	tree	native	-	-	-
Ailanthus altissima	Tree of heaven	tree	non-native (invasive)	-	Moderate	FACU
Arum italicum	Italian lords and ladies	perennial herb	non-native	-	-	-
Avena barbata	Slim oat	annual, perennial grass	non-native (invasive)	-	Moderate	-
Baccharis pilularis ssp. consanguinea	Coyote brush	shrub	native	-	-	-
Bromus diandrus	Ripgut brome	annual grass	non-native (invasive)	-	Moderate	-
Carduus pycnocephalus ssp. pycnocephalus	Italian thistle	annual herb	non-native (invasive)	-	Moderate	-
Claytonia cordifolia	Heart leaf spring beauty	perennial herb	native	-	-	FAC
Conium maculatum	Poison hemlock	perennial herb	non-native (invasive)	-	Moderate	FACW
Cotoneaster sp.	-	-	-	-	-	-
Erigeron canadensis	Canada horseweed	annual herb	native	-	-	FACU
Eucalyptus globulus	Blue gum	tree	non-native (invasive)	-	Limited	-
Frangula californica	California coffeeberry	shrub	native	-	-	-
Galium aparine	Cleavers	annual herb	native	-	-	FACU
Genista monspessulana	French broom	shrub	non-native (invasive)	-	High	-
Hedera helix	English ivy	vine, shrub	non-native (invasive)	-	High	FACU
Helminthotheca echioides	Bristly ox-tongue	annual, perennial herb	non-native (invasive)	-	Limited	FAC
Heteromeles arbutifolia	Toyon	shrub	native	-	-	-

Scientific name	Common name	Life form	Origin	Rare Status[1]	Invasive Status[2]	Wetland indicator[3]
Hirschfeldia incana	Short-podded mustard	perennial herb	non-native (invasive)	-	Moderate	-
Hypochaeris radicata	Hairy cats ear	perennial herb	non-native (invasive)	-	Moderate	FACU
Lysimachia arvensis	Scarlet pimpernel	annual herb	non-native	-	-	FAC
Marah fabacea	California man-root	perennial herb, vine	native	-	-	-
Marrubium vulgare	White horehound	perennial herb	non-native (invasive)	-	Limited	FACU
Medicago polymorpha	California burclover	annual herb	non-native (invasive)	-	Limited	FACU
Nicotiana glauca	Tree tobacco	tree, shrub	non-native (invasive)	-	Moderate	FAC
Oxalis pes-caprae	Bermuda buttercup	perennial herb	non-native (invasive)	-	Moderate	-
Quercus agrifolia	Coast live oak	tree	native	-	-	-
Salix laevigata	Red willow	tree	native	-	-	FACW
Sambucus nigra ssp. caerulea	Blue elderberry	shrub	native	-	-	FAC
Sequoia sempervirens	Coast redwood	tree	native	-	-	-
Toxicodendron diversilobum	Poison oak	vine, shrub	native	-	-	FACU
Umbellularia californica	California bay	tree	native	-	-	FAC
Urtica dioica	Stinging nettle	perennial herb	native	-	-	FAC
Urtica urens	Annual stinging nettle	annual herb	non-native	-	-	-
Vinca major	Vinca	perennial herb	non-native (invasive)	-	Moderate	-

All species identified using the *Jepson Manual, 2nd Edition* (Baldwin et al. 2012) and Jepson eFlora (2018); nomenclature follows Jepson eFlora. Sp.: "species", intended to indicate that the observer was confident in the identity of the genus but uncertain which species. Af.: intended to indicate a species appeared to the observer to be specific, but was not identified based on diagnostic characters.

[1]Rare Status: The CNPS Inventory of Rare and Endangered Plants (CNPS 2018)

FE: Federal Endangered
FT: Federal Threatened
SE: State Endangered

ST: State Threatened
SR: State Rare
Rank 1A: Plants presumed extirpated in California and either rare or extinct elsewhere
Rank 1B: Plants rare, threatened, or endangered in California and elsewhere
(*Rank 1B: Rare in native stands only)
Rank 2A: Plants presumed extirpated in California, but more common elsewhere
Rank 2B: Plants rare, threatened, or endangered in California, but more common elsewhere
Rank 3: Plants about which we need more information – a review list
Rank 4: Plants of limited distribution – a watch list

[2]Invasive Status: California Invasive Plant Inventory (Cal-IPC 2018)
High: Severe ecological impacts; high rates of dispersal and establishment; most are widely distributed ecologically.
Moderate: Substantial and apparent ecological impacts; moderate-high rates of dispersal, establishment dependent on disturbance; limited-moderate distribution ecologically
Limited: Minor or not well documented ecological impacts; low-moderate rate of invasiveness; limited distribution ecologically
Assessed: Assessed by Cal-IPC and determined to not be an existing current threat

[3]Wetland Status: National List of Plant Species that Occur in Wetlands, Arid West Region (Lichvar et al. 2016)
OBL: Almost always a hydrophyte, rarely in uplands
FACW: Usually a hydrophyte, but occasionally found in uplands
FAC: Commonly either a hydrophyte or non-hydrophyte
FACU: Occasionally a hydrophyte, but usually found in uplands
UPL: Rarely a hydrophyte, almost always in uplands
NL: Rarely a hydrophyte, almost always in uplands
NI: No information; not factored during wetland delineation

Table A-2. Wildlife Species Observed in the Study Area on February 6, 2018

Common Name (status if applicable)	**Species**
BIRDS	
Scrub jay	*Aphelocoma californica*
American robin	*Turdus migratorius*
MAMMALS	
Eastern gray squirrel	*Sciurus carolinensis*
San Francisco dusky-footed woodrat*	*Neotoma fuscipes annectens*

*CDFW Species of Special Concern

Part 9. Special-status Species Table

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Part 9. Evaluation of Special Status Plant and Wildlife Species Occurrence in the Project Area. List compiled from the California Department of Fish and Wildlife (CDFW) Natural Diversity Database (CDFW 2019), U.S. Fish and Wildlife Service (USFWS) Species Lists (USFWS 2019), and California Native Plant Society (CNPS) Electronic Inventory search of the Cupertino, Mindego Hill, Palo Alto, Redwood Point, Woodside, Mountain View, San Mateo, Newark, and La Honda USGS 7.5' Quadrangles.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS***
San Mateo thorn-mint *Acanthomintha duttonii*	FE, SE, Rank 1B.1	Chaparral, valley, and foothill grassland/ serpentine. Elevation ranges from 160 to 980 feet (50 to 300 meters). Blooms Apr-Jun.	**Unlikely**. The Project Area lacks expansive clays and serpentine substrates most often associated with this species.	**Not Observed**. Suitable habitat for this species was not observed within the Project Area. No further actions are recommended for this species.
Franciscan onion *Allium peninsulare var. franciscanum*	Rank 1B.2	Cismontane woodland, valley, and foothill grassland/clay, volcanic, often serpentine. Elevation ranges from 170 to 980 feet (52 to 300 meters). Blooms (Apr), May-Jun.	**Unlikely**. Although the Project Area contains potentially suitable cismontane woodland habitat, the Project Area lacks serpentine or volcanic substrates, and the understory is dominated by non-native plants or eroded bank, a primary threat to this species.	**Not Observed**. Suitable habitat for this species was not observed within the Project Area. No further actions are recommended for this species.
bent-flowered fiddleneck *Amsinckia lunaris*	Rank 1B.2	Coastal bluff scrub, cismontane woodland, valley, and foothill grassland. Elevation ranges from 10 to 1640 feet (3 to 500 meters). Blooms Mar-Jun.	**Unlikely**. The Project Area lacks potentially suitable habitat, and the species does not have a frequent history of occurrences near the Project Area. The closest is 4 miles north of the site and recorded in 1933 (CNDDB 2019). The next nearest occurrence is greater than 10 miles away.	**Not Observed**. Suitable habitat for this species was not observed within the Project Area. No further actions are recommended for this species.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS***
California androsace *Androsace elongata ssp. acuta*	Rank 4.2	Chaparral, cismontane woodland, coastal scrub, meadows and seeps, pinyon and juniper woodland, valley and foothill grassland. Elevation ranges from 490 to 3940 feet (150 to 1200 meters). Blooms Mar-Jun.	**Unlikely**. The Project Area lacks the dry, exposed slopes in high elevation habitat often associated with this species.	**Not Observed**. Suitable habitat for this species was not observed within the Project Area. No further actions are recommended for this species.
Anderson's manzanita *Arctostaphylos andersonii*	Rank 1B.2	Broadleafed upland forest, chaparral, north coast coniferous forest/openings, edges. Elevation ranges from 200 to 2490 feet (60 to 760 meters). Blooms Nov-May.	**No Potential**. This species is known from openings within redwood forests (CNPS 2019), and such habitat is not present within the Project Area.	**Not Observed.** Suitable habitat for this species was not observed within the Project Area. No further actions are recommended for this species.
Montara manzanita *Arctostaphylos montaraensis*	Rank 1B.2	Chaparral (maritime), coastal scrub. Elevation ranges from 260 to 1640 feet (80 to 500 meters). Blooms Jan-Mar.	**No Potential**. The Project Area lacks chaparral and coastal scrub habitat most often associated with this species.	**Not Observed.** Suitable habitat for this species was not observed within the Project Area. No further actions are recommended for this species.
Kings Mountain manzanita *Arctostaphylos regismontana*	Rank 1B.2	Broadleafed upland forest, chaparral, north coast coniferous forest/granitic or sandstone. Elevation ranges from 1000 to 2400 feet (305 to 730 meters). Blooms Jan-Apr.	**No Potential**. The Project Area lacks granitic or sandstone outcrops associated with this species and is outside the elevation ranges for this species.	**Not Observed.** Suitable habitat for this species was not observed within the Project Area. No further actions are recommended for this species.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS***
coastal marsh milk-vetch *Astragalus pycnostachyus var. pycnostachyus*	Rank 1B.2	Coastal dunes (mesic), coastal scrub, marshes, and swamps (coastal salt, streamsides). Elevation ranges from 0 to 100 feet (0 to 30 meters). Blooms Apr-Oct.	**Unlikely**. Although the Project Area contains streamside habitat, this species is typically associated with the immediate coastal environs and is not known from Santa Clara County. Its nearest documented occurrence is 9.5 miles north of the Project Area from 1894 (CNDDB 2019).	**Not Observed.** Suitable habitat for this species was not observed within the Project Area. No further actions are recommended for this species.
alkali milk-vetch *Astragalus tener var. tener*	Rank 1B.2	Playas, valley and foothill grassland (adobe clay), vernal pools/alkaline. Elevation ranges from 0 to 200 feet (1 to 60 meters). Blooms Mar-Jun.	**No Potential**. The Project Area lacks all suitable habitat associated with this species.	**Not Observed.** Suitable habitat for this species was not observed within the Project Area. No further actions are recommended for this species.
Brewer's calandrinia *Calandrinia breweri*	Rank 4.2	Chaparral, coastal scrub/sandy or loamy, disturbed sites and burns. Elevation ranges from 30 to 4000 feet (10 to 1220 meters). Blooms (Jan), Mar-Jun.	**Unlikely**. The Project Area lacks recently disturbed chaparral and coastal scrub habitats which could support this species.	**Not Observed.** Suitable habitat for this species was not observed within the Project Area. No further actions are recommended for this species.
Oakland star-tulip *Calochortus umbellatus*	Rank 4.2	Broadleafed upland forest, chaparral, cismontane woodland, lower montane coniferous forest, valley and foothill grassland/often serpentine. Elevation ranges from 330 to 2300 feet (100 to 700 meters). Blooms Mar-May.	**Unlikely**. The Project Area lacks suitable serpentine substrates and the majority of habitat types associated with this species. This species has not been documented from the urban, flatlands of the Silicon Valley.	**Not Observed.** Suitable habitat for this species was not observed within the Project Area. No further actions are recommended for this species.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS***
johnny-nip *Castilleja ambigua var. ambigua*	Rank 4.2	Coastal bluff scrub, coastal prairie, coastal scrub, marshes and swamps, valley and foothill grassland, vernal pool margins. Elevation ranges from 0 to 1430 feet (0 to 435 meters). Blooms Mar-Aug.	**No Potential**. The Project Area lacks seasonal wetland and coastal mesic grassland associated with this species.	**Not Observed.** Suitable habitat for this species was not observed within the Project Area. No further actions are recommended for this species.
Congdon's tarplant *Centromadia parryi ssp. congdonii*	Rank 1B.1	Valley and foothill grassland (alkaline). Elevation ranges from 0 to 750 feet (0 to 230 meters). Blooms May-Oct (Nov).	**No Potential**. The Project Area lacks alkaline substrates associated with this species.	**Not Observed.** Suitable habitat for this species was not observed within the Project Area. No further actions are recommended for this species.
Point Reyes bird's-beak *Chloropyron maritimum ssp. palustre*	Rank 1B.2	Marshes and swamps (coastal salt). Elevation ranges from 0 to 30 feet (0 to 10 meters). Blooms Jun-Oct.	**No Potential**. The Project Area lacks saline and marsh habitat associated with this species.	**Not Observed.** Suitable habitat for this species was not observed within the Project Area. No further actions are recommended for this species.
San Francisco Bay spineflower *Chorizanthe cuspidata var. cuspidata*	Rank 1B.2	Coastal bluff scrub, coastal dunes, coastal prairie, coastal scrub/sandy. Elevation ranges from 10 to 710 feet (3 to 215 meters). Blooms Apr-Jul (Aug).	**No Potential**. The Project Area lacks all suitable habitat associated with this species.	**Not Observed.** Suitable habitat for this species was not observed within the Project Area. No further actions are recommended for this species.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS***
fountain thistle *Cirsium fontinale var. fontinale*	FE, SE, Rank 1B.1	Chaparral (openings), cismontane woodland, meadows, valley and foothill grassland, and serpentine seeps. Elevation ranges from 150 to 570 feet (45 to 175 meters). Blooms (Apr), May-Oct.	**No Potential**. The Project Area lacks serpentine substrates necessary to support this species.	**Not Observed.** Suitable habitat for this species was not observed within the Project Area. No further actions are recommended for this species.
lost thistle *Cirsium praeteriens*	Rank 1A	Unknown. Elevation ranges from 0 to 330 feet (0 to 100 meters). Blooms Jun-Jul.	**Unlikely**. Habitat is unknown for this species. Not seen since 1901, this species is thought to be extinct, and may represent a casual introduction from Europe (CNPS 2019).	**Not Observed.** No further actions are recommended for this species.
Santa Clara red ribbons *Clarkia concinna ssp. automixa*	Rank 4.3	Chaparral, cismontane woodland. Elevation ranges from 300 to 4920 feet (90 to 1500 meters). Blooms (Apr), May-Jun (Jul).	**Unlikely**. Although the Project Area contains potentially suitable cismontane woodland habitat, the understory is dominated by non-native plants or eroded bank, a primary threat to this species.	**Not Observed.** Suitable habitat for this species was not observed within the Project Area. No further actions are recommended for this species.
round-headed Chinese-houses *Collinsia corymbosa*	Rank 1B.2	Coastal dunes. Elevation ranges from 0 to 70 feet (0 to 20 meters). Blooms Apr-Jun.	**No Potential**. The Project Area lacks coastal dune habitat.	**Not Observed.** Suitable habitat for this species was not observed within the Project Area. No further actions are recommended for this species.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS***
San Francisco collinsia *Collinsia multicolor*	Rank 1B.2	Closed-cone coniferous forest, coastal scrub/sometimes serpentine. Elevation ranges from 100 to 820 feet (30 to 250 meters). Blooms (Feb), Mar-May.	**No Potential**. The Project Area lacks the habitats and substrates associated with this species.	**Not Observed.** Suitable habitat for this species was not observed within the Project Area. No further actions are recommended for this species.
clustered lady's-slipper *Cypripedium fasciculatum*	Rank 4.2	Lower montane coniferous forest, north coast coniferous forest/usually serpentine seeps and streambanks. Elevation ranges from 330 to 7990 feet (100 to 2435 meters). Blooms Mar-Aug.	**Unlikely**. This species is typically found in serpentine seeps or moist streambank within conifer forests, not present in the Project Area.	**Not Observed.** Suitable habitat for this species was not observed within the Project Area. No further actions are recommended for this species.
mountain lady's-slipper *Cypripedium montanum*	Rank 4.2	Broadleafed upland forest, cismontane woodland, lower montane coniferous forest, north coast coniferous forest. Elevation ranges from 610 to 7300 feet (185 to 2225 meters). Blooms Mar-Aug.	**Unlikely**. This species is typically found on dry, undisturbed slopes in the Sierra and Klamath ranges. The Project Area represents the species southern range. Potentially suitable in the Project Area is below the known elevation range for the species.	**Not Observed.** Suitable habitat for this species was not observed within the Project Area. No further actions are recommended for this species.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS***
western leatherwood *Dirca occidentalis*	Rank 1B.2	Broadleafed upland forest, closed-cone coniferous forest, chaparral, cismontane woodland, north coast coniferous forest, riparian forest, riparian woodland/mesic. Elevation ranges from 80 to 1390 feet (25 to 425 meters). Blooms Jan-Mar (Apr).	**Unlikely**. The Project Area lacks potentially suitable habitat. On-site habitat is disturbed by eroded bank and non-native plants. The nearest documented occurrence of unknown location is approximately 2 miles west of the Project Area from 1931 (CNDDB 2019). The next nearest occurrence is from 2013 and located approximately 4 miles west of the Project Area (CNDDB 2019).	**Not Observed.** The species was not observed during 2019 site visits. Due to the disturbed nature of habitat observed within the Project Area, absence from site visits conducted during the blooming period, presence of non-native species, this species is unlikely to occur within the Project Area. Suitable habitat for this species was not observed within the Project Area. No further actions are recommended for this species.
California bottle-brush grass *Elymus californicus*	Rank 4.3	Broadleafed upland forest, cismontane woodland, north coast coniferous forest, riparian woodland. Elevation ranges from 50 to 1540 feet (15 to 470 meters). Blooms May-Aug (Nov).	**Unlikely**. The Project Area lacks sandy humus soils associated with this species.	**Not Observed.** Suitable habitat for this species was not observed within the Project Area. No further actions are recommended for this species.
Ben Lomond buckwheat *Eriogonum nudum var. decurrens*	Rank 1B.1	Chaparral, cismontane woodland, lower montane coniferous forest (maritime ponderosa pine sandhills)/sandy. Elevation ranges from 160 to 2620 feet (50 to 800 meters). Blooms Jun-Oct.	**No Potential**. This species is primarily known from ponderosa pine sandhills in Santa Cruz County (CNPS 2019). As such, habitat is not present within the Project Area.	**Not Observed.** Suitable habitat for this species was not observed within the Project Area. No further actions are recommended for this species.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS***
San Mateo woolly sunflower *Eriophyllum latilobum*	FE, SE, Rank 1B.1	Cismontane woodland (often serpentine, on roadcuts). Elevation ranges from 150 to 490 feet (45 to 150 meters). Blooms May-Jun.	**Unlikely**. The Project Area lacks serpentine substrates most often associated with this species. This species is only known from 7 extant occurrences, all within San Mateo County (CNPS 2019).	**Not Observed.** Suitable habitat for this species was not observed within the Project Area. No further actions are recommended for this species.
Hoover's button-celery *Eryngium aristulatum var. hooveri*	Rank 1B.1	Vernal pools. Elevation ranges from 10 to 150 feet (3 to 45 meters). Blooms (Jun), Jul (Aug).	**No Potential**. The Project Area lacks vernal pool and alkaline habitat.	**Not Observed.** Suitable habitat for this species was not observed within the Project Area. No further actions are recommended for this species.
Jepson's coyote thistle *Eryngium jepsonii*	Rank 1B.2	Vernal pools, valley and foothill grassland. Elevation range from 9 to 980 feet (3 to 300 meters). Blooms Apr-Aug.	**No Potential**. The Project Area lacks clay substrates and vernal pool and grassland habitat often associated with this species.	**Not Observed.** Suitable habitat for this species was not observed within the Project Area. No further actions are recommended for this species.
San Francisco wallflower *Erysimum franciscanum*	Rank 4.2	Chaparral, coastal dunes, coastal scrub, valley and foothill grassland/often serpentine or granitic, sometimes roadsides. Elevation ranges from 0 to 1800 feet (0 to 550 meters). Blooms Mar-Jun.	**Unlikely**. The Project Area lacks serpentine or granitic substrates and rocky outcrops most often associated with this species.	**Not Observed.** Suitable habitat for this species was not observed within the Project Area. No further actions are recommended for this species.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS***
San Joaquin spearscale *Extriplex joaquinana*	Rank 1B.2	Chenopod scrub, meadows and seeps, playas, valley and foothill grassland/alkaline. Elevation ranges from 0 to 2740 feet (1 to 835 meters). Blooms Apr-Oct.	**No Potential**. The Project Area lacks alkaline habitats most often associated with this species.	**Not Observed.** Suitable habitat for this species was not observed within the Project Area. No further actions are recommended for this species.
Hillsborough chocolate lily *Fritillaria biflora var. ineziana*	Rank 1B.1	Cismontane woodland, valley and foothill grassland/serpentine. Elevation ranges from 490 to 490 feet (150 to 150 meters). Blooms Mar-Apr.	**No Potential**. The Project Area lacks serpentine substrates necessary to support this species.	**Not Observed.** Suitable habitat for this species was not observed within the Project Area. No further actions are recommended for this species.
fragrant fritillary *Fritillaria liliacea*	Rank 1B.2	Cismontane woodland, coastal prairie, coastal scrub, valley and foothill grassland/often serpentine. Elevation ranges from 10 to 1350 feet (3 to 410 meters). Blooms Feb-Apr.	**Unlikely**. The Project Area lacks serpentine substrates and heavy clay soils most often associated with this species.	**Not Observed.** Suitable habitat for this species was not observed within the Project Area. No further actions are recommended for this species.
short-leaved evax *Hesperevax sparsiflora var. brevifolia*	Rank 1B.2	Coastal bluff scrub (sandy), coastal dunes, coastal prairie. Elevation ranges from 0 to 710 feet (0 to 215 meters). Blooms Mar-Jun.	**No Potential**. The Project Area lacks the sandy habitat most often associated with this species.	**Not Observed.** Suitable habitat for this species was not observed within the Project Area. No further actions are recommended for this species.
Marin western flax *Hesperolinon congestum*	FT, ST, Rank 1B.1	Chaparral, valley and foothill grassland/serpentine. Elevation ranges from 20 to 1210 feet (5 to 370 meters). Blooms Apr-Jul.	**No Potential**. The Project Area lacks chaparral and grassland habitat underlain by serpentine substrates most often associated with this species.	**Not Observed.** Suitable habitat for this species was not observed within the Project Area. No further actions are recommended for this species.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS***
Loma Prieta hoita *Hoita strobilina*	Rank 1B.1	Chaparral, cismontane woodland, riparian woodland/usually serpentine, mesic. Elevation ranges from 100 to 2820 feet (30 to 860 meters). Blooms May-Jul (Aug-Oct).	**Unlikely**. Although the Project Area contains cismontane woodland and riparian habitat, it lacks serpentine substrates, and the understory is dominated by non-native plants. The nearest recorded occurrence is from 1913 and of unknown accuracy located approximately 15 miles south of the Project Area.	**Not Observed.** Suitable habitat for this species was not observed within the Project Area. No further actions are recommended for this species.
coast iris *Iris longipetala*	Rank 4.2	Coastal prairie, lower montane coniferous forest, meadows and seeps/mesic. Elevation ranges from 0 to 1970 feet (0 to 600 meters). Blooms Mar-May.	**Unlikely**. The Project Area lacks all habitat types most often associated with this species.	**Not Observed.** Suitable habitat for this species was not observed within the Project Area. No further actions are recommended for this species.
Contra Costa goldfields *Lasthenia conjugens*	FE, Rank 1B.1	Cismontane woodland, playas (alkaline), valley and foothill grassland, vernal pools/mesic. Elevation ranges from 0 to 1540 feet (0 to 470 meters). Blooms Mar-Jun.	**No Potential**. The Project Area lacks alkaline vernal pools and seasonal wetlands most often associated with this species.	**Not Observed.** Suitable habitat for this species was not observed within the Project Area. No further actions are recommended for this species.
legenere *Legenere limosa*	Rank 1B.1	Vernal pools. Elevation ranges from 0 to 2890 feet (1 to 880 meters). Blooms Apr-Jun.	**No Potential**. The Project Area lacks vernal pool habitat.	**Not Observed.** Suitable habitat for this species was not observed within the Project Area. No further actions are recommended for this species.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS***
serpentine leptosiphon *Leptosiphon ambiguus*	Rank 4.2	Cismontane woodland, coastal scrub, valley and foothill grassland/usually serpentine. Elevation ranges from 390 to 3710 feet (120 to 1130 meters). Blooms Mar-Jun.	**No Potential**. The Project Area lacks serpentine substrates associated with this species.	**Not Observed.** Suitable habitat for this species was not observed within the Project Area. No further actions are recommended for this species.
Crystal Springs lessingia *Lessingia arachnoidea*	Rank 1B.2	Cismontane woodland, coastal scrub, valley and foothill grassland/serpentine, often roadsides. Elevation ranges from 200 to 660 feet (60 to 200 meters). Blooms Jul-Oct.	**No Potential**. The Project Area lacks serpentine substrates most often associated with this species.	**Not Observed.** Suitable habitat for this species was not observed within the Project Area. No further actions are recommended for this species.
woolly-headed lessingia *Lessingia hololeuca*	Rank 3	Broadleafed upland forest, coastal scrub, lower montane coniferous forest, valley and foothill grassland/clay, serpentine. Elevation ranges from 50 to 1000 feet (15 to 305 meters). Blooms Jun-Oct.	**Unlikely**. The Project Area lacks clay and serpentine substrates most often associated with this species.	**Not Observed.** Suitable habitat for this species was not observed within the Project Area. No further actions are recommended for this species.
coast lily *Lilium maritimum*	Rank 1B.1	Broadleafed upland forest, closed-cone coniferous forest, coastal prairie, coastal scrub, marshes and swamps (freshwater), north coast coniferous forest/sometimes roadside. Elevation ranges from 20 to 1560 feet (5 to 475 meters). Blooms May-Aug.	**No Potential**. The Project Area lacks the wet, hummocky habitat most often associated with this species. San Mateo County represents the species historical southern range and is presumed extirpated from this county (CNPS 2019).	**Not Observed.** Suitable habitat for this species was not observed within the Project Area. No further actions are recommended for this species.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS***
San Mateo tree lupine *Lupinus arboreus var. eximius*	Rank 3.2	Chaparral, coastal scrub. Elevation ranges from 300 to 1800 feet (90 to 550 meters). Blooms Apr-Jul.	**No Potential**. The Project Area lacks chaparral and coastal scrub habitat most often associated with this species.	**Not Observed.** Suitable habitat for this species was not observed within the Project Area. No further actions are recommended for this species.
arcuate bush-mallow *Malacothamnus arcuatus*	Rank 1B.2	Chaparral, cismontane woodland. Elevation ranges from 50 to 1160 feet (15 to 355 meters). Blooms Apr-Sep.	**Unlikely**. Although the Project Area contains cismontane woodland habitat, the understory is dominated by non-native plants or eroded slopes. The nearest/most recent recorded occurrence is from 2001 located approximately 4.5 miles south of the Project Area (CNDDB 2019).	**Not Observed.** Suitable habitat for this species was not observed within the Project Area. No further actions are recommended for this species.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS***
Davidson's bush-mallow *Malacothamnus davidsonii*	Rank 1B.2	Chaparral, cismontane woodland, coastal scrub, riparian woodland. Elevation ranges from 610 to 2810 feet (185 to 855 meters). Blooms Jun-Jan.	**Unlikely**. Although the Project Area contains riparian habitat and sandy washes within the stream channel, on-site habitat is dominated by non-native plants or eroded slopes. The nearest/most recent recorded occurrence is from 2001 and located approximately 4.5 miles south of the Project Area (CNDDB 2019).	**Not Observed.** The species was not observed during 2019 site visits when this species would have been observable vegetatively. Woody riparian vegetation is dominated by native willows with an understory of non-native herbaceous plants. Due to the to the disturbed nature of habitat observed within the Project Area, absence of the species from site visits, and abundance of non-native species, this species is presumed absent from the Project Area. No further actions are recommended for this species.
Mt. Diablo cottonweed *Micropus amphibolus*	Rank 3.2	Broadleafed upland forest, chaparral, cismontane woodland, valley and foothill grassland/rocky. Elevation ranges from 150 to 2710 feet (45 to 825 meters). Blooms Mar-May.	**Unlikely**. The Project Area lacks bare, grassy, or rock slopes most often associated with this species.	**Not Observed.** Suitable habitat for this species was not observed within the Project Area. No further actions are recommended for this species.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS***
woodland woolythreads *Monolopia gracilens*	Rank 1B.2	Broadleafed upland forest (openings), chaparral (openings), cismontane woodland, north coast coniferous forest (openings), valley and foothill grassland/serpentine. Elevation ranges from 330 to 3940 feet (100 to 1200 meters). Blooms (Feb), Mar-Jul.	**Unlikely**. Although the Project Area contains cismontane woodland, it lacks serpentine substrates, and the understory is dominated by non-native plants, a primary threat to this species. The nearest documented occurrence is 3.5 miles southwest of the Project Area and from 1971 (CNDDB 2019).	**Not Observed.** Suitable habitat for this species was not observed within the Project Area. No further actions are recommended for this species.
pincushion navarretia *Navarretia myersii ssp. myersii*	Rank 1B.1	Vernal pools, often acidic. Elevation ranges from 70 to 1080 feet (20 to 330 meters). Blooms Apr-May.	**No Potential**. The Project Area lacks clay substrates and vernal pool habitat.	**Not Observed.** Suitable habitat for this species was not observed within the Project Area. No further actions are recommended for this species.
Patterson's navarretia *Navarretia paradoxiclara*	Rank 1B.3	Meadows and seeps. Elevation ranges from 490 to 1400 feet (150 to 430 meters). Blooms May-Jun (Jul).	**No Potential**. The Project Area lacks serpentinite substrates. This species is primarily restricted to the foothill ranges in Calaveras and Tuolumne counties.	**Not Observed.** Suitable habitat for this species was not observed within the Project Area. No further actions are recommended for this species.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS***
Dudley's lousewort *Pedicularis dudleyi*	SR, Rank 1B.2	Chaparral (maritime), cismontane woodland, north coast coniferous forest, valley and foothill grassland. Elevation ranges from 200 to 2950 feet (60 to 900 meters). Blooms Apr-Jun.	**No Potential**. The Project Area lacks maritime chaparral and coast redwood forests most often associated with this species. This species is only known from immediate coastal environs in Monterey, San Mateo, Santa Cruz, and San Luis Obispo counties (CNPS 2019).	**Not Observed.** Suitable habitat for this species was not observed within the Project Area. No further actions are recommended for this species.
white-rayed pentachaeta *Pentachaeta bellidiflora*	FE, SE, Rank 1B.1	Cismontane woodland, valley and foothill grassland (often serpentine). Elevation ranges from 110 to 2030 feet (35 to 620 meters). Blooms Mar-May.	**Unlikely**. The Project Area lacks serpentine derived substrates. Understory consists of eroded slopes or is dominated by non-native herbaceous species. The nearest recorded occurrence is from 2004 and located approximately 7 miles northwest of the Project Area (CNDDB 2019).	**Not Observed.** Suitable habitat for this species was not observed within the Project Area. No further actions are recommended for this species.
white-flowered rein orchid *Piperia candida*	Rank 1B.2	Broadleafed upland forest, lower montane coniferous forest, north coast coniferous forest/sometimes serpentine. Elevation ranges from 100 to 4300 feet (30 to 1310 meters). Blooms (Mar), May-Sep.	**Unlikely**. The Project Area lacks organic substrates and rocky outcrops most often associated with this species.	**Not Observed.** Suitable habitat for this species was not observed within the Project Area. No further actions are recommended for this species.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS***
Choris' popcornflower *Plagiobothrys chorisianus var. chorisianus*	Rank 1B.2	Chaparral, coastal prairie, coastal scrub/mesic. Elevation ranges from 50 to 520 feet (15 to 160 meters). Blooms Mar-Jun.	**Unlikely**. The Project Area lacks coastal prairie and scrub habitats most often associated within this species. The nearest recorded occurrence is from 2016 and located approximately 5 miles southwest of the Project Area (CNDDB 2019).	**Not Observed.** Suitable habitat for this species was not observed within the Project Area. No further actions are recommended for this species.
hairless popcornflower *Plagiobothrys glaber*	Rank 1A	Meadows and seeps (alkaline), marshes and swamps (coastal salt). Elevation ranges from 50 to 590 feet (15 to 180 meters). Blooms Mar-May.	**No Potential**. The Project Area lacks salt marsh and alkaline meadow habitat.	**Not Observed.** Suitable habitat for this species was not observed within the Project Area. No further actions are recommended for this species.
Oregon polemonium *Polemonium carneum*	Rank 2B.2	Coastal prairie, coastal scrub, lower montane coniferous forest. Elevation ranges from 0 to 6000 feet (0 to 1830 meters). Blooms Apr-Sep.	**No Potential**. The Project Area lacks all habitat types associated within this species.	**Not Observed.** Suitable habitat for this species was not observed within the Project Area. No further actions are recommended for this species.
Lobb's aquatic buttercup *Ranunculus lobbii*	Rank 4.2	Cismontane woodland, north coast coniferous forest, valley and foothill grassland, vernal pools/mesic. Elevation ranges from 50 to 1540 feet (15 to 470 meters). Blooms Feb-May.	**Unlikely**. The Project Area lacks ponded and wetland habitat most often associated with this species. (Jepson eFlora 2019).	**Not Observed.** Suitable habitat for this species was not observed within the Project Area. No further actions are recommended for this species.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS***
chaparral ragwort *Senecio aphanactis*	Rank 2B.2	Chaparral, cismontane woodland, coastal scrub/sometimes alkaline. Elevation ranges from 50 to 2620 feet (15 to 800 meters). Blooms Jan-Apr.	**Unlikely**. The Project Area lacks alkaline substrates and habitats most often associated within this species.	**Not Observed.** Suitable habitat for this species was not observed within the Project Area. No further actions are recommended for this species.
Scouler's catchfly *Silene scouleri ssp. scouleri*	Rank 2B.2	Coastal bluff scrub, coastal prairie, valley and foothill grassland. Elevation ranges from 0 to 1970 feet (0 to 600 meters). Blooms (Mar-May) Jun-Aug (Sep).	**No Potential**. The Project Area lacks suitable habitat often associated with this species.	**Not Observed.** Suitable habitat for this species was not observed within the Project Area. No further actions are recommended for this species.
San Francisco campion *Silene verecunda ssp. verecunda*	Rank 1B.2	Coastal bluff scrub, chaparral, coastal prairie, coastal scrub, valley and foothill grassland/sandy. Elevation ranges from 100 to 2120 feet (30 to 645 meters). Blooms (Feb), Mar-Jun (Aug).	**Unlikely**. The Project Area lacks coastal bluff scrub and prairie, and sandy soils associated with this species.	**Not Observed.** No suitable substrates or habitat was observed within the Project Area. No further actions are recommended for this species.
long-styled sand-spurrey *Spergularia macrotheca var. longistyla*	Rank 1B.2	Alkaline meadows and seeps, marshes and swamps. Elevation ranges 0 to 835 (0 to 255 meters). Blooms Feb-May (Jun).	**No Potential**. The Project Area lacks alkaline meadow and wetland habitat often associated with this species.	**Not Observed.** No suitable substrates or habitat was observed within the Project Area. No further actions are recommended for this species.
slender-leaved pondweed *Stuckenia filiformis ssp. alpina*	Rank 2B.2	Marshes and swamps (assorted shallow freshwater). Elevation ranges from 980 to 7050 feet (300 to 2150 meters). Blooms May-Jul.	**No Potential**. The Project Area lacks ponded habitats associated with this species.	No suitable substrates or habitat was observed within the Project Area. No further actions are recommended for this species.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS***
California seablite *Suaeda californica*	FE, Rank 1B.1	Marshes and swamps (coastal salt). Elevation ranges from 0 to 50 feet (0 to 15 meters). Blooms Jul-Oct.	**No Potential**. The Project Area lacks salt marsh habitat associated with this species.	**Not Observed.** No suitable substrates or habitat was observed within the Project Area. No further actions are recommended for this species.
two-fork clover *Trifolium amoenum*	FE, Rank 1B.1	Coastal bluff scrub, valley and foothill grassland (sometimes serpentine). Elevation ranges from 20 to 1360 feet (5 to 415 meters). Blooms Apr-Jun.	**Unlikely**. The Project Area contains cliff-like characteristics due to the eroding stream bank. However, no scrub habitat or serpentine substrates most often associated with this species is present. There is one recorded occurrence within 15 miles of the Project Area. The recorded occurrence is located 3.5 miles west of the Project Area from 1950 with an unknown accuracy (CNDDB 2019).	**Not Observed.** No suitable substrates or habitat was observed within the Project Area. No further actions are recommended for this species.
Santa Cruz clover *Trifolium buckwestiorum*	Rank 1B.1	Broadleafed upland forest, cismontane woodland, coastal prairie/gravelly, margins. Elevation ranges from 340 to 2000 feet (105 to 610 meters). Blooms Apr-Oct.	**Unlikely**. Although the Project Area contains cismontane woodland habitat, the understory lacks moist grassland and gravelly substrates. This species is more typically known from the immediate coastal environs of Mendocino, Monterey, and Santa Cruz counties (CNPS 2019).	**Not Observed.** No suitable substrates or habitat was observed within the Project Area. No further actions are recommended for this species.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS***
saline clover *Trifolium hydrophilum*	Rank 1B.2	Marshes and swamps, valley and foothill grassland (mesic, alkaline), vernal pools. Elevation ranges from 0 to 980 feet (0 to 300 meters). Blooms Apr-Jun.	**No Potential**. The Project Area lacks alkaline wetland and grassland habitat often associated with this species.	**Not Observed.** No suitable substrates or habitat was observed within the Project Area. No further actions are recommended for this species.
San Francisco owl's-clover *Triphysaria floribunda*	Rank 1B.2	Coastal prairie, coastal scrub, valley and foothill grassland/usually serpentine. Elevation ranges from 30 to 520 feet (10 to 160 meters). Blooms Apr-Jun.	**Unlikely**. The Project Area lacks gravelly or sandy openings in coastal scrub and coastal prairie most often associated with this species. The nearest/most recent recorded occurrence is from 2018 and located approximately 9 miles north of the Project Area (CNDDB 2019).	**Not Observed.** Suitable habitat for this species was not observed within the Project Area. No further actions are recommended for this species.
caper-fruited tropidocarpum *Tropidocarpum capparideum*	Rank 1B.1	Valley and foothill grassland (alkaline hills). Elevation ranges from 0 to 1490 feet (1 to 455 meters). Blooms Mar-Apr.	**Unlikely**. The Project Area lacks alkaline substrates and grassland habitat often associated with this species.	**Not Observed.** Suitable habitat for this species was not observed within the Project Area. No further actions are recommended for this species.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS***
Mammals				
pallid bat *Antrozous pallidus*	SSC, WBWG High	Found in a variety of habitats ranging from grasslands to mixed forests, favoring open and dry, rocky areas. Roost sites include crevices in rock outcrops and cliffs, caves, mines, and also hollow trees and various manmade structures such as bridges, barns, and buildings (including occupied buildings). Roosts must protect bats from high temperatures. Very sensitive to disturbance of roosting sites.	**Unlikely.** Buildings present within and near the Project Area appear to be regularly attended by people. May forage over the Project Area.	No further actions are recommended.
Townsend's big-eared bat *Corynorhinus townsendii*	SSC, WBWG High	Associated with a wide variety of habitats from deserts to higher-elevation mixed and coniferous forests. Females form maternity colonies in buildings, caves and mines, and males roost singly or in small groups. Foraging typically occurs at edge habitats near wooded areas, e.g. along streams.	**Unlikely.** The Project Area contains no caves or cave-like areas, and buildings there appear to be regularly attended by people.	No further actions are recommended.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS***
salt-marsh wandering shrew *Sorex vagrans halicoetes*	SSC	Salt marshes of the south arm of San Francisco Bay. Medium high marsh 6 to 8 feet above sea level where abundant driftwood is scattered among *Salicornia*.	**No Potential**. The Project Area contains no tidal wetland and thus provides no habitat for this species.	No further actions are recommended.
salt-marsh harvest mouse *Reithrodontomys raviventris*	FE, SE, CFP	Endemic to emergent salt and brackish wetlands of the San Francisco Bay Estuary. Pickleweed marshes are primary habitat; also occurs in various other wetland communities with dense vegetation. Does not burrow, builds loosely organized nests. Requires higher areas for flood escape.	**No Potential**. The Project Area contains no tidal wetland and thus provides no habitat for this species.	No further actions are recommended.
San Francisco dusky-footed woodrat *Neotoma fuscipes annectens*	SSC	Forest habitats of moderate canopy and moderate to dense understory. Also in chaparral habitats. Constructs nests of shredded grass, leaves, and other material. May be limited by availability of nest-building materials.	**Moderate Potential.** Woodland and scrub areas within the Project Area may support this species.	Prior to ground disturbance and/or vegetation removal, a pre-construction survey should be conducted. Any woodrat structures identified should be avoided, or dissembled by a qualified biologist if avoidance is not feasible.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS***
American badger *Taxidea taxus*	SSC	Most abundant in drier open stages of most shrub, forest, and herbaceous habitats, with friable soils. Requires friable soils and open, uncultivated ground. Preys on burrowing rodents.	**No Potential.** Developed areas surrounding the Project Area preclude the presence of this species.	No further actions are recommended.
Birds				
Allen's hummingbird *Selasphorus sasin*	BCC	Summer resident along the California coast, breeding in a variety of woodland and forest habitats, including parks and gardens with abundant nectar sources. Nest in shrubs and trees with dense vegetation.	**Moderate Potential.** Riparian trees and oaks within the Project Area provide suitable habitat for this species.	A breeding bird survey should be conducted if ground disturbance and/or vegetation removal occurs from February 1 to August 31; active nests should be avoided.
Barrow's goldeneye *Bucephala islandica*	SSC	(Nesting) breeds in high central and northern Sierra Nevada mountains, near wooded mountain lakes or large streams. Nest in tree cavities, such as a deserted nest-hole of a pileated woodpecker or flicker; also use nest boxes.	**Unlikely.** Aquatic habitats within San Francisquito Creek are too small in area to provide any typical wintering habitat.	No further actions are recommended.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS***
harlequin duck *Histrionicus histrionicus*	SSC	(Nesting) Found in marine waters along rocky shore during non-breeding season. Breeds on west slope of the Sierra Nevada range. Nests in inland streams or along shores of swift, shallow rivers. Nest often built within 7 feet of water in a recess, sheltered overhead by the stream bank, rocks or woody debris.	**Unlikely.** San Francisquito Creek is too small in area and sheltered to provide any suitable wintering habitat for this species.	No further actions are recommended.
California thrasher *Toxostoma redivivum*	BCC	Year-round resident in lowland and coastal chaparral, as well as riparian woodland thickets. Commonly seen in parks and gardens. Typically nest in dense shrubs, and feed chiefly on insects and fruit.	**Moderate Potential.** Riparian trees and oaks within the Project Area could provide suitable habitat for this species.	A breeding bird survey should be conducted if ground disturbance and/or vegetation removal occurs from February 1 to August 31; active nests should be avoided.
common loon *Gavia immer*	SSC	Primarily a winter visitor; breeding restricted to northeastern portion of the state. Nests amid emergent vegetation along larger lakes and reservoirs that produce quantities of large fish. Winters along the coast and on larger inland water bodies.	**Unlikely.** San Francisquito Creek is too small in area and sheltered to provide any suitable wintering habitat for this species.	No further actions are recommended.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS***
American white pelican *Pelecanus erythrorhynchos*	SSC	Non-breeding visitor in most of California. Nests colonially on large interior lakes or rivers; breeding restricted to portions of eastern California. Winters on sheltered inland and estuarine waters with abundant small fishes for forage.	**No Potential.** San Francisquito Creek is too small in area to provide any suitable aquatic habitat for this species.	No further actions are recommended.
California brown pelican *Pelecanus occidentalis californicus*	FD, SD, CFP	(Nesting colony) colonial nester on coastal islands just outside the surf line. Nests on coastal islands of small to moderate size which afford immunity from attack by ground-dwelling predators.	**No Potential.** San Francisquito Creek is too small in area to provide any suitable aquatic habitat for this species.	No further actions are recommended.
golden eagle *Aquila chrysaetos*	CFP	Year-round resident in rolling foothill and mountain areas, sage-juniper flats, and desert. Cliff-walled canyons provide nesting habitat in most parts of range.	**Unlikely.** The Project Area is developed and provides no habitat for this species. May occasionally fly over the area.	No further actions are recommended.
ferruginous hawk *Buteo regalis*	BCC	Winter visitor to open habitats, including grasslands, sagebrush flats, scrub, and low foothills surrounding valleys. Preys on mammals. Does not breed in California.	**No Potential.** The Project Area is developed and provides no habitat for this species.	Species is not anticipated to be affected by the Project. No further surveys or avoidance measures are necessary.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS***
Lawrence's goldfinch *Spinus (= Carduelis) lawrencei*	BCC	Summer resident, primarily in southern California; generally uncommon and local. Also found in large open areas in Contra Costa and Alameda Counties. Typically found in arid open woodlands, including oak savannah. Breeding distribution is erratic from year to year.	**Unlikely.** The Project Area is developed and provides no habitat for this species. May occasionally fly over the area.	No further actions are recommended.
northern harrier *Circus hudsonius (cyaneus)*	SSC	Year-round resident and winter visitor. Found in open habitats including grasslands, prairies, marshes and agricultural areas. Nests on the ground in dense vegetation, typically near water or otherwise moist areas. Preys on small vertebrates.	**Unlikely.** The Project Area is developed and provides no habitat for this species. May occasionally fly over the area.	No further actions are recommended.
white-tailed kite *Elanus leucurus*	CFP	Year-round resident in coastal and valley lowlands with scattered trees and large shrubs, including grasslands, marshes and agricultural areas. Nests in trees, of which the type and setting are highly variable. Preys on small mammals and other vertebrates.	**Moderate Potential.** Although this species requires open areas for foraging, nesting does occur adjacent to or even within developed sites.	A breeding bird survey should be conducted if ground disturbance and/or vegetation removal occurs from February 1 to August 31; active nests should be avoided.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS***
bald eagle *Haliaeetus leucocephalus*	FD, SE, CFP, BCC	Occurs year-round in California, but primarily a winter visitor; breeding population is growing. Nests in large trees in the vicinity of larger lakes, reservoirs and rivers. Wintering habitat somewhat more variable but usually features large concentrations of waterfowl or fish.	**Unlikely.** The Project Area is developed and provides no habitat for this species. May occasionally fly over the area.	No further actions are recommended.
prairie falcon *Falco mexicanus*	BCC	Year-round resident and winter visitor. Inhabits dry, open terrains, including foothills and valleys. Breeding sites located on steep cliffs. Forages widely.	**Unlikely.** The Project Area is developed and provides no habitat for this species. May occasionally fly over the area.	No further actions are recommended.
American peregrine falcon *Falco peregrinus anatum*	FD, SD, CFP, BCC	Year-round resident and winter visitor. Occurs in a wide variety of habitats, though often associated with coasts, bays, marshes and other bodies of water. Nests on protected cliffs and also on man-made structures including buildings and bridges. Preys on birds, especially waterbirds. Forages widely.	**Unlikely.** The Project Area is developed and provides no typical habitat for this species. May occasionally fly over the area.	No further actions are recommended.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS***
California black rail *Laterallus jamaicensis coturniculus*	ST, CFP	Year-round resident in marshes (saline to freshwater) with dense vegetation within four inches of the ground. Prefers larger, undisturbed marshes that have an extensive upper zone and are close to a major water source. Extremely secretive and cryptic.	**No Potential.** The Project Area contains no tidal or brackish wetland and provides no habitat for this species.	No further actions are recommended.
California Ridgway's (clapper) rail *Rallus obsoletus obsoletus*	FE, SE, CFP	Year-round resident in tidal marshes of the San Francisco Bay estuary. Requires tidal sloughs and intertidal mud flats for foraging, and dense marsh vegetation for nesting and cover. Typical habitat features abundant growth of cordgrass and pickleweed. Feeds primarily on molluscs and crustaceans.	**No Potential.** The Project Area contains no tidal or brackish wetland and provides no habitat for this species.	No further actions are recommended.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS***
marbled murrelet *Brachyramphus marmoratus*	FT, SE	Predominantly coastal marine. Nests in old-growth coniferous forests up to 30 miles inland along the Pacific coast, from Eureka to Oregon border, and in Santa Cruz/San Mateo Counties. Nests are highly cryptic, and typically located on platform-like branches of mature redwoods and Douglas firs. Forages on marine invertebrates and small fishes.	**No Potential.** The Project Area is developed and provides no habitat for this species.	No further actions are recommended.
western snowy plover *Charadrius nivosus (alexandrines) nivosus*	FT, SSC, BCC, RP	Federal listing applies only to the Pacific coastal population. Year-round resident and winter visitor. Occurs on sandy beaches, salt pond levees, and the shores of large alkali lakes. Nests on the ground, requiring sandy, gravelly or friable soils.	**No Potential.** The Project Area contains no beaches or salt ponds and provides no habitat for this species.	No further actions are recommended.
black oystercatcher *Haematopus bachmani*	BCC	Year-round resident of rocky coast habitats along the Pacific coast. Also occurs on coastal and lower estuarine mud-flats. Forages primarily on intertidal invertebrates.	**No Potential.** The Project Area contains no rocky shores or beaches and provides no habitat for this species.	No further actions are recommended.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS***
long-billed curlew *Numenius americanus*	BCC	(Nesting) breeds in upland shortgrass prairies and wet meadows in northeastern California. Habitats on gravelly soils and gently rolling terrain are favored over others	**Unlikely.** The Project Area contains no grasslands are mudflats; may occasionally fly over the area or occur incidentally.	No further actions are recommended.
caspian tern *Hydroprogne caspia*	BCC	Summer resident (NorCal, year-round presence in SoCal). Nests colonially on sparsely-vegetated islands (including man-made islands), sandbars and beaches near expanses of open water. Forages on fishes.	**Unlikely.** San Francisquito Creek is too small in area and secluded to provide habitat for this species; may occasionally fly over the area.	No further actions are recommended.
black skimmer *Rynchops niger*	BCC, SSC	Found primarily in southern California; South San Francisco Bay has a small resident population. Nests colonially on gravel bars, low islets, and sandy beaches	**No Potential.** The Project Area is developed and too far inland to provide any habitat for this species.	No further actions are recommended.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS***
California least tern *Sternula antillarum browni*	FE, SE, CFP	Summer resident along the coast from San Francisco Bay south to northern Baja California; inland breeding also very rarely occurs. Nests colonially on barren or sparsely vegetated areas with sandy or gravelly substrates near water, including beaches, islands, and gravel bars. In San Francisco Bay, has also nested on salt pond margins.	**No Potential.** San Francisquito Creek is too small in area and secluded to provide habitat for this species.	No further actions are recommended.
short-eared owl *Asio flammeus*	SSC	Occurs year-round, but primarily as a winter visitor; breeding very restricted in most of California. Found in open, treeless areas (e.g., marshes, grasslands) with elevated sites for foraging perches and dense herbaceous vegetation for roosting and nesting. Preys mostly on small mammals, particularly voles.	**No Potential.** The Project Area is developed, with no open grasslands or marshes.	No further actions are recommended.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS***
long-eared owl *Asio otus*	SSC	Occurs year-round in California. Nests in trees in a variety of woodland habitats, including oak and riparian, as well as tree groves. Requires adjacent open land with rodents for foraging, and the presence of old nests of larger birds (hawks, crows, magpies) for breeding.	**Unlikely.** The Project Area is developed, and lacks typical forest/woodland areas as well as suitable open spaces for foraging.	No further actions are recommended.
burrowing owl *Athene cunicularia*	SSC, BCC	Year-round resident and winter visitor. Occurs in open, dry grasslands and scrub habitats with low-growing vegetation, perches and abundant mammal burrows. Preys upon insects and small vertebrates. Nests and roosts in old mammal burrows, most commonly those of ground squirrels.	**Unlikely.** The Project Area is developed, with no open grassland or other typical habitat for this species.	No further actions are recommended.
Vaux's swift *Chaetura vauxi*	SSC	Summer resident, breeding primarily in forested areas. Nests in tree cavities, favoring those with a large vertical extent; also uses chimneys and other man-made substrates. Forages aerially for insects.	**Unlikely.** The Project Area is developed, lacking the natural forest habitat favored by this species.	No further actions are recommended.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS***
black swift *Cypseloides niger*	SSC, BCC	Summer resident with a fragmented breeding distribution; most occupied areas in California either montane or coastal. Breeds in small colonies on cliffs behind or adjacent to waterfalls, in deep canyons, and sea-bluffs above surf. Forages aerially over wide areas.	**No Potential.** The Project Area contains no cliffs or waterfalls, and provides no suitable habitat for this species.	No further actions are recommended.
wrentit *Chamaea fasciata*	BCC	Year-round resident in coastal scrub and chaparral along the West Coast. Nests in many types of vegetation including California sage, coyote brush, blackberry, poison oak, coffeeberry, Douglas-fir, bush lupine, wild rose, valley oak, and wild grape.	**No Potential.** The Project Area contains no coastal scrub or chaparral and provides no suitable habitat for this species.	No further actions are recommended.
Nuttall's woodpecker *Picoides nuttallii*	BCC	Year-round resident in lowland woodlands throughout much of California west of the Sierra Nevada. Typical habitat is dominated by oaks; also occurs in riparian woodland. Nests in tree cavities.	**High Potential.** Riparian trees and oaks within the Project Area provide suitable habitat for this species.	A breeding bird survey should be conducted if ground disturbance and/or vegetation removal occurs from February 1 to August 31; active nests should be avoided.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS***
olive-sided flycatcher *Contopus cooperi*	SSC, BCC	Summer resident. Typical breeding habitat is montane coniferous forests. At lower elevations, also occurs in wooded canyons and mixed forests and woodlands. Often associated with forest edges. Arboreal nest sites located well off the ground.	**Unlikely.** The Project Area is developed, lacking the natural forest habitat favored by this species.	No further actions are recommended.
loggerhead shrike *Lanius ludovicianus*	SSC, BCC	Year-round resident in open woodland, grassland, savannah and scrub. Prefers areas with sparse shrubs, trees, posts, and other suitable perches for foraging. Preys upon large insects and small vertebrates. Nests are well-concealed in densely-foliaged shrubs or trees.	**Unlikely.** The Project Area is developed, with no open grassland, scrubland or other typical habitat for this species.	No further actions are recommended.
purple martin *Progne subis*	SSC	Summer resident. Inhabits woodlands and low elevation coniferous forests. Nests in old woodpecker cavities and man-made structures. Nest is often located in tall, isolated tree or snag.	**Unlikely.** The Project Area is developed, with no woodland or open forest habitat favored by this species.	No further actions are recommended.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS***
bank swallow *Riparia riparia*	ST	Summer resident in riparian and other lowland habitats near rivers, lakes and the ocean in northern California. Nests colonially in excavated burrows on vertical cliffs and bank cuts (natural and manmade) with fine-textured soils. Historical nesting range in southern and central areas of California has been eliminated by habitat loss. Currently known to breed in Siskiyou, Shasta, and Lassen Cos., portions of the north coast, and along Sacramento River from Shasta Co. south to Yolo Co.	**No Potential.** The Project Area is developed and provides no suitable breeding habitat for this species.	No further actions are recommended.
rufous hummingbird *Selasphorus rufus*	BCC	Summer resident, with breeding in California restricted to the northwest corner of the state. Favors habitats rich in nectar-producing flowers. Nests in berry tangles, shrubs, deciduous forests and conifers. Occurs widely during migration.	**No Potential.** The Project Area is developed and provides no suitable breeding habitat for this species, and the Action Area is outside known breeding locations for this species.	No further actions are recommended.
oak titmouse *Baeolophus inornatus*	BCC	Occurs year-round in woodland and savannah habitats where oaks are present, as well as riparian areas. Nests in tree cavities.	**High Potential.** Riparian trees and oaks within the Project Area provide suitable habitat for this species.	A breeding bird survey should be conducted if ground disturbance and/or vegetation removal occurs from February 1 to August 31; active nests should be avoided.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS***
(Brewster's) Californian yellow warbler *Setophaga (Dendroica) petechia brewsteri*	SSC, BCC	Summer resident throughout much of California. Breeds in riparian vegetation close to water, including streams and wet meadows. Microhabitat used for nesting variable, but dense willow growth is typical. Occurs widely on migration.	**Moderate Potential.** Riparian trees and other vegetation along San Francisquito Creek may be used for nesting.	A breeding bird survey should be conducted if ground disturbance and/or vegetation removal occurs from February 1 to August 31; active nests should be avoided.
San Francisco common yellowthroat *Geothlypis trichas sinuosa*	BCC, SSC	Resident of the San Francisco Bay region, in fresh and salt water marshes. Requires thick, continuous cover down to water surface for foraging; tall grasses, tule patches, willows for nesting.	**Unlikely.** The Project Area does not contain emergent wetland vegetation or similar habitats favored by this subspecies.	No further actions are recommended.
grasshopper sparrow *Ammodramus savannarum*	SSC	Summer resident. Breeds in open grasslands in lowlands and foothills, generally with low- to moderate-height grasses and scattered shrubs. Well-hidden nests are placed on the ground.	**Unlikely.** The Project Area is developed and does not contain open grassland areas, providing no habitat for this species.	No further actions are recommended.
Alameda song sparrow *Melospiza melodia pusillula*	BCC, SSC	Year-round resident of salt marshes bordering the south arm of San Francisco Bay. Inhabits primarily pickleweed marshes; nests placed in marsh vegetation, typically shrubs such as gumplant.	**No Potential.** The Project Area does not contain tidal marsh and provides no habitat for this subspecies.	No further actions are recommended.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS***
Bryant's savannah sparrow *Passerculus sandwichensis alaudinus*	SSC	Year-round resident associated with the coastal fog belt, primarily between Humboldt and northern Monterey Counties. Occupies low tidally influenced habitats and adjacent areas; often found where wetland communities merge into grassland. May also occur in drier grasslands. Nests near the ground in taller vegetation, including along roads, levees, and canals.	**Unlikely.** The Project Area does not contain tidal marsh or adjacent grassland habitats.	No further actions are recommended.
tricolored blackbird *Agelaius tricolor*	ST, SSC, BCC, RP	Nearly endemic to California, where it is most numerous in the Central Valley and vicinity. Highly colonial, nesting in dense aggregations over or near freshwater in emergent growth or riparian thickets. Also uses flooded agricultural fields. Abundant insect prey near breeding areas essential.	**Unlikely.** The Project Area contains no emergent wetland habitat and provides no typical breeding habitat for this species. May occur occasionally in open areas with other blackbird sp. during the non-breeding season.	No further actions are recommended.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS***
yellow-headed blackbird *Xanthocephalus xanthocephalus*	SSC	Summer resident. Breeds colonially in freshwater emergent wetlands with dense vegetation and deep water, often along borders of lakes or ponds. Requires abundant large insects such as dragonflies; nesting is timed for maximum emergence of insect prey.	**Unlikely.** The Project Area contains no emergent wetland habitat and provides no typical breeding habitat for this species.	No further actions are recommended.
Reptiles and Amphibians				
California tiger salamander *Ambystoma californiense*	FE/FT, ST, RP	Populations in Santa Barbara and Sonoma counties currently listed as endangered; threatened in remainder of range. Inhabits grassland, oak woodland, ruderal and seasonal pool habitats. Adults are fossorial and utilize mammal burrows and other subterranean refugia. Breeding occurs primarily in vernal pools and other seasonal water features.	**No Potential.** The Project Area is developed and does not contain vernal pool habitat.	No further actions are recommended.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS***
California giant salamander *Dicamptodon ensatus*	SSC	Occurs in the north-central Coast Ranges. Moist coniferous and mixed forests are typical habitat; also uses woodland and chaparral. Adults are terrestrial and fossorial, breeding in cold, permanent or semi-permanent streams. Larvae usually remain aquatic for over a year.	**No Potential.** The Project Area is developed and does not contain suitable moist coniferous forest, or otherwise suitable habitat.	No further actions are recommended.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS***
California red-legged frog *Rana draytonii*	FT, SSC, RP	Lowlands and foothills in or near permanent sources of deep water with dense, shrubby, or emergent riparian vegetation. Requires 11 to 20 weeks of permanent water for larval development. Associated with quiet perennial to intermittent ponds, stream pools and wetlands. Prefers shorelines with extensive vegetation. Disperses through upland habitats after rains.	**Moderate Potential.** CNDDB states that CRLF is likely extirpated from an area of suitable breeding habitat in Lake Lagunita at Stanford University, approximately 1.3 miles from the Action Area. This site has been well monitored, and no CRLF have been encountered here since the last occurrence in 1956 (CNDDB 2019). There is an additional CRLF occurrence upstream on San Francisquito Creek, approximately 3.1 miles from the Action Area (CNDDB 2019). This occurrence is listed as possibly extirpated. Within the Project Area, the creek is unlikely to provide any breeding habitat, but may be used for dispersal and other movements, particularly during the rainy season.	Pre-construction surveys should be conducted prior to work within or surrounding San Francisquito Creek in the Action Area. Additional avoidance and minimization measures may be established following consultation with the USFWS, which is currently underway. See Part 10. Section 7 Biological Assessment for a detailed discussion of avoidance and minimization measures.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS***
foothill yellow-legged frog *Rana boylii*	SC, SSC	Found in or adjacent to rocky streams in a variety of habitats. Prefers partly-shaded, shallow streams and riffles with a rocky substrate; requires at least some cobble-sized substrate for egg-laying. Needs at least 15 weeks to attain metamorphosis. Feeds on both aquatic and terrestrial invertebrates.	**Unlikely.** Urban creeks do not typically provide suitable habitat for this species, and there are no nearby documented occurrences.	No further actions are recommended.
San Francisco garter snake *Thamnophis sirtalis tetrataenia*	FE, SE, CFP, RP	Vicinity of freshwater marshes, ponds and slow moving streams in San Mateo County and extreme northern Santa Cruz County. Prefers dense cover and water depths of at least one foot. Upland areas near water are also very important.	**No Potential.** The Project Area provides no typical habitat or forage for this species.	No further actions are recommended.
Pacific (western) pond turtle *Actinemys marmorata*	SSC	A thoroughly aquatic turtle of ponds, marshes, rivers, streams and irrigation ditches with aquatic vegetation. Require basking sites such as partially submerged logs, vegetation mats, or open mud banks, and suitable upland habitat (sandy banks or grassy open fields) for egg-laying.	**Unlikely.** There are no deep-water areas that support Pacific pond turtle habitat. When flows are present in San Francisquito Creek they are fast flowing, not slow meandering flows required for regular use by Pacific pond turtle.	No further actions are recommended.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS***
Fishes				
Delta smelt *Hypomesus transpacificus*	FT, SE, RP	Lives in the Sacramento-San Joaquin estuary in areas where salt and freshwater systems meet. Occurs seasonally in Suisun Bay, Carquinez Strait and San Pablo Bay. Seldom found at salinities > 10 ppt; most often at salinities < 2 ppt.	**No Potential.** San Francisquito Creek does not provide any suitable habitat for this species.	No further actions are recommended.
longfin smelt *Spirinchus thaleichthys*	FC, ST, SSC, RP	Euryhaline, nektonic and anadromous. Found in open waters of estuaries, mostly in middle or bottom of water column. Prefer salinities of 15 to 30 ppt, but can be found in completely freshwater to almost pure seawater.	**No Potential.** San Francisquito Creek does not provide any suitable habitat for this species.	No further actions are recommended.
green sturgeon, southern Distinct Population Segment *Acipenser medirostris*	FT, SSC	Spawn in the Sacramento River and the Feather River. Spawn at temperatures between 8-14 degrees C. Preferred spawning substrate is large cobble, but can range from clean sand to bedrock.	**No Potential.** San Francisquito Creek does not provide any suitable habitat for this species.	No further actions are recommended.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS***
tidewater goby *Eucyclogobius newberryi*	FE, SSC	Brackish water habitats along the California coast from Agua Hedionda Lagoon, San Diego County to the mouth of the Smith River. Found in shallow lagoons and lower stream reaches; requires fairly still but not stagnant water and high oxygen levels.	**No Potential.** San Francisquito Creek does not provide any suitable habitat for this species, and the Project Area is outside of its known range.	No further actions are recommended.
Coho salmon - central CA coast ESU *Oncorhynchus kisutch*	FE, SE, NMFS	Federal listing includes populations between Punta Gorda and San Lorenzo River. State listing includes populations south of San Francisco Bay only. Occurs inland and in coastal marine waters. Requires beds of loose, silt-free, coarse gravel for spawning. Also needs cover, cool water and sufficient dissolved oxygen.	**No Potential.** The Project Area is outside the known range for this species, and no suitable habitat is present.	No further actions are recommended.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS***
steelhead - central CA coast DPS *Oncorhynchus mykiss irideus*	FT	Occurs from the Russian River south to Soquel Creek and Pajaro River. Also in San Francisco and San Pablo Bay Basins. Adults migrate upstream to spawn in cool, clear, well-oxygenated streams. Juveniles remain in fresh water for 1 or more years before migrating downstream to the ocean.	**Present.** Surveys within San Francisquito Creek have noted steelhead presence since 1905.The Action Area is known to contain this species.	If dewatering is required, a Service-approved biologist should lead a fish rescue to capture and relocate any steelhead from within the Project Area prior to the start of work. Additional avoidance and minimization measures may be established following consultation with the USFWS, which is currently underway. See Part 10. Section 7 Biological Assessment for a detailed discussion of avoidance and minimization measures.
Chinook salmon – Sacramento winter-run ESU *Oncorhynchus tshawytscha*	FE, SE, RP, NMFS	Occurs in the Sacramento River below Keswick Dam. Spawns in the Sacramento River but not in tributary streams. Requires clean, cold water over gravel beds with water temperatures between 6 and 14 degrees C for spawning. Adults migrate upstream to spawn in cool, clear, well-oxygenated streams. Juveniles typically migrate to the ocean soon after emergence from the gravel.	**Unlikely.** No spawning occurs in streams which drain into South San Francisco Bay.	No further actions are recommended.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS***
Invertebrates				
San Bruno elfin butterfly *Callophrys mossii bayensis*	FE, SSI	Limited to the vicinity of San Bruno Mountain, San Mateo County. Colonies are located on in rocky outcrops and cliffs in coastal scrub habitat on steep, north-facing slopes within the fog belt. Species range is tied to the distribution of the larval host plant, Sedum spathulifolium.	**No Potential.** The Project Area provides no suitable habitat and is outside of this species known range.	No further actions are recommended.
Bay checkerspot butterfly *Euphydryas editha bayensis*	FT, SSI, RP	Restricted to native grasslands on outcrops of serpentine soil in the vicinity of San Francisco Bay. *Plantago erecta* is the primary host plant; *Orthocarpus densiflorus* and *O. purpurscens* are the secondary host plants.	**No Potential.** The Project Area provides no suitable habitat and is outside of this subspecies' known range.	No further actions are recommended.
Myrtle's silverspot butterfly *Speyeria zerene myrtleae*	FE, RP, SSI	Restricted to the fog belt of northern Marin and southernmost Sonoma County, including the Point Reyes peninsula; extirpated from coastal San Mateo County. Occurs in coastal prairie, dunes, and grassland. Larval foodplant is typically *Viola adunca*. Adult flight season may range from late June to early September.	**No Potential.** The Project Area provides no coastal prairies, dunes grassland, or otherwise suitable habitat for this species.	No further actions are recommended.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS***
monarch butterfly *Danaus plexippus*	SSI	Winter roost sites extend along the coast from northern Mendocino to Baja California, Mexico. Roosts located in wind-protected tree groves (eucalyptus, Monterey pine, Monterey cypress), with nectar and water sources nearby.	**Unlikely.** Tree rows within the Project Area do not provide any typical roost habitat for this species. Individual monarchs may occur regularly, particularly during migration.	No further actions are recommended.

*** Key to status codes:**

FE	Federal Endangered
FT	Federal Threatened
FC	Federal Candidate
FD	Federal De-listed
FPD	Federal Proposed for De-listing
NMFS	Species under the Jurisdiction of the National Marine Fisheries Service
BCC	USFWS Birds of Conservation Concern
RP	Sensitive species included in a USFWS Recovery Plan or Draft Recovery Plan
SE	State Endangered
ST	State Threatened
SR	State Rare
CSC	CDFG Species of Special Concern
CFP	CDFG Fully Protected Animal
SSI	CDFG Special Status Invertebrates
WBWG	Western Bat Working Group High Priority species

California Rare Plant Rank (CRPR)

Rank 1A	CRPR 1A: Plants presumed extinct in California
Rank 1B	CRPR 1B: Plants rare, threatened or endangered in California and elsewhere
Rank 2A	CRPR 2A: Plants presumed extirpated in California, but more common elsewhere
Rank 2B	CRPR 2B: Plants rare, threatened, or endangered in California, but more common elsewhere
Rank 3	CRPR 3: Plants about which CNPS needs more information (a review list)
Rank 4	CRPR 4: Plants of limited distribution (a watch list)

Threat Ranks

0.1	Seriously threatened in California
0.2	Moderately threatened in California
0.3	Not very threatened in California

****Potential to Occur:**

No Potential. Habitat on and adjacent to the site is clearly unsuitable for the species requirements (cover, substrate, elevation, hydrology, plant community, site history, disturbance regime).

Unlikely. Few of the habitat components meeting the species requirements are present, and/or the majority of habitat on and adjacent to the site is unsuitable or of very poor quality. The species is not likely to be found on the site.

Moderate Potential. Some of the habitat components meeting the species requirements are present, and/or only some of the habitat on or adjacent to the site is unsuitable. The species has a moderate probability of being found on the site.

High Potential. All of the habitat components meeting the species requirements are present and/or most of the habitat on or adjacent to the site is highly suitable. The species has a high probability of being found on the site.

***Results and Recommendations:**

Present. Species was observed on the site or has been recorded (i.e. CNDDB, other reports) on the site recently.
Assumed Present. Species has a high likelihood of occurring and actions to avoid/mitigate impacts are recommended; surveys not conducted.
Assumed Absent. Species is assumed to not be present or utilize the site due to a lack of key habitat components.
Not Observed. Species was not observed during protocol-level surveys.

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Part 10. Section 7 Biological Assessment

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Biological Assessment

Prepared for Department of Army - Corps of Engineers

Section 7 Endangered Species Act Consultation

Children's Health Council, San Francisquito Creek Bank Stabilization – Phase 2, Santa Clara County, California

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LIST OF ABBREVIATIONS

Applicant	Children's Health Council
BA	Section 7 Biological Assessment
BMP(s)	Best Management Practice(s)
CCC	Central California Coast
CDFW	California Department of Fish and Wildlife
CHC	Children's Health Council
CNDDB	California Natural Diversity Database
Corps	U.S. Army Corps of Engineers
CRLF	California red-legged frog
DPS	Distinct Population Segment
EFH	Essential Fish Habitat
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FR	Federal Register
NMFS	National Marine Fisheries Service
OHWM	Ordinary High Water Mark
PCE	Primary Constituent Elements
steelhead	Central California Coast Distinct Population Segment steelhead
SWPPP	Storm Water Pollution Prevention Plan
TOB	Top of Bank
USFWS	United States Fish and Wildlife Service
WRA	WRA, Inc.

DEFINITIONS

Action Area	The Action Area includes the Project Area (areas subject to disturbance associated with construction), as well as approximately a 150 foot buffer upstream and downstream for Project related disturbance or species relocations. Additionally the Action Area includes the perennial pool below Searsville Dam. The pool below Searsville Dam will be used for relocation of any steelhead if suitable habitat is not present upstream or downstream of the Project Area (e.g. due to dry conditions or Private Property restrictions). The location of the Action Area is shown in Figure 1 (Appendix A). The extent of the Action Area around the Project Area is shown in Figure 2 (Appendix A).
Project Area	Approximately 0.7-acre area within the Action Area containing San Francisquito Creek and mixed riparian woodlands as well as developed uplands associated with the Children's Health Council School where the Project will take place. Figure 2, Appendix A.
Project	The Project will use a combination of live log crib wall sections to protect and stabilize the bank along the Applicants property within the Project Area.
Service-approved Biologist	A biologist or biological monitor whose scientific qualifications have been approved by NMFS and/or USFWS

1.0 INTRODUCTION

WRA, Inc. (WRA) on behalf of Children's Health Council (CHC, Applicant) submits this Biological Assessment (BA) in accordance with legal requirements set forth under Section 7 of the Endangered Species Act (ESA) (16 U.S.C. 1536 (c)) and follows ESA guidance provided by the National Marine Fisheries Service (NMFS), and United States Fish and Wildlife Service (USFWS) in accordance with standards established in the National Environmental Policy Act. Children's Health Council is a provider of education and clinical services to children and teens with autism, ADHD, anxiety and depression, and other learning differences. CHC consists of two on-site schools, a therapy center, clinics for underserved families, community education center, outdoor learning area/playground, and serves approximately 150 students daily.

The purpose of this BA is to review the proposed Action, the San Francisquito Creek Bank Stabilization – Phase 2 Project (Project) in sufficient detail to determine to what extent the Project may affect any of the endangered or threatened species or designated critical habitats listed below.

The Project is located approximately 0.6 mile southwest of the intersection of El Camino Real (Highway 82) and Sand Hill Road, in the center of urban development associated with the City of Palo Alto (Action Area, Figure 1, Appendix A). The Action Area includes the Project Area (areas subject to disturbance associated with construction), as well as an approximately 150 foot buffer for Project related disturbance or species relocations as well as a perennial pool below Searsville Dam. The pool below Searsville Dam will be used for relocation of any steelhead if suitable habitat is not present directly downstream of the Project Area (e.g. due to dry conditions or Private Property restrictions). The location of the Action Area is shown in Figure 1 (Appendix A). Details concerning the Action Area, Project Area and Project elements are shown in Figure 2 (Appendix A).

1.1 Federal Listed or Candidate Species Considered

1.1.1 Federal Listed Species that May Be Affected by the Proposed Action

The following listed species may be affected by the proposed Action:

- Central California Coast (CCC) Distinct Population Segment (DPS) steelhead (steelhead, *Oncorhynchus mykiss irideus*) - Threatened
- California red-legged frog (CRLF, *Rana draytonii*) – Threatened

1.1.2 Federal Listed Species that are Not Likely to be Adversely Affected by the Proposed Action

There are no Federal-listed species that merit this determination for this Project.

1.1.3 Federal Listed Species that will have No Effect by the Proposed Action

- Salt-marsh harvest mouse (*Reithrodontomys raviventris*) – Endangered
- Yellow-billed cuckoo (*Coccyzus americanus occidentalis*) – Threatened
- Marbled murrelet (*Brachyramphus marmoratus*) – Threatened
- Bald eagle (*Haliaeetus leucocephalus*) – Delisted
- California least tern (*Sterna antillarum browni*) – Endangered
- Ridgeway's clapper rail (*Rallus longirostris obsoletus*) – Endangered
- Western snowy plover (*Charadrius nivosus (alexandrines) nivosus*) – Threatened

- California tiger salamander (*Ambystoma californiense*) – Threatened
- San Francisco gartersnake (*Thamnophis sirtalis tetrataenia*) – Endangered
- Delta smelt (*Hypomesus transpacificus*) – Threatened
- Green sturgeon (*Acipenser medirostris*) – Threatened
- Longfin smelt (*Spirinchus thaleichthys*) – Threatened
- San Bruno elfin butterfly (*Callophrys mossii bayensis*) – Endangered
- Bay checkerspot butterfly (*Euphydryas editha bayensis*) – Threatened
- San Mateo thorn-mint (*Acanthomintha duttonii*) – Endangered
- Crystal Springs fountain thistle (*Cirsium fontinale var. fontinale*) – Endangered
- Marin western flax (*Hesperolinon congestum*) – Threatened
- Two-fork clover (*Trifolium amoenum*) – Endangered

The majority of the aforementioned species have been found to have a No Effect determination due to the absence of habitat. The Project Area is primarily a creek channel, surrounded on all sides for at least 1.5 miles (with the exception of San Francisquito Creek) by dense urban development which precludes natural habitats such as salt marsh, vernal pools, old growth forest or other such habitats required to support aforementioned listed species. Due to the total absence of habitat, these species have no potential to occur and will be unaffected by the Action.

All of the aforementioned species in Section 1.1 are addressed in more detail in Appendix B. Those species found to have *No Effect* (Section 1.1.3) are not considered further in this analysis. Any species that *May Be Affected* (Section 1.1.1) are evaluated in more detail below.

1.2 Critical Habitat

Critical habitat is a term defined and used by the ESA as a specific, designated geographic area that contains features essential for the conservation of a threatened or endangered species and that may require special management and protection. The ESA requires federal agencies to consult with the USFWS and NMFS to conserve listed species within critical habitat areas and to ensure that any activities or projects they fund, authorize, or carry out on such lands will not jeopardize the survival of a threatened or endangered species; this requirement applies even if the subject listed species are considered absent in the focal area

Critical Habitat is designated for CCC DPS steelhead on San Francisquito Creek (70 FR 52488 - 52627). Figure 3 (Appendix A) includes areas defined as “Perennial Stream”. In accordance with the definition of the extent of critical habitat under 70 FR 52488, areas identified as “Perennial Stream” are the same areas which are also designated as critical habitat (Figure 3, Appendix A).

1.3 Essential Fish Habitat

Essential Fish Habitat (EFH) for Chinook and Coho Salmon is present within the Project Area. An assessment of effects to EFH is included as Appendix C.

1.4 Consultation to Date

Interagency meetings including USFWS and NMFS staff were held on September 14, 2017 and March 14, 2019 in which details of the bank stabilization were discussed, and feedback from the regulatory agencies was received.

On March 26, 2019, WRA initiated a request for technical assistance with Brian Meux and Dan Logan of the NMFS. The technical assistance request focused on review of the crib wall design

in association with steelhead habitat in San Francisquito Creek. The technical assistance concluded on June 18, 2019, and WRA has integrated the recommendations of NMFS staff into the project design.

On December 30, 2019, WRA communicated with Joseph Terry of the USFWS to discuss the potential for CRLF within the Project Area. It was recommended in the email response from USFWS that the Project should seek take coverage for CRLF due to the nature of development surrounding San Francisquito Creek which may provide the only natural corridor which CRLF could use when dispersing from potential breeding sites to the west of the Project Area. On this recommendation the BA was updated to include take of CRLF.

No other consultation has yet been initiated for this Project.

1.5 Current Management Direction

Lands which contain the Project Area are currently owned by Stanford and are leased to the Applicant to operate a school. A section of the school is currently threatened by bank erosion along San Francisquito Creek. To protect school facilities, the Applicant proposes to stabilize the creek bank, but following this work, no additional projects are planned to occur within the creek channel.

2.0 DESCRIPTION OF THE PROPOSED ACTION

2.1 Location

The Project Area straddles the boundary line between Santa Clara, and San Mateo Counties and is located approximately 0.6 mile southwest of the intersection of El Camino Real and Sand Hill Road, in the center of urban development associated with the City of Palo Alto. The Project Area is at the northwestern edge of the CHC campus located at 650 Clark Way in Palo Alto. Details concerning the Project Area are shown in Figure 2 (Appendix A).

2.2 Existing Conditions

The banks of San Francisquito Creek at the margins of the school's outdoor learning area, are at risk for erosion and are identified as a high priority for stabilization in the San Francisquito Creek Joint Powers Authority Bank Stabilization and Revegetation Master Plan. Recent active erosion of the channel banks on the CHC property accelerated during the 2016 – 2017 rainy season, resulting in the loss of approximately 50 horizontal feet of the creek bank and 7,500 square feet of CHC's outdoor learning area. The channel banks in the area of accelerated erosion are approximately 30 feet high and vertical. Intact soils behind the bank failure are cracking and near failure.

In 2019, a shear pin wall was installed above the top of bank to provide protection to critical resources on the CHC campus. As a condition of approval for the shear pin wall (referred to as "Phase 1" of the project), the City of Palo Alto required that additional in-channel improvements be installed based on comment they received from the San Francisquito Creek Joint Powers Authority (JPA) and the Santa Clara Valley Water District. Details of the shear pin wall were shared with regulatory agencies, including the USFWS and NMFS on September 14, 2017 and it was determined that no potential effects to species listed under the ESA would occur from the shear pin wall installation.

The CHC property line is defined by the historic centerline of San Francisquito Creek. The Project would take place on CHC property within San Francisquito Creek, below the top of bank (TOB). Channel banks in this area are approximately 30 feet high. A gravel access road, where the Phase I shear pin wall was installed (2019), forms the northeastern boundary of the Project Area, followed by the CHC playground, containing landscaped grass and shrubs and built children's play equipment (Figure 2, Appendix A). In the area of proposed work, San Francisquito Creek is bordered by single-family residences under West Menlo Park jurisdiction to the west and south. The property is also designated as Major Institution/Special Facility according to the City of Palo Alto Comprehensive Plan, which is defined as "institutional…lands that are either publicly owned or operated as non-profit organizations."

Vegetation within the Project Area is sparse and primarily composed of non-native grasses and herbs, as well as coast live oak (*Quercus agrifolia*), California bay (*Umbellularia californica*), and California buckeye (*Aesculus californica*). Any biological communities within the Project Area are detailed below in Table 1. Photographs of the Project Area are included in Appendix D.

Table 1. Biological Community Acreages within the Project Area

Community Type	**Project Area (Acres)**
Landscaped/Developed	0.32
Unvegetated/Ruderal	0.15
Perennial Stream	0.14
Mixed Riparian Woodland	0.08
Total	**0.69**

Landscaped/Developed

The Project Area contains approximately 0.32 acre of landscaped/developed area. These areas are located in the east portion of the Project Area and are outside or above TOB. Landscaped/Developed areas include the existing outdoor learning area/playground, a paved parking lot turnaround, gravel access pathways, fencing, and landscaped areas. Landscaped areas contain a mixture of ornamental and native tree species including pear (*Pyrus* sp.), coast redwood (*Sequoia sempervirens*), and coast live oak.

Unvegetated/Ruderal

Crib wall work within the unvegetated/ruderal area includes 0.15 acre of permanent disturbance to the bare/eroded portions of San Francisquito Creek. Disturbance includes excavation of 189 cubic yards of artificial fill and native fill material, grading, and placement of approximately 735 cubic yards of fill for the crib wall structure and backfill material. The temporary access road extends into the unvegetated/ruderal area and will disturb approximately 0.01 acre (614 square feet; includes area above the Ordinary High Water Mark [OHWM] and below TOB) and requires the placement of approximately 150 cubic yards of clean fill.

Perennial Stream (San Francisquito Creek)

San Francisquito Creek is a perennial stream that occupies approximately 275 linear feet (0.14 acre) of the Project Area. The creek is confined within an approximately 30-foot deep by 60-foot wide fluvial terrace. Within the Project Area, San Francisquito Creek flows roughly south to north. The creek bed in undisturbed portions of channel contains cobbles mixed with gravel, sand, and silts. Disturbed portions of the creek bed contain artificial fill material, including brick, concrete and native material eroded from the bank. The creek contains well-developed meanders and point bar complexes upstream and downstream of the Project Area. During the rainy season, the wetted creek channel varies between 10 to 20 feet wide and approximately 3 feet deep. During summer months or times of low precipitation, the channel becomes shallow and narrow (approximately 1 to 2 feet wide); occasionally drying completely with the exception of pockets of standing water.

Woody species observed on the banks of San Francisquito Creek include, polished willow (*Salix laevigata*), coast live oak, tree of heaven (*Ailanthus altissima*), and California bay (*Umbellularia californica*). Portions of the creek bank slumped into the creek are primarily denude of vegetation or contain sparse cover of tobacco tree (*Nicotiana glauca*), French broom (*Genista monspessulana*), and native and non-native forb species including Bermuda buttercup (*Oxalis pes-caprae*), stinging nettle (*Urtica dioica*), and poison hemlock (*Conium maculatum*). The OHWM was mapped based on evidence of bed and bank indicators, scouring, and/or sediment sorting. The TOB was mapped based on geomorphic position within the landscape, extent of erosion, and break in slope.

Mixed Riparian Woodland

Crib wall work within the vegetated riparian area includes 0.08 acre (3,485 square feet) of permanent disturbance as a result of the placement of bioengineered bank stabilization materials, excavation of 101 cubic yards of artificial and native fill material, grading, and placement of approximately 315 cubic yards of fill for the crib wall structure and backfill material. The temporary access road will also extend into the riparian area and will disturb 0.01 acre (553 square feet, includes area above OHWM and below TOB) requiring placement of approximately 191 cubic yards of clean fill.

Riparian vegetation removal will disturb 0.06 acre below TOB and entail the removal of six trees; three coast live oak (*Quercus agrifolia*), two California buckeyes (*Aesculus californica*), and one red willow (*Salix laevigata*). All trees to be removed are located on the east bank. In addition, understory poison oak patches and herbaceous cover will be cleared and grubbed. Details of all trees inventoried are included in the Tree Survey Report included in Part 7 of this permit application package. Tree species proposed for removal are depicted on Sheet C-4.0 in Part 9. Project Plans.

Riparian habitat disturbed in the Project Area will be restored immediately following final grading activities. Riparian revegetation totals approximately 0.15 acre (6,360 square feet). Riparian revegetation is discussed further in Section 2.2.2 above and described in further detail is Part 16. HMMP. In accordance with the City of Palo Alto's Tree Technical Manual, Ordinance-sized trees will be protected with tree protection fencing and signage before construction activities commence; protection fencing and signage will remain in place for duration of work. Tree replacement will occur at a minimum of a 3:1 ratio for the number of trees removed, with new native tree species planted to add greater diversity to the riparian cover within the Project Area.
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2.3 Description of the Proposed Action

2.3.1 Action Agency

The Action Agency is the Army Corps of Engineers (Corps).

2.3.2 Applicant

Children's Health Council is the Applicant and will be responsible for avoidance and minimization measures related to the Action. The address and contact information for CHC is:

Children's Health Council
650 Clark Way
Palo Alto, CA 94304
Contact: Terry Boyle
tboyle@chconline.org650-688-3602

This biological assessment was prepared by WRA, Inc., and WRA serves as the Authorized Agent. Contact information for the Authorized Agent is:

WRA, Inc.
2169-G East Francisco Blvd.
San Rafael, California 94901
Contact: Bianca Clarke
(415) 454-8868 x 1470

2.3.3 Purpose of Action

The purpose of the Action is to mitigate bank erosion and failures along the creek which are threatening to further erode and collapse parts of the Children's Health Council school facility.

Due to the nature, location, and time-sensitivity of the creek bank failure, an emergency project was approved by the City of Palo Alto on September 24, 2018 (Phase I of the proposed project). The purpose of Phase I was to stabilize the eastern bank of San Francisquito Creek to prevent further loss of outdoor learning areas used by CHC's students and minimize hazards to public safety due to imminent continued bank loss. Phase I of the project, completed in February 2019, included emergency installation of 19 concrete "shear pins" and steel tie-backs, set back from the creek bank by about 6 feet and extending 20 feet vertically below the existing creek bed. The shear pin wall is meant to stabilize the property behind the eroding bank and prevent imminent dangers to the property and human safety. The shear pins are a line-of-last-defense against bank retreat and loss of property into the creek, but do not protect the existing character of San Francisquito Creek, which supports significant ecological resources.

In approving the Phase I emergency project, the City of Palo Alto stipulated a number of Conditions of Approval. The thirteenth condition states, "Following approval of this project, the property owner or its designee shall apply for permits with the City of Palo Alto and other applicable agencies to complete in-channel creek bank stabilization." The condition goes on to say that, "the purpose of this secondary project would be to minimize risk of future exposure to the shear pin wall, maintain or improve sediment transport by minimizing continued erosion along

the base of the wall adjacent the subject property, and maintain or otherwise improve stream function." The Project is a direct response to this Condition of Approval from the City.

2.3.4 Description of the Proposed Action

The Project is focused on bank stabilization which will be accomplished by the construction of a live log crib wall along the east side of San Francisquito Creek. Work on the crib wall is located downslope of the shear pin wall constructed during Phase I (completed spring 2019). To access the creek channel a temporary access pathway will be constructed to allow construction equipment and construction personnel access to the work area and is discussed further below. All work will occur below the TOB, with some work also occurring below the OHWM. The most recent draft plan set at the time of the submission of this document are attached as Appendix E. Species-specific measures are discussed in greater detail in Section 4.2.

Site Access, Staging, and Dewatering

To accomplish the bank stabilization work, a temporary access route will be constructed in the eastern edge of the Project Area (Figure 2, Appendix A). The access route will connect to the CHC parking lot and is located in an area with relatively gradual slopes. Approximately 291 cubic yards of material will be placed to create the access ramp from TOB down into the channel. Vegetation removal will be required to facilitate access road construction and will consist of removing native and non-native shrubs and understory vegetation. Clearing will entail removal of six trees; two mature coast live oak and four smaller trees including two California buckeyes, one coast live oak, and one red willow (*Salix laevigata*). No paving is proposed for the temporary access route which will also be removed once construction is complete. Existing paved areas above the top of bank will be used for the storage and staging of materials throughout the course of the project.

Crib wall work will start once the Project Area is established and prepared including implementation of species avoidance and minimization measures, vegetation removal, construction of the temporary access route into the work area, and any dewatering operations are completed. If dewatering is required, a dewatering plan has been included as Appendix F. The contents of the plan will only be enacted if flows are present at the time the Project is initiated.

Equipment

Construction equipment used to complete the Project may include general use service vehicles (i.e. pickup trucks), excavators, haul trucks, dewatering equipment (i.e. pumps, generators, and piping), trailers, and assorted power and hand tools. All construction and equipment will be staged above the TOB and outside the limit of grading (Figure 2, Appendix A).

Bank Stabilization and Crib Wall Installation

Creek stabilization work will entail the excavation of native sediment with some amounts of eroded brick and artificial fill. All artificial debris removed will be off-hauled to an appropriate disposal site as it is not an appropriate material for backfill within a perennial stream system. Native sediment will be removed from the Project Area and evaluated for re-use. If reuse is not appropriate, the native material will be off-hauled as well to an appropriate disposal site.

Once the east bank of San Francisquito Creek is excavated, a new channel bank will be rebuilt in approximately the same elevation and location as the existing bank with the bioengineered crib

wall. Work includes grading, placement of boulder and cobble fill, placement, anchoring, and pinning of rootwads and crib logs, placement of engineered fill, and native seeding and planting within the riparian area. Clean boulder, cobble, and engineered fill material will be imported and placed below TOB. The boulder grade control will serve as the foundation of the crib wall and prevent the channel from undercutting the crib wall. Above the foundation, a "Lincoln-log" style structure crib wall will be embedded into the creek bank. The structure will consist of stacked 1.5-foot diameter logs, either Douglas fir (*Pseudotsuga menziesii*), coast redwood, or another native riparian tree if determined necessary (no eucalyptus will be used), at a 1:1 slope along the bank. The structure will be secured together with threaded rebar and helical anchors in the bank. The first log level of the crib wall will use tie-back logs, which are logs set into the bank, braced to resist the force of the streamflow. In addition, the first level of the crib wall will also include 13 rootwads, spaced approximately 10 feet apart. The rootwads provide additional streambank protection and interstitial space for fish habitat. Rootwads are strategically located at existing pools in the creek to help reduce water velocities during high flow events and to provide habitat and flow refugia for steelhead. Engineered fill material, consisting of clean gravel and cobble sized material, will be placed within and behind the crib wall cavities. The upper channel bank, area above the crib wall, will be back filled and graded to a maximum slope of 2:1 up to the existing vertical face below TOB. A portion of the exposed vertical face below TOB will remain intact and undisturbed to potential cultural resource impacts.

Revegetation

Following completion of final grading and work on the lower and upper channel bank, riparian areas within the limit of grading will be seeded and replanted with native woody and herbaceous vegetation to replace removed riparian vegetation. Replanting includes three distinct native riparian planting areas and schedules. The lowest portion of the crib wall will be planted with arroyo willow (*Salix lasiolepis*) and sandbar willow (*Salix exigua*) stakes placed within the lower crib wall cavities. The remaining slopes above will be planted with native riparian shrub and tree species and hydroseeded with a native riparian seed mix.

2.4 Avoidance, Minimization, and Conservation Measures

The proposed Project will include measures to avoid or minimize effects to listed species, sensitive habitats, and the surrounding environment. Measures below which include numbers prior to text correspond to the numbered measures within the USFWS Programmatic Biological Opinion for Small Projects that may affect CRLF (USFWS 2014) and have been included for ease of cross referencing.

2.4.1 General Avoidance and Minimization Measures

The following general conservation measures will be implemented during the Project to avoid and minimize adverse effects on sensitive species and habitats. Any conservation measures specific to individual species addressed in this BA are presented in the next section. All permit conditions, legal requirements, and appropriate excavation and engineering practices shall be followed to avoid and minimize environmental impacts associated with the proposed Action. Best Management Practices (BMPs), as identified by the San Francisco Regional Water Quality Control Board and in the Stormwater Pollution Prevention Plan (SWPPP) (14), will be implemented to control water erosion during the Action.

- (11) The Project will be timed to occur during the dry season (May 1 to October 30).

- (9) Construction disturbance or removal of vegetation will be restricted to the minimum footprint necessary to complete the work. The work area will be delineated with high visibility fencing, markers, or silt fencing to minimize impacts to habitat beyond the work limit. Fencing will be maintained throughout Project construction and removed upon completion.
- (20) Any disturbed areas shall be restored with a combination of native seed mix, or appropriate plantings at the conclusion of the Project.
- (14, 29) Dust control will be used as needed to minimize airborne dust.
- (14) Staging, maintenance, and parking areas shall be located outside of stream channel banks. Any petroleum or similar substances shall be staged outside of the channel within a contained area.
- (14) Prior to the start of construction, the contractor shall prepare a hazardous materials management/fuel spill containment plan. This plan should include procedures to be used in the event of spills as well as information regarding the disposal of any spilled materials.
- (14) Refueling or maintenance of equipment (stationary or otherwise) within the TOB shall only occur when secondary containment sufficient to eliminate escape of all potential fluids is in place.
- (14) Stationary equipment such as motors, pumps, and generators, located adjacent to aquatic features will be positioned over drip pans.
- (14) All activities performed near aquatic features will have spill kits available for use in the case of an accidental spill.
- Vehicles will be decontaminated before and after working on the Project (e.g. all soils and petroleum fluids shall be cleaned from the equipment).
- (16) Any equipment or vehicles operated adjacent to aquatic features will be checked and maintained daily to prevent leaks.
- Appropriate BMPs will be installed around any stockpiles of soil or other materials which could be mobilized to prevent runoff from entering aquatic habitats.
- (14) No construction debris or wastes will be placed where they may be washed into any aquatic features. All such debris and waste will be picked-up regularly and will be disposed of at an appropriate facility.
- (18) Any food waste that may attract scavengers shall be deposited in closed containers and removed from the work area daily.
- Upon completion of work, all temporary construction materials will be removed from the Project Area including any temporary ramps or temporary access points.

2.4.2 Avoidance and Minimization Measures for Federal-listed Species

Fish rescue or additional avoidance measures for steelhead are required beyond the general measures listed above only if water is present at the time work is initiated. Flow in San Francisquito Creek is anticipated to be low, or entirely absent in the dry season when the proposed Project will occur. If the Project Area is naturally dry, as is typical for the proposed work window, then no dewatering will be required and subsequent fish specific measures would not be applicable.

Any general measures stated above will be followed throughout the Project. For the protection of Federal-listed species and their critical habitat the following additional measures will be implemented if water is present to minimize impacts to Federal-listed species and critical habitats.

- (5) The qualifications of any biologists who will lead the fish rescue and relocation or who

will survey for and relocate CRLF will be submitted to the NMFS or USFWS (respectively) for review and written approval at least thirty (30) calendar days prior to initiation of the Project (Service-approved Biologist). A Service-approved Biologist will be onsite during all activities that may result in take of steelhead or CRLF.

- (8) All construction personnel will participate in a worker environmental awareness program. Under this program, a Service-approved Biologist (either in person or via a pre-recorded presentation) will instruct all construction personnel about (1) the description and status of the species found on-site; (2) the importance of their associated habitats; (3) a list of measures being taken to reduce impacts on these species during work, and (4) procedures to follow if a protected species is encountered. Once completed workers shall sign a list verifying the completion of training. The list of trained personnel shall be available on-site until completion of the Project.
- (3) The contact information for a Designated Representative who will assure compliance with any measures implemented for the Project will be submitted to the USFWS and NMFS at least 30 days prior to the start of work.
- (4) CDFW, USFWS or NMFS shall be allowed to inspect the site at any point during the Project with a request for access.
- (31) Non-native predators (e.g. bullfrogs) will not be relocated.

Measures specific to steelhead (Applicable if water is present at the time of construction)

- A fish rescue plan is attached in Appendix G for NMFS review, and outlines the methods to be used (e.g., types of cofferdam to be deployed, method of fish collection such as electrofishing, seining, etc.), criteria for relocation site selection, data to be collected, decontamination procedures, and reporting procedures that will be followed.
- If habitat is available, any captured steelhead will be relocated immediately downstream of the Project Area. If suitable habitat is not available, any steelhead will be released at the perennial pool below Searsville Dam.
- If a fish rescue is required, a Service-approved biologist will lead the fish rescue to capture and relocate any steelhead from within the Project Area prior to the start of work.
- A bypass will be installed to route flows around the work area either via diversion into another portion of the extant channel which is outside of the Project Area footprint, or via a pipe, hose or similar structure.
- (15) Any pumps used for the Project shall be screened according to NMFS criteria for salmonid streams until the area has been cleared by a Service-approved biologist.
- Any water actively pumped out of the Project Area (e.g. removal of groundwater seepage) will (at minimum) pass through a gravel bucket or filter sock to lower turbidity before waters are allowed to reenter the live stream.
- Any pumps used in areas not cleared of fish shall be screened according the NMFS Screening Criteria for waters containing salmonids (NMFS 1997). Once an area has been cleared, no additional screening shall be required.

Measures specific to CRLF

One Federal-listed species, CRLF, was determined have potential to disperse through the Project Area. Because of the timing, and limited duration of the Project, take of CRLF is not readily expected to occur. To further ensure take is minimized, additional measures are proposed below to specifically minimize adverse effects to individual CRLF. The measures have been guided off a review of the conservation measures presented in the USFWS Programmatic Biological Opinion for Small Projects that may affect CRLF (USFWS 2014). As with the recommendations of the

Programmatic Biological Opinion, the only monitoring recommended is during initial vegetation removal. No other biological monitoring is recommended as it is unlikely that a CRLF would move during the time of year when the Project is scheduled.

- (6) Within 24 hours prior to the start of construction, a Service-approved Biologist will conduct a preconstruction survey for CRLF within the bounds of the Project Area.
- (7) The Service-approved Biologist will have stop work authority for all Project activities to protect CRLF and shall be given the authority to communicate with the USFWS if they exercise such authority.
- (6, 17) If CRLF are detected during preconstruction surveys, or during the course of work, any work in the vicinity that may threaten CRLF will stop. The Service-approved Biologist will then determine the best course of action based on the situation at hand. If possible, the CRLF will be monitored and allowed to leave the area of its own volition. However, if the CRLF is unlikely to fully relocate out of the Project Area on their own in a reasonable timeframe, or if they cannot leave the area without exposure to other risks (e.g. predation); the individual(s) will be captured and relocated in accordance with the process outlined below.
    - Before beginning a relocation, the Service-approved Biologist will assure any equipment used for the relocation has been properly cleaned and decontaminated. If using their hands to capture CRLF, they will either don sterile gloves, or assure their hands are free from toxic substances such as insect repellant, sunscreen or other chemicals.
    - Using a dip net, wetted, or gloved hands, the Service-approved Biologist will catch the CRLF and place it into a clean container (e.g. bucket with a lid).
    - If multiple frogs of similar age class are captured, they may be put into the same container. However, frogs of varying age class will be segregated into separate containers to avoid predation.
    - Once all CRLF have been captured, the Service-approved Biologist will relocate the animals to the nearest suitable habitat. Release locations will be at least 100-feet from the Project Area.
    - After relocation, all equipment will be sterilized according to the industry standards to prevent the spread of disease.
    - (32) The Service-approved Biologist will contact the USFWS within 24 hours following any relocation to report the relocation of CRLF.
- Any vegetation that could conceal CRLF shall be removed under the supervision of a Service-approved Biologist. If vegetation is too dense to be adequately surveyed (e.g. tall grasses, or blackberry), the Service-approved Biologist may request that vegetation is cut to a height of 6-12 inches (and cut vegetation removed) prior to conducting a survey. If no CRLF are found, the vegetation shall be cut to ground level before work with tracked or wheeled equipment is initiated.
- (12) Project-related vehicles will observe a 20-mile per hour speed limit within the Project Area. All construction activities will cease one half hour before sunset and shall not begin prior to one half hour after sunrise.
- (26) Construction activities shall not occur during rain events or within 24 hours of events which have delivered >0.25 inches of rain, until a Service-approved biologist resurveys and clears the work site.
- (21, 28) Erosion control structures shall not include monofilament netting or similar materials that may entangle CRLF.
- (30) Any open holes or trenches shall be covered or have escape ramps installed to prevent CRLF from becoming entrapped.

- (27) Work shall be restricted to daylight hours only (sunrise to sunset).
- (23) No pets will be permitted during Project construction.
- (25) Any pipes or similar materials required for the Project will be stored in upland areas, and elevated or covered to prevent entrance by CRLF.

The following measures from the USFWS programmatic biological opinion will not be utilized. An explanation as to why they are not applicable is included.

Measure 1 - Habitat Compensation. The Project Area is composed entirely of developed uplands associated with a school and creek channel. Any work within the uplands will not impact potential CRLF habitat due to its developed nature and all work within the channel will be fully restored or enhanced following completion of the Project through riparian planting, or increased habitat complexity following construction of the crib wall.

Measure 2 - Passage for Road Improvements. The Project is not conducting any permanent roads or improvements and will not create any barriers to movement within the creek upon completion.

Measure 13 - Bio Swales. No permanent roadways are being constructed, therefore no bio swales are required.

Measure 19 - Concrete and Asphalt. Any concrete, or other non-natural materials encountered during the Project will be hauled offsite and disposed. Neither material will be used as part of the general Project.

Measure 22 - Pesticide, Herbicide, Insecticide. None of these substances are proposed for use on the Project.

Measure 24 - Firearms. The Project is located on a school ground, firearms are already prohibited or anyone other than law enforcement personnel.

2.5 Project Schedule

The Project is anticipated to be permitted in 2020, with the intent to begin construction in the dry season of 2021. The Project is anticipated to be completed within a single dry season.

3.0 STATUS OF THE SPECIES AND CRITICAL HABITAT IN THE ACTION AREA

A list of Federal endangered, threatened, and candidate species that have been documented in the vicinity of the Project Area is provided in Appendix B. This list was generated from a review of the California Natural Diversity Database (CNDDB; CDFW 2019) and the NMFS California Species List Tool (NMFS 2019, Appendix H). The results of the CNDDB query are shown in Figure 4a and 4b (Appendix A). Biological studies and related observations previously conducted in the Project Area are described in Section 3.1.

3.1 Surveys and Resources Consulted for Federal Listed Species and Habitat

In addition to CDFW (2019) and NMFS (2019), WRA searched publicly available sources for information pertaining to federal-listed species and habitats within the Project Area. The list below outlines additional documents that have been consulted to help determine the presence of Federal-listed species.

- Historical Distribution and Current Status of Steelhead/Rainbow Trout (*Oncorhynchus mykiss*) in Streams of the San Francisco Estuary, California (Leidy 2005).
- Endangered and Threatened Species; Designation of Critical Habitat for Seven Evolutionarily Significant Units of Pacific Salmon and Steelhead in California; Final Rule (70 FR 52488 - 52627)

3.2 CCC DPS Steelhead - Federal-Threatened

The CCC DPS steelhead includes all naturally spawned populations of steelhead (and their progeny) in California streams from the Russian River to Aptos Creek, and the drainages of San Francisco and San Pablo Bays eastward to the Napa River (inclusive), excluding the Sacramento-San Joaquin River Basin. Two artificial propagation programs are considered to be part of the CCC DPS: the Kingfisher Flat Hatchery/Scott Creek, and the Don Clausen Fish Hatchery (NMFS 2007).

3.2.1 Life History and Habitat Requirements

The life history patterns for steelhead are both highly variable and flexible (Moyle 2002). While similar to most Pacific salmonids (*Oncorhynchus* sp.) in their anadromous life history, steelhead exhibit a greater variation in timing for each component of their life history (NMFS 2007). Steelhead typically migrate to marine waters after spending two years in freshwater, though they may stay up to seven. They then reside in marine waters for two or three years prior to returning to their natal stream to spawn as four or five year-olds. In addition to the anadromous life history, a resident freshwater life history known as rainbow trout exists for the species. Both of these life history types often exist in the same populations, and genetically these types are indistinct from each other with resident rainbow trout capable of producing steelhead and steelhead progeny sometimes becoming resident rainbow trout (Moyle 2002).

Steelhead are generally classified into two groups based on their timing in returning from the ocean to freshwater systems and their state of sexual maturity at that time (NMFS 2007). “Summer-run” steelhead are sexually immature when they enter freshwater in the spring and early summer. They then hold in suitable freshwater habitat, preferring deep (three meters or more) cold (10 to 15° Celsius) pools, for several months while they sexually mature. “Winter-run” steelhead enter freshwater systems during late fall or early winter and are either at or near sexual maturity.

Steelhead adults typically return to their natal streams to spawn between December and June. Unlike other Pacific salmonids, steelhead are iteoparous, meaning adults do not always die after spawning (NMFS 2007).

Juvenile steelhead prefer to rear in eddies and along velocity breaks where they can exert minimal energy holding in one position while being in close proximity to forage on terrestrial and aquatic invertebrates washed downstream. Instream cover such as large woody debris and undercut banks in deep pools, along with sufficient riparian cover form important rearing habitat (USFWS 1986). Growth rate varies based on temperature, with optimal growth thought to occur between 15 and 19 degrees Celsius (Hayes et al. 2008). Ephemeral floodplain habitat has been shown to be particularly important foraging and refuge for juvenile salmonids (Jeffres et al. 2008). Sommer et al. (2001) found significantly higher growth rates for salmonids rearing in floodplain habitat then with those rearing in adjacent stream habitat. Survival rates for juveniles and smolts is higher for

larger and older steelhead, which demonstrates the importance of productive juvenile rearing habitat for the survival of the species (USFWS 1986).

Smolting occurs when juvenile steelhead outmigrate to the ocean. A process of morphological, behavioral, and biochemical changes occur that prepares the individual for a pelagic life in the ocean (USFW 1986). While in the ocean, a rapid growth phase occurs where individuals feed on the nutrient rich marine ecosystem and become much larger then resident Rainbow Trout.

3.2.2 Habitat Assessment and Survey Results

Surveys within San Francisquito Creek have noted steelhead presence since 1905. Electrofishing surveys throughout reaches above and below the Project Area in the 1990's documented numerous fish holding in features primarily consisting of small seasonal pools (Leidy et al 2005). Surveys conducted between 1999 and 2001 also identified steelhead juveniles throughout San Francisquito Creek from Highway 101 to the Searsville Dam (Leidy et al 2005). In 2013, photographs were taken of two adult steelhead in San Francisquito Creek near the Searsville Dam, indicating passage from San Francisco Bay to the dam is fully possible, and confirming that anadromous fish do return to the creek (American River 2014). A migration barrier study also reported Searsville Dam as the only complete barrier to migration on the mainstem of San Francisquito Creek which runs through the Project Area (Leidy et al 2005, CDFW 2018). Because the only barrier to migration is located above the Project Area, and recent accounts have shown that the species is present, steelhead are considered at least seasonally present within the Project Area.

3.2.3 Current Threats

The primary driving factor identified in the decline of CCC steelhead is the loss and degradation of natural habitat and flow conditions (NMFS 2007). Factors contributing to this include urbanization, changes in watershed drainage, agriculture, forestry, channel realignment, water withdrawal, diversions, and fish passage barriers.

3.3 CCC DPS Steelhead Critical Habitat

Critical Habitat is designated for CCC DPS steelhead (70 FR 52488 - 52627).

3.3.1 Critical Habitat Requirements

The definition of critical habitat includes "space for individual and population growth, and for normal behavior; food, water, air, light, minerals, or other nutritional or physiological requirements; cover or shelter; sites for breeding, reproduction, or rearing offspring; and, generally, habitats that are protected from disturbance or are representative of the historic geographical and ecological distributions of this species." For steelhead, the Primary Constituent Elements (PCE) or physical and biological features defined by the final critical habitat designation (70 FR 52488 - 52627) include: spawning sites, food resources, water quality and quantity, riparian vegetation, migration corridors, estuarine areas, nearshore marine areas, and offshore marine areas. The lateral extent of critical habitat is also defined by 70 FR 52487 as: "…the width of the stream channel defined by the ordinary high-water line as defined by the COE in 33 CFR 329.11." Areas identified in Figure 3 as "Perennial Stream" are those which meet this definition and are considered critical habitat. In total 0.14 acres of critical habitat are present within the Project Area.

3.3.2 Habitat Assessment and Survey Results

The critical habitat designation for CCC DPS steelhead specifically identifies San Francisquito Creek as being critical habitat (70 FR 52488 - 52627).

The two specific PCE descriptions for habitats that occur within the Project Area, or in close proximity include:

- Freshwater rearing sites with water quantity and floodplain connectivity to form and maintain physical habitat conditions and support juvenile growth and mobility; water quality and forage supporting juvenile development; and natural cover such as shade, submerged and overhanging large wood, log jams and beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks. These features are essential to conservation because without them, juveniles cannot access and use the areas needed to forage, grow, and develop behaviors (e.g., predator avoidance, competition) that help ensure their survival.

- Freshwater migration corridors free of obstruction with water quantity and quality conditions and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels, and undercut banks supporting juvenile and adult mobility and survival. These features are essential to conservation because without them juveniles cannot use the variety of habitats that allow them to avoid high flows, avoid predators, successfully compete, begin the behavioral and physiological changes needed for life in the ocean, and reach the ocean in a timely manner. Similarly, these features are essential for adults because they allow fish in a non-feeding condition to successfully swim upstream, avoid predators, and reach spawning areas on limited energy stores.

Spawning is not known to occur within this portion of San Francisquito Creek, but has been observed higher in the watershed near the Searsville Dam, therefore spawning habitat is not present. The Project Area is also outside of tidal influence from San Francisco Bay and as such does not contain estuarine, nearshore, or offshore marine habitats. While the Project Area typically goes dry, small perennial flows in the area, and small pools within the Project Area may continue to support rearing late into the year when water conditions are sufficient. Therefore freshwater rearing and migratory corridors are considered present.

3.3.3 Current Threats

The primary driving factors identified in the decline of CCC steelhead habitat are the loss or degradation of natural habitat (NMFS 2007). Factors contributing to this include urbanization, water diversions, modification of natural flow regimes, fish passage barriers (e.g., dams and road crossings) as well as surrounding land use activities and loss of supporting habitats (i.e., wetlands and riparian forest).

3.4 California Red-legged Frog – Federal-Threatened

California red-legged frog was listed as Federally Threatened on May 23, 1996 (61 FR 25813-25833). Critical Habitat for the CRLF was designated on April 13, 2006 (71 FR 19243-19346), and the revised designation was finalized on March 17, 2010 (75 FR 12815-12959). A Recovery Plan for the CRLF was published by the USFWS on May 28, 2002.

3.4.1 *Life History and Habitat Requirements*

The historical range of the CRLF extended along the coast from the vicinity of Point Reyes National Seashore, Marin County, California and inland from Redding, Shasta County southward to northwestern Baja California, Mexico (Jennings and Hayes 1985). The current distribution of this species includes only isolated localities in the Sierra Nevada, northern Coast, and Northern Traverse Ranges. It is still common in the San Francisco Bay area and along the central coast. It is now believed to be extirpated from the southern Transverse and Peninsular Ranges (USFWS 2002).

There are four physical and biological characteristics that are essential for the conservation or survival of a species. These characteristics for the CRLF include: aquatic breeding habitat; non-breeding aquatic habitat; upland habitat; and dispersal habitat (USFWS 2010).

Aquatic breeding habitat consists of low-gradient fresh water bodies, including natural and manmade (e.g., stock) ponds, backwaters within streams and creeks, marshes, lagoons, and dune ponds. It does not include deep-water habitat, such as lakes and reservoirs. Aquatic breeding habitat must hold water for a minimum of 20 weeks in most years. This is the average amount of time needed for egg and larval development and metamorphosis so that juveniles can become capable of surviving in upland habitats (USFWS 2010).

Aquatic non-breeding habitat may or may not hold water long enough for this species to hatch and complete its aquatic life cycle, but it provides shelter, foraging, predator avoidance, and aquatic dispersal for juvenile and adult CRLF. These waterbodies include plunge pools within intermittent creeks; seeps; quiet water refugia during high water flows; and springs of sufficient flow to withstand the summer dry period. CRLF can use large cracks in the bottom of dried ponds as refugia to maintain moisture and avoid heat and solar exposure (Alvarez 2004). Non-breeding aquatic features enable CRLF to survive drought periods and disperse to other aquatic breeding habitat (USFWS 2010).

Upland habitats typically include areas within 300 feet of aquatic and riparian habitat and are comprised of grasslands, woodlands, and/or vegetation that provide shelter, forage, and predator avoidance. These upland features provide breeding, non-breeding, feeding, and sheltering habitat for juvenile and adult frogs (e.g., shelter, shade, moisture, cooler temperatures, a prey base, foraging opportunities, and areas for predator avoidance). Upland habitat can include structural features such as boulders, rocks and organic debris (e.g. downed trees, logs), as well as small mammal burrows and moist leaf litter (USFWS 2010).

Dispersal Habitat includes accessible upland or riparian habitats between occupied locations within 0.7 mile of each other that allow for movement between these sites. Dispersal habitat includes various natural and altered habitats such as agricultural fields, which do not contain barriers to dispersal. Moderate- to high-density urban or industrial developments, large reservoirs, and heavily traveled roads without bridges or culverts are considered barriers to dispersal (USFWS 2010). Although CRLF is highly aquatic, this species has been documented to make overland movements of several hundred meters and up to one mile during a winter-spring wet season in Northern California (Bulger et al. 2003, Fellers and Kleeman 2007) and 2,860 meters (1.8 miles) in the central California coast (Rathbun and Schneider 2001). Frogs traveling along water courses can exceeded these distances.

3.4.2 Habitat Assessment and Survey Results

A review of CNDDB records shows a record of CRLF from 2016 occurring in the Atherton Channel, approximately 2.3 miles from the Project Area. This site is close to the known dispersal distance for this species, however the occurrence is isolated from the Project Area by urban development. CNDDB states that CRLF is likely extirpated from an area of suitable breeding habitat in Lake Lagunita at Stanford University, approximately 1.3 miles from the Project Area. This site has been well monitored, and no CRLF have been encountered here since the last occurrence in 1956 (CNDDB 2019). There is an additional CRLF occurrence upstream on San Francisquito Creek, approximately 3.1 miles from the Project Area (CNDDB 2019). This occurrence is listed as possibly extirpated. While the majority of these sites are presumed extirpated, the dense urban development surrounding San Francisquito Creek leave only one dispersal corridor for individuals that may persist in these areas. If there are CRLF present at these previously recorded sites, CRLF would have only one route to disperse, through San Francisquito Creek, potentially passing through the Project Area.

The Project Area does not contain suitable CRLF breeding habitat. The proposed Project will occur during the dry season, and the anticipated lack of depth of any remaining pools within the Project Area is anticipated to prevent CRLF from using water depth to evade predation, which is a requirement of aquatic non-breeding habitat. Therefore, the Project Area does not contain the physical or biological features necessary to be considered aquatic nonbreeding habitat. No suitable small mammal burrows or other such structural features are present; therefore, the Project Area is unsuitable for long-term upland occupancy for CRLF. The Project Area would only be useful for CRLF as a temporary stopover habitat during migration or dispersal events and as such, the Project Area is best described as dispersal habitat for CRLF.

3.4.3 Current Threats

CRLF populations are threatened by numerous human activities that often act synergistically and cumulatively with natural disturbances (i.e. droughts or floods) (USFWS 2002). Human activities that negatively affect CRLF include agriculture, urbanization, mining, overgrazing, recreation, timber harvesting, nonnative plants, impoundments, water diversions, degraded water quality, and introduced predators.

More than 90 percent of the historic wetlands in the Central Valley have been lost due to conversion for agriculture or urban development (USFWS 1978, Dahl 1990). This has resulted in a significant loss of frog habitat throughout the species' range (USFWS 2002). Habitat along many stream courses has also been isolated and fragmented, resulting in reduced connectivity between populations and lowered dispersal opportunities.

Isolated populations are now more vulnerable to extinction through stochastic environmental events (i.e., drought, floods) and human-caused impacts (i.e., grazing disturbance, contaminant spills) (Soulé 1999). Isolated populations suffer from increased predation by nonnative predators, changes in hydroperiod due to variable wastewater outflows, and increased potential for toxic runoff.

4.0 EFFECTS ANALYSIS

The sections below discuss direct, indirect, interrelated/interdependent, and cumulative effects from the proposed Project on steelhead and steelhead critical habitat.

4.1 CCC DPS Steelhead

Steelhead presence in San Francisquito Creek has been documented since the early 1900's (Leidy et al 2005). While steelhead have been documented spawning in reaches just below Searsville Dam, this feature represents a total barrier to upstream migration above the dam. However, juvenile steelhead persist in areas downstream of the dam as far as Highway 101 (Leidy et al 2005). While the Project Area goes seasonally dry, steelhead are assumed present during migratory periods or when foraging and rearing when waters are present. Steelhead may also be present if pools within the Project Area have been recently isolated due to natural drying, essentially stranding steelhead within the Project Area naturally.

4.1.1 Direct Effects

Direct or immediate effects are defined as those which occur on the species or its habitat at the time the Project is implemented.

If water is not present, then no direct effects are anticipated to steelhead as the species will be absent from the Project Area at the time work occurs.

If water is present at the time the Project begins, the proposed Project may have direct effects to steelhead. If water is flowing, or pools have only recently become isolated due to the natural drying cycle, steelhead juveniles may be present in several pools that occur within the Project Area. Dewatering would cause a direct effect by drying out these habitat features, stranding any steelhead that may be present. To minimize this effect, a Service-approved Biologist will lead a fish rescue to capture and relocate any steelhead that may be holding within the Project Area. Rescuing steelhead also poses a risk to fish which will be exposed to stress during capture as well as effects specific to the capture methods (e.g. seining and electrofishing). In addition relocation poses some risk of predation following relocation, and crowding at relocation sites. The methods used for capture and relocation are detailed in a relocation plan (Appendix G), and the effort would be led by a Service-approved Biologist who is knowledgeable in capture methods, and techniques to minimize stress on captured steelhead, thereby making the relocation process as minimally stressful to steelhead as possible, while fulfilling the benefit of relocating fish to other sections of creek which are not subject to construction related dewatering effects.

The Project is scheduled to occur during the dry season when flows are at their lowest, and when the local area is naturally dry. As such it is not expected that fish will be able to pass the area due to the natural drying cycle of the creek. If flows are present, they will either be diverted to the opposite side of the creek channel outside of the Project Area, or a gravity fed bypass system will be installed to allow the free flow of water downstream for as long as water is naturally present. The bypass will be suitably sized to carry the dry season flow of the stream in order to keep water flowing as long as it is naturally available. If any water is pumped or drained from the Project Area (i.e. remnant water or groundwater seepage) it would pass through a filtration system before re-entering the creek channel to minimize any potential effects of turbidity or water quality on fish downstream. By conducting work when it is proposed, it is likely that water will be naturally absent avoiding any impacts to steelhead or their localized movement. However, if flows are present, then they will be re-routed and bypassed in order to avoid water quality impacts that might otherwise limit or cause direct harm to steelhead individuals.

4.1.2 Indirect Effects

Indirect effects are those effects that are caused by or will result from the proposed Project and are later in time, but still reasonably certain to occur.

The design of the Project is likely to have several beneficial indirect effects to steelhead. First, steelhead are anticipated to benefit from increased habitat complexity within the Project Area following completion of the Project. Currently the banks are composed of largely unvegetated sandstone which lacks structure to support cover or foraging resources for steelhead. The overall structure will be composed of root wads, topped by a timber or log crib wall which will increase habitat complexity and diversity. Steelhead individuals would likely benefit from interstitial spaces for cover, potentially decreasing predation risk. Steelhead may also use those spaces as velocity refugia in high flows, keeping individuals from washing out to the Bay before acclimation to saltwater could occur. Natural elements such as stone and timber are also better for supporting invertebrates or other similar food sources which benefit steelhead by increasing size of fish before migrating out. Additionally, riparian tree plantings will increase woody debris and detritus in the local system, further increasing the available foraging materials and potentially the growth and survival rate for individuals. The bank within the crib wall will be planted with numerous willow stakes while the higher elevations of the bank are planted with oaks and buckeye trees. Once mature, these trees will provide shade to waters beneath, decreasing thermal exposure, reducing heat stress on steelhead that can hold within the crib wall while migrating.

If any toxic substances remained in the creek after the completion of the Project, they could potentially impact fish when flows return to the channel. Items such as treated lumber, and spills from equipment into the creek have potential to indirectly effect steelhead following completion of the Project. These effects will be negated by using only non-treated lumber, and by the implementation of a spill prevention plan during Project work. Additionally, any concrete, or other non-natural materials encountered during excavation will be hauled offsite and replaced with suitable fill, furthering the beneficial effect of the Project. Given the design of the Project and implementation of measures, no negative indirect effects are anticipated as a result of the Project.

4.1.3 Analysis of Interrelated/Interdependent Effects

Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration.

Once completed, the Project is anticipated to be free of the need for maintenance. While the timber crib wall may disintegrate over 75 to 100 years, the root structure of the planted vegetation within the Project Area will stabilize the bank by holding gravels and generally slowing flow of water along the bank, negating the need to refurbish the crib wall. As such, no additional phases to this Project are anticipated. Because this Project represents the end of the foreseeable work, no interrelated or interdependent effects are anticipated.

4.1.4 Cumulative Effects

Cumulative effects are those effects of future State, Tribal, local or private actions that are reasonably certain to occur within and in the vicinity of the Project Area.

No additional phases of this Project are anticipated once construction is complete. Maintenance of the structure is not anticipated within the foreseeable future as the structures are designed to

either survive a 100 year flood, or to be replaced by a natural growth of vegetation planted within the Project Area.

The only future Projects known for the San Francisquito Creek drainage are a proposed project by the San Francisquito Creek Joint Powers Authority which would seek to construct flood reduction features, as well as enhance the environment and recreational opportunities, along a stretch of San Francisquito Creek from the upstream side of West Bayshore Road to the area immediately upstream of the Pope-Chaucer Bridge (SFCJPA 2019). In addition, Stanford has announced plans to either open up, or remove the Searsville Dam which currently represents the upstream end of anadromy for San Francisquito Creek (BSD 2019, Mercury News 2015). No specific date or timeline could be found during investigation for this report to say when Stanford expects to accomplish, removal or breaching of the dam. When viewed in combination with these proposed flood control and dam removal projects, this Project is expected to provide a beneficial cumulative effect for the species by enhancing habitat complexity and resiliency for steelhead during high flows.

4.2 CCC DPS Steelhead Critical Habitat

The critical habitat designation for CCC DPS steelhead specifically identifies San Francisquito Creek as being critical habitat (70 FR 52488 - 52627).

The Project Area is located within the lower half of the watershed, and does not support perennial flows or gravel beds required for spawning. However, the location within the watershed means that the Project Area does function as a freshwater migration corridor and potentially as rearing habitat for some part of the year when water is present.

4.2.1 Direct Effects

Direct or immediate effects are defined as those which occur on the species or its habitat at the time the Project is implemented.

If water is not present at the time the Project is initiated, no direct effects are anticipated to steelhead critical habitat as it will not currently be serving as habitat.

The Project Area contains mapped critical habitat and functions primarily as a migratory corridor, and at times as rearing habitat. The Project is scheduled to occur during the dry season (May 1 to October 31), after outmigrating smolts have exited the stream, and ending before adults return to streams. Therefore, there is not likely to be any direct effect to the Project Area functioning as a migratory corridor. If flows are present at the time of construction, the Project Area or downstream reaches may also serve as rearing habitat. By diverting flows into the opposite side of the extant channel, or using a bypass pipe, hydrologic connectivity will be maintained for critical habitat, thus minimizing any direct effects to rearing habitat. By the design and timing of the Project, any negative effects to critical habitat will either be temporary and minimized or fully avoided , which will in turn result in numerous beneficial indirect effects.

4.2.2 Indirect Effects

Indirect effects are those effects that are caused by or will result from the proposed action and are later in time, but still reasonably certain to occur.

The design of the Project is likely to have several beneficial indirect effects to steelhead critical habitat. The structure is composed of root wads, topped by a timber or log crib wall, which will be interspersed with plantings and gravels to secure the bank. Currently the banks are composed of exposed sandstone which lacks structure to support cover (interstitial spaces), velocity refugia, or surfaces that might support invertebrate prey. The structure (including the crib wall) will increase habitat complexity and diversity along this bank of the creek, providing interstitial spaces for velocity refugia, as well as cover for rearing and migrating salmonids. The bank within the crib wall will be planted with numerous willow stakes while the higher elevations of the bank are planted with oaks and buckeye trees. Once mature vegetation is present it will provide shade to waters beneath, decreasing thermal exposure. The mature vegetation is also expected to contribute woody debris to the stream, adding to downstream habitat complexity. This additional habitat complexity is expected to increase overall habitat suitability and function for migration and rearing. Lastly, the Project Area is located in a sinuous portion of San Francisquito Creek just upstream of a small oxbow. The Project is expected to help maintain sinuosity by allowing flows to continue around the curve and into the oxbow, thereby maintaining lower flow velocities, and increased habitat complexity within this portion of the creek.

4.2.3 Analysis of Interrelated/Interdependent Effects

Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration.

Once completed the Project is anticipated to be free of the need for maintenance. While the timber crib wall may disintegrate over 75 to 100 years, the root structure of planted vegetation within the Project Area will stabilize the bank, negating the need to refurbish the crib wall. As such, no additional phases to this Project are anticipated. Because this Project represents the end of the foreseeable work, no interrelated or interdependent effects are anticipated.

4.2.4 Cumulative Effects

Cumulative effects are those effects of future State, Tribal, local or private actions that are reasonably certain to occur within and in the vicinity of the Project Area.

The only future Projects known for the San Francisquito Creek drainage are a proposed project by the San Francisquito Creek Joint Powers Authority which would seek to construct flood reduction features, as well as enhance the environment and recreational opportunities, along a stretch of San Francisquito Creek from the upstream side of West Bayshore Road to the area immediately upstream of the Pope-Chaucer Bridge (SFCJPA 2019). In addition, Stanford has announced plans to either open up, or remove the Searsville Dam which currently represents the upstream end of anadromy for San Francisquito Creek (BSD 2019, Mercury News 2015). No specific date or timeline could be found during investigation for this report to say when Stanford expects to accomplish removal or breaching of the dam. When viewed in combination with these proposed flood control and dam removal projects, this Project would likely provide a beneficial cumulative effect for critical habitat by enhancing habitat complexity and resiliency during high flows.

As this Project is anticipated to provide a long term beneficial effect (as described under Section 4.2.2) no negative cumulative effects are anticipated if either of these projects mentioned above evolve further.

4.3 California Red-legged Frog

During a site visit conducted by WRA, Inc. on February 6, 2018, no CRLF of any life stage was observed within the Project Area. There are several occurrences of this species within 3 miles of the Project Area, though some are isolated by urban development, and others are considered extirpated. However, given nearby occurrences, and the lack of other dispersal areas due to urban development, it is possible that CRLF from those areas upstream, may disperse, or be washed downstream during high flows, and could subsequently end up within the Project Area. Given the distances, there is a low potential for the species to be present. However, the species presence cannot be fully ruled out. Therefore, impacts are being assessed assuming that a very low number of individuals may have either been washed downstream or migrated downstream and could interact with Project activities.

4.3.1 Direct Effects

Direct or immediate effects are defined as those which occur on the species or its habitat at the time the Project is implemented.

Direct effects to CRLF resulting from the proposed Project include take by injury or harassment associated with vegetation removal, or observation and relocation. Once initial surveys are complete, vegetation is removed and any initial grading is complete, all potential refugia for CRLF will have been removed, leaving no place for CRLF to hide and eliminating any future potential to be impacted by Project activities. The Project will occur during the dry season when rains are not likely to prompt CRLF to disperse into the Project Area, eliminating potential for further interaction with CRLF that may be in the vicinity. Through the limited scope and duration of Project activities as well as implementation of the aforementioned conservation measures, including biological monitoring for vegetation clearing, the likelihood for injury or death of CRLF is very low. However, take in the form of injury or harassment may occur if CRLF are in the vicinity of Project activities and encountered by work or are observed and relocated during Project activities.

4.3.2 Indirect Effects

Indirect effects are those effects that are caused by or will result from the proposed action and are later in time, but still reasonably certain to occur.

Following completion of the Project no further maintenance is anticipated that could impact CRLF in the future.

Implementation of the Project is not likely to modify CRLF dispersal patterns, habitat type or habitat connectivity in the area. Given the natural drying cycle of this section of San Francisquito Creek, the Project Area is not likely to support water of suitable depth or duration to be used as any form of aquatic habitat. Overall potential use of the Project Area is not expected to change.

The primary indirect effect may be in a localized increase in structural complexity that CRLF may use the structure as cover during dispersal events. Currently the banks are composed of unvegetated sandstone which lacks structure to support refugia for dispersing CRLF. The crib wall structure will increase complexity which may aid CRLF in dispersal by providing interstitial spaces for cover. Additionally, increasing natural elements (woody debris, detritus and live vegetation) may also support invertebrate or other food sources for CRLF that disperse through the area.

Items such as treated lumber, and spills of toxic substances have potential to indirectly effect CRLF following completion of the Project. However, these effects will be avoided by using only non-treated lumber, and by the implementation of a spill prevention plan during Project work. Given these Project design elements and measures, no significant indirect effects (positive or negative) are anticipated as a result of the Project.

4.3.3 Analysis of Interrelated/Interdependent Effects

Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration.

Once completed, the Project is anticipated to be free of the need for maintenance. While the timber crib wall may disintegrate over 75 to 100 years, the trees planted within the Project Area will stabilize the bank by holding gravels and generally slowing flow of water along the bank, negating the need to refurbish the crib wall. As such, no additional phases to this Project are anticipated. Because this Project represents the end of the foreseeable work, no interrelated or interdependent effects are anticipated.

4.3.4 Cumulative Effects

Cumulative effects are those effects of future State, Tribal, local or private actions that are reasonably certain to occur within and in the vicinity of the Project Area.

The only future Projects known for the San Francisquito Creek drainage are a proposed project by the San Francisquito Creek Joint Powers Authority which would seek to construct flood reduction features, as well as enhance the environment and recreational opportunities, along a stretch of San Francisquito Creek from the upstream side of West Bayshore Road to the area immediately upstream of the Pope-Chaucer Bridge (SFCJPA 2019). In addition, Stanford has announced plans to either open up, or remove the Searsville Dam which currently represents the upstream end of anadromy for San Francisquito Creek (BSD 2019, Mercury News 2015). No specific date or timeline could be found during investigation for this report to say when Stanford expects to accomplish, removal or breaching of the dam. When viewed in combination with these proposed flood control and dam removal projects no cumulative updates are anticipated to CRLF. Due to the Project Area location within the watershed and distance from any current populations of CRLF, it is unlikely that the Project would influence cumulative effects for CRLF in the San Francisquito Creek drainage.

5.0 DETERMINATION OF EFFECT

CCC DPS steelhead, and their designated critical habitat are known to occur within San Francisquito Creek. Though the Project is scheduled to occur during the dry season, if water is present at the time of initiation, steelhead may be present, and the Project Area will still be functional as either a migratory corridor or foraging and rearing habitat.

The conclusions of this Biological Assessment for Federal-listed species with potential to occur and critical habitat within the Project Area are as follows:

- CCC DPS Steelhead – *May affect, Likely to adversely affect*
- CCC DPS Steelhead Critical Habitat – *Not Likely to adversely Modify or Destroy*
- California red-legged frog – *May Affect, Likely to Adversely Affect*

5.1 CCC DPS Steelhead

A run of steelhead is known to occur on San Francisquito Creek. The Project may have direct effects to steelhead if water is present when the Project breaks ground. Steelhead juveniles and smolts could be stranded during dewatering, but with the implementation of a fish relocation plan, it is anticipated that the risk could be minimized. Effects to steelhead downstream would be avoided by the routing of flows around the Project Area within the stream channel or using a gravity fed bypass system that will allow water to continue flowing, to maintain downstream fish health. All indirect effects of the Project are anticipated to be beneficial. These effects primarily include benefits from increased habitat complexity which will improve migratory conditions for steelhead allowing for higher survival rates, due to better cover and increased foraging success. The Project is not anticipated to have any interrelated or interdependent effects, since the Project represents the end of any foreseeable work. No additional phases of this Project are anticipated once construction is complete, and there will be no foreseeable maintenance required, thus no cumulative effects are anticipated. There are yet to be determined projects pending a Corps flood control feasibility study on San Francisquito Creek, and Stanford has announced plans to open or remove the Searsville Dam, although no specific timeline could be found for this potential project. Based on these factors, the primary opportunity for take of steelhead would be during dewatering and the subsequent fish relocation. This would only occur if water is present when work occurs, even if all minimization measures are employed there is still a risk to steelhead during the relocation therefore the Project ***may affect, and is likely to adversely affect*** steelhead.

5.2 CCC DPS Steelhead Critical Habitat

The Project Area has been designated as critical habitat for CCC steelhead. The Project will be initiated in the dry season when flows are most likely to be naturally discontinuous through the Project Area, thereby limiting the potential for any direct effects to migratory and rearing habitat. If water is present when construction begins a bypass will maintain flows in order to maintain downstream connectivity and minimize temporary effects to rearing habitat. The Project has been designed to provide beneficial indirect effects to rearing and migratory habitat as well as fulfilling the role of stabilizing the bank and protecting the Applicant's facility. The indirect benefits to critical habitat will include increasing available high flow refugia and habitat complexity that may serve to limit predation, minimizing thermal exposure by planting a variety of native riparian trees, adding structures which will diversify substrates to increase foraging opportunities through the use of natural and diverse materials, as well as with additions of detritus and woody debris. While the Project may temporarily impact a small amount of critical habitat during construction, those effects are minimized by the Project design and timing, but in turn will result in indirect benefits to steelhead critical habitat. As such the Project is ***not likely to adversely modify or destroy s***teelhead critical habitat.

5.3 California Red-legged Frog

The proposed Project will have no effect on CRLF eggs or larvae, because CRLF breeding habitat is not present in the Project Area. The Project may have direct effects to adult CRLF that have dispersed into the area, but suitable non-breeding aquatic habitat is not present to support CRLF for prolonged periods over the summer. Therefore any individuals encountered are expected to be limited in number and consist of holdovers from earlier migratory events. The construction window for the Project is during the dry season which would also preclude CRLF from dispersing into the Project Area during work as suitable moist conditions would not be present. Therefore the only potential time when CRLF may be affected would be during initial preconstruction surveys

or during monitoring for vegetation clearing which would result in take in the form of injury and harassment associated with these activities. The chance of CRLF presence in the Project Area is very low, and while risks are minimized by the design of the Project as well as the use of minimization measures, the potential for take is not eliminated. Assuming these factors, the Project ***may affect, and is likely to adversely affect*** CRLF.

6.0 LIST OF CONTACTS, CONTRIBUTORS, PREPARERS

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This biological assessment was prepared by WRA with supplemental information provided by the Applicant. The addresses and telephone numbers are:

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7.0 REFERENCES

American Rivers. 2014. America's Most Endangered Rivers, San Francisquito Creek. https://www.americanrivers.org/river/san-francisquito-creek/. Most Recently Accessed: March 2019.

Alvarez, J. A. 2004. Rana aurora draytonii (California red-legged frog) Microhabitat. Herpetological Review 35:162-163.

Bulger, J.B., Scott, N.J., and Seymour, R.B. 2003. Terrestrial activity and conservation of adult California red-legged frogs Rana aurora draytonii in coastal forests and grasslands. Biological Conservation 110:85–95.

[BSD]. Beyond Searsville Dam. 2019. Beyond Searsville Dam Organization Website. http://www.beyondsearsvilledam.org/Beyond_Searsville_Dam/Home.html. Most Recently Accessed: March 2019.

[CDFW] California Department of Fish and Wildlife. 2019. California Natural Diversity Data Base (CNDDB). RareFind 5. Natural Heritage Division, California Department of Fish and Game. Sacramento, California.

CDFW. 2018. California Department of Fish and Wildlife. BIOS. California Passage Assessment Database. California Department of Fish and Game. Sacramento, California.

Dahl, T. E. 1990. Wetland losses in the United States, 1978s to 1980s. U.S. Fish and Wildlife Service, Washington, DC.

Fellers, G. and P.M. Kleeman. 2007. California red-legged frog (Rana draytonii) movement and habitat use: Implications for conservation. Journal of Herpetology 41(2): 276-286.

Hayes, S., M. Bond, C. Hanson, E. Freund, J. Smith, E. Anderson, A. Ammann, and R. MacFarlane. 2008. Steelhead Growth in a Small Central California Watershed: Upstream and Estuarine Rearing Patterns. *Transactions of the American Fisheries Society* 137:114-128.

Hayes, M. P. and D. M. Krempels. 1986. Vocal sac variation among frogs of the genus Rana from western North America. Copeia 1986(4):927-936.

Jeffres C., J. Opperman, and P. Moyle. 2008. Ephemeral floodplain habitats provide best growth conditions for juvenile Chinook salmon in a California river. *Environmental Biology of Fishes* (2008) 83:449–458

Jennings, M. R. and M. P. Hayes. 1985. Pre- 1900 overharvest of California red-legged frogs (Rana aurora draytonii): The inducement for bullfrog (*Rana catesbeiana*) introduction. Herpetological Review 32(1):94-103.

Leidy, R.A., G.S. Becker, B.N. Harvey. 2005. Historical distribution and current status of steelhead/rainbow trout (Oncorhynchus mykiss) in streams of the San Francisco Estuary, California. Center for Ecosystem Management and Restoration, Oakland, CA.

Mercury News. 2015. Stanford announces future of Searsville Dam. Publish Date: May 1, 2015.

Moyle, P. 2002. Inland Fishes of California Revised and Expanded. University of California Press. Berkeley, California.

[NMFS] National Marine Fisheries Service. 1997. Fish Screening Criteria for Anadromous Salmonids. National Marine Fisheries Service Southwest Region.

NMFS. 2007. Federal Recovery Outline for the Distinct Population Segment of Central California Coast Steelhead. Prepared by NMFS Southwest Regional Office. Long Beach, California.

NMFS. 2019. California Species List Tool. Maps and Data. Available Online at: http://www.westcoast.fisheries.noaa.gov/maps_data/california_species_list_tools.html. Accessed February 2018.

Rathbun, Galen B., and Julie Schneider. 2001. “Translocation of California Red-Legged Frogs (Rana Aurora Draytonii).” Wildlife Society Bulletin (1973-2006), vol. 29, no. 4, pp. 1300–1303.

[SFCJPA]. San Francisquito Creek Joint Powers Authority. 2019. Environmental Impact Report, San Francisquito Creek Flood Protection, Ecosystem Restoration, and Recreation Project Upstream of Highway 101. Priority Projects List March 2020. Available Online at: http://www.sfcjpa.org. Most Recently Accessed: March 2019.

Sommer, T., M. Nobriga, W. Harrell, W. Batham, and W. Kimmerer. 2001. Floodplain rearing of juvenile chinook salmon: evidence of enhanced growth and survival. Canadian Journal of Fisheries and Aquatic Sciences 58: 325-333.

Soulé, M.E. and J. Terbough. 1999. Conserving nature at regional and continental scales - a scientific program for North America. Bioscience 49:809-817.

[USFWS] U.S. Fish and Wildlife Service. 1978. Concept plan for waterfowl wintering habitat preservation, Central Valley, California. Region 1, Portland, OR.

USFWS. 1986. Species Profile: Life Histories and Environmental Requirements of Coastal Fishes and Invertebrates (Pacific Northwest) Steelhead Trout. Biological Report 82 (11.82).

USFWS. 2002. Recovery plan for the California red-legged frog (*Rana aurora draytonii*). U.S. Fish and Wildlife Service, Portland, OR.

USFWS. 2010. Endangered and Threatened Wildlife and Plants: Revised Designation of Critical Habitat for California Red-legged Frog; Final Rule. Federal Register, Vol. 75, No. 51. 12815-12959.

USFWS. 2014. Programmatic Biological Opinion for Issuance of Permits under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act, including Authorizations Under 22 Nationwide Permits, for Projects that May Affect the Threatened California Red- Legged Frog in Nine San Francisco Bay Area Counties, California

Appendix A

Figures

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Sources: National Geographic, WRA | Prepared By: njander, 2/5/2020

Figure 1. Action Area Map

Children's Health Council
Creek Bank Restoration
Palo Alto, California

0 0.5 1 Miles

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wra ENVIRONMENTAL CONSULTANTS

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Sources: Esri Streaming - NAIP 2016 | Prepared By: njander, 2/10/2020

Figure 2. Action Area, Project Area and Design Elements

Children's Health Council
Creek Bank Restoration
Palo Alto, California

0 50 100 Feet

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ENVIRONMENTAL CONSULTANTS

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Sources: Esri Streaming - NAIP 2016 | Prepared By: SGillespie, 1/13/2020

Figure 3. Biological Communities within the Project Area

Children's Health Council
Creek Bank Restoration
Palo Alto, California

0 50 100 Feet N

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Sources: Esri Streaming - NAIP 2016 | Prepared By: SGillespie, 3/9/2020

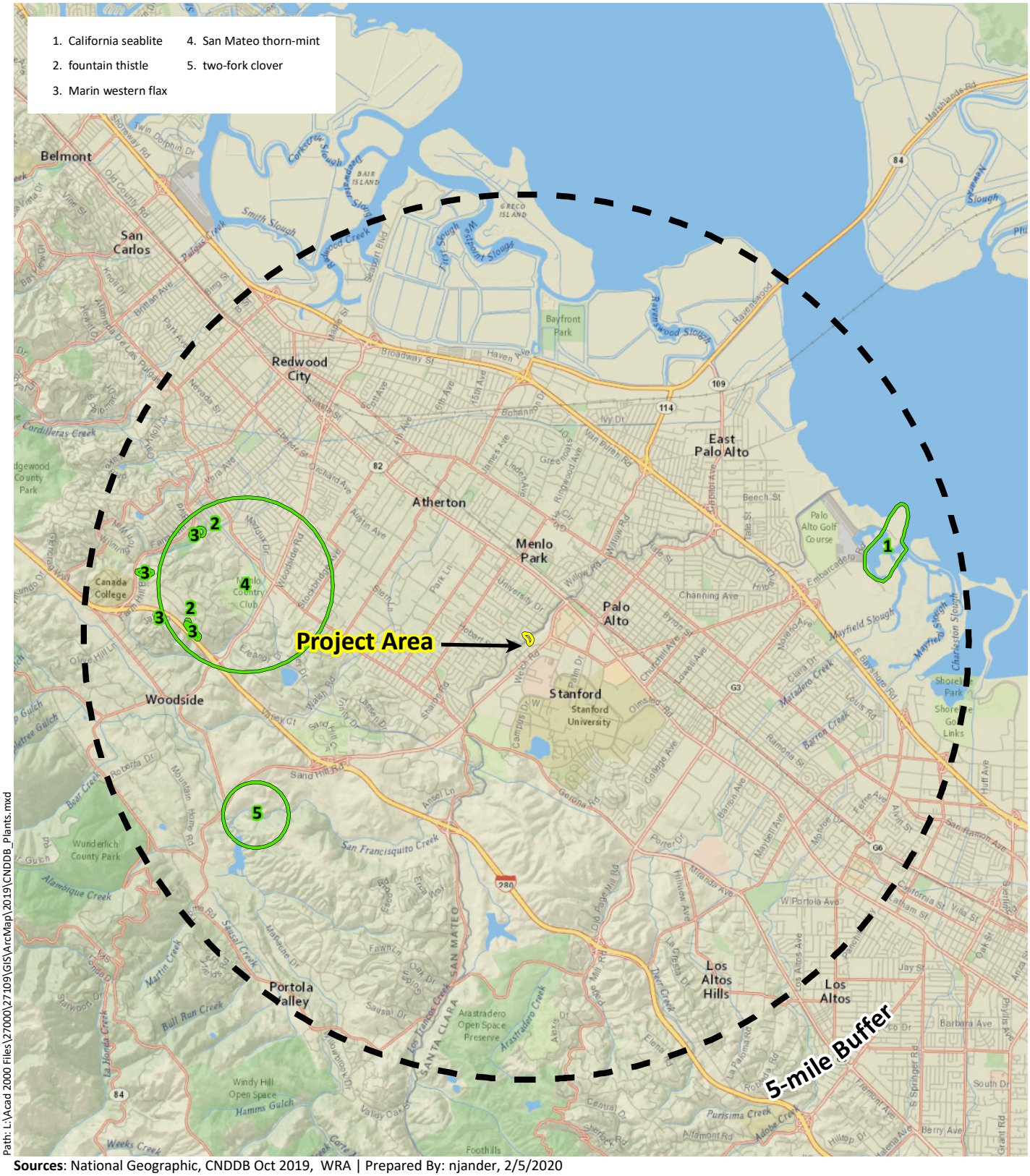
Figure 3. Biological Communities within the Project Area

Children's Health Council
Creek Bank Restoration
Palo Alto, California

0 50 100 Feet

N

ENVIRONMENTAL CONSULTANTS



Sources: National Geographic, CNDDB Oct 2019, WRA | Prepared By: njander, 2/5/2020

Figure 4a. Federal-listed Plant Species within 5-miles of the Project Area

Children's Health Council
Creek Bank Restoration
Palo Alto, California

0 1 2 Miles

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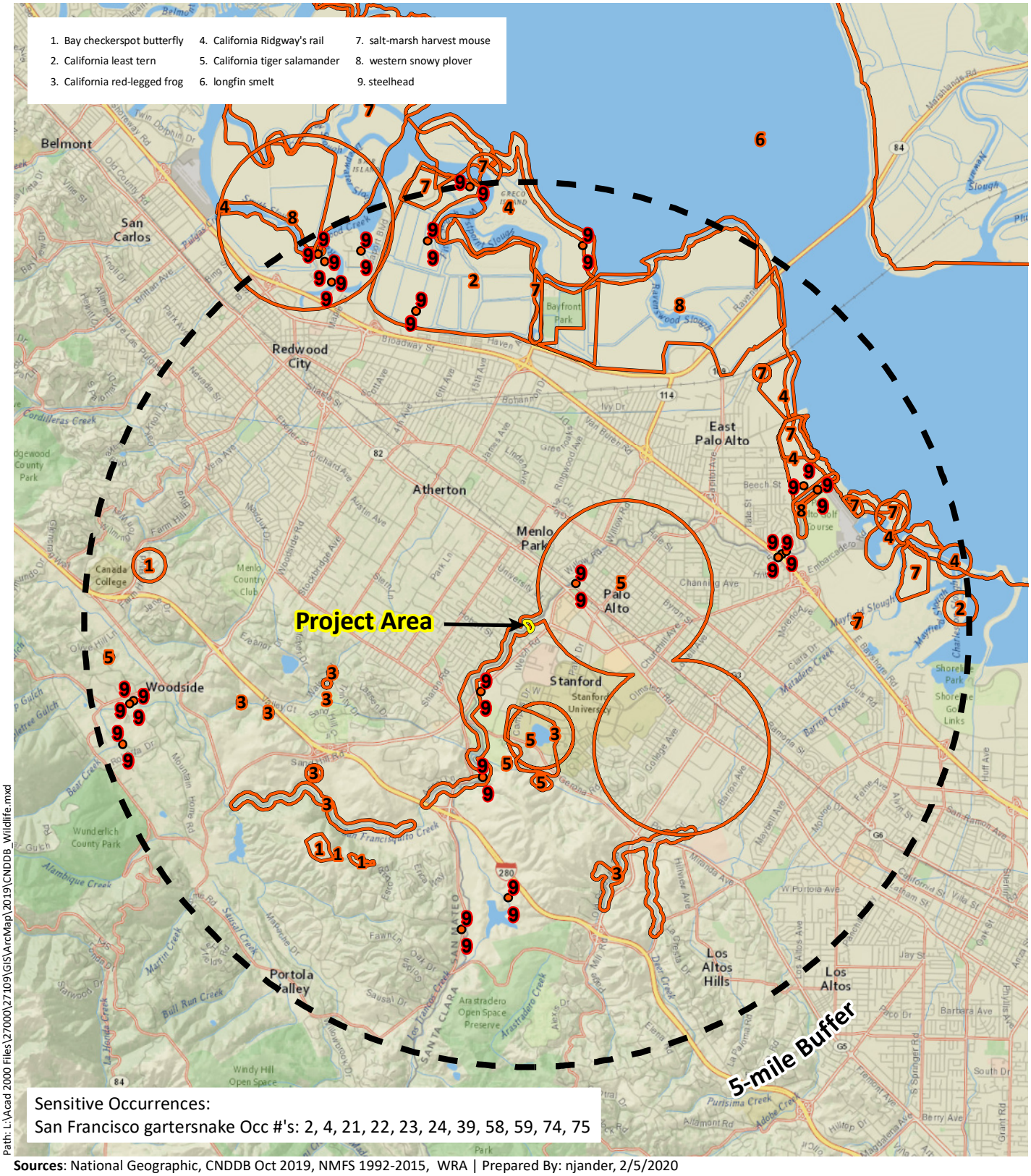
ENVIRONMENTAL CONSULTANTS



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Sources: National Geographic, CNDDB Oct 2019, NMFS 1992-2015, WRA | Prepared By: njander, 2/5/2020

Figure 4b. Federal-listed Wildlife Species within 5-miles of the Project Area

Children's Health Council
Creek Bank Restoration
Palo Alto, California

0 1 2 Miles

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ENVIRONMENTAL CONSULTANTS

Appendix B

Potential Federal Listed, Proposed, and Candidate Species

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Appendix B. Potential for special-status plant and wildlife species to occur in the Action Area. List compiled from the California Natural Diversity Database (CDFW 2019), and National Marine Fisheries Service Species Lists (2019) database searches for the Palo Alto USGS 7.5-minute quadrangle.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
Wildlife			
Mammals			
salt-marsh harvest mouse *Reithrodontomys raviventris*	FE	Found only in the saline emergent wetlands of San Francisco Bay and its tributaries. Pickleweed is primary habitat. Do not burrow, build loosely organized nests. Require higher areas for flood escape.	**Not Present.** No tidal marsh, pickleweed or suitable undeveloped grasslands are present to support this species.
Birds			
yellow-billed cuckoo *Coccyzus americanus occidentalis*	FT	Summer resident, breeding in dense riparian forests and jungles, typically with early successional vegetation present. Utilizes densely-foliaged deciduous trees and shrubs. Eats mostly caterpillars. Current breeding distribution within California very restricted.	**Not Present.** The Action Area is outside the known distribution for this species.
marbled murrelet *Brachyramphus marmoratus*	FT	Predominantly coastal marine. Nests in old-growth coniferous forests up to 30 miles inland along the Pacific coast, from Eureka to Oregon border, and in Santa Cruz/San Mateo Counties. Nests are highly cryptic, and typically located on platform-like branches of mature redwoods and Douglas firs. Forages on marine invertebrates and small fishes.	**Not Present.** Suitable mature redwoods and Douglas firs are not present within the Action Area or surrounds to support nesting by this species.
bald eagle *Haliaeetus leucocephalus*	FD	Occurs year-round in California, but primarily a winter visitor. Nests in large trees in the vicinity of larger lakes, reservoirs and rivers. Wintering habitat somewhat more variable but usually features large concentrations of waterfowl or fish.	**Not Present.** No suitable large trees are present within the Action Area or surrounds to support nesting by this species.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
California least tern *Sterna antillarum browni*	FE	Nests along the coast from San Francisco bay south to northern Baja California. Colonial breeder on bare or sparsely vegetated, flat substrates: sand beaches, alkali flats, landfills, or paved areas.	**Not Present.** No suitable sand or gravel bars are present to support nesting by this species.
Ridgeway's clapper rail *Rallus longirostris obsoletus*	FE	Associated with tidal salt marsh and brackish marshes supporting emergent vegetation, upland refugia, and incised tidal channels.	**Not Present.** No suitable saltmarsh or tidal marsh habitat is present to support nesting by the species.
western snowy plover *Charadrius nivosus (alexandrines) nivosus*	FT	Federal listing applies only to the Pacific coastal population. Year-round resident and winter visitor. Occurs on sandy beaches, salt pond levees, and the shores of large alkali lakes. Nests on the ground, requiring sandy, gravelly or friable soils.	**Not Present.** No suitable beach or shoreline habitat is present to support nesting by this species.
Reptiles and Amphibians			
California red-legged frog *Rana aurora draytonii*	FT	Associated with quiet perennial to intermittent ponds, stream pools, and wetlands. Prefers shorelines with extensive vegetation. Documented to disperse through upland habitats after rains.	**Present.** No suitable freshwater marsh, ponds, or other such features are present within the local area to support breeding by this species. The Action Area is however within two miles of known breeding occurrences (CNDDB 2019). Due to dense urban development on both sides of the creek, dispersing CRLF may be funneled through the Action Area as no other corridors or potential habitats are present between the Action Area and previously documented occurrences.
California tiger salamander *Ambystoma californiense*	FT	Populations in Santa Barbara and Sonoma counties currently listed as endangered; threatened in remainder of range. Inhabits grassland, oak woodland, ruderal and seasonal pool habitats. Adults are fossorial and utilize mammal burrows and other subterranean refugia. Breeding occurs primarily in vernal pools and other seasonal water features.	**Not Present.** No suitable vernal pools, stock ponds, or other such features are present within the local area to support breeding by this species. Undeveloped uplands with burrows or other suitable aestivation habitat, which is also connected to breeding habitat, is not present. The Action Area is over 1 mile from recent occurrences, and is isolated from those occurrences by dense urban development (CNDDB 2019).

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
San Francisco gartersnake *Thamnophis sirtalis tetrataenia*	FE	Vicinity of freshwater marshes, ponds and slow moving streams in San Mateo County and extreme northern Santa Cruz County. Prefers dense cover and water depths of at least one foot. Upland areas near water are also very important.	**Not Present.** This species is known only for San Mateo and Santa Cruz Counties, and is not considered present within Santa Clara County, and thus the Action Area.
Fish			
delta smelt *Hypomesus transpacificus*	FT	Lives in the Sacramento-San Joaquin estuary in areas where salt and freshwater systems meet. Occurs seasonally in Suisun Bay, Carquinez Strait and San Pablo Bay. Seldom found at salinities > 10 ppt; most often at salinities < 2 ppt.	**Not Present.** No suitable estuarine habitat that would support this species is present within the Action Area.
green sturgeon *Acipenser medirostris*	FT	Anadromous. Spawns in the Sacramento and Klamath River systems. Lingering transients may be found throughout the San Francisco Bay Estuary, particularly juveniles.	**Not Present.** No suitable estuarine or marine habitat exists within the Action Area to support this species.
longfin smelt *Spirinchus thaleichthys*	FC	Found in open waters of estuaries, mostly in the middle or bottom of the water column. This species prefers salinities of 15 to 30 ppt, but can be found in completely freshwater to almost pure seawater.	**Not Present.** No suitable estuarine habitat that would support this species is present within the Action Area.
steelhead - central CA coast DPS *Oncorhynchus mykiss irideus*	FT	Occurs from the Russian River south to Soquel Creek and Pajaro River. Also in San Francisco and San Pablo Bay Basins. Adults migrate upstream to spawn in cool, clear, well-oxygenated streams. Juveniles remain in fresh water for 1 or more years before migrating downstream to the ocean.	**Present.** This species is known to occur in waters surrounding the Action Area. Waters of the Action Area are within the species designated critical habitat.
Invertebrates			

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
San Bruno elfin butterfly *Callophrys mossii bayensis*	FE	Limited to the vicinity of San Bruno Mountain, San Mateo County. Colonies are located on in rocky outcrops and cliffs in coastal scrub habitat on steep, north-facing slopes within the fog belt. Species range is tied to the distribution of the larval host plant, Sedum spathulifolium.	**Not Present.** No host plants or suitable grassland habitats are present to support the species.
bay checkerspot butterfly *Euphydryas editha bayensis*	FT	Restricted to native grasslands on outcrops of serpentine soil in the vicinity of San Francisco Bay. *Plantago erecta* is the primary host plant; *Castilleja densiflorus* and *C. exserta* subsp. *exserta* are the secondary host plants.	**Not Present.** No host plants or suitable grassland habitats are present to support the species.
Plants			
San Mateo thorn-mint	FE		**Not Present.** The Action Area is highly developed and lacks expansive clays and serpentine substrates associated with this species. No suitable habitat is present for this species.
Crystal Springs fountain thistle	FE		**Not Present**. The Action Area lacks serpentine substrates necessary to support this species. No suitable habitat is present for this species.
Marin western flax	FT		**Not Present**. The Action Area lacks chaparral and grassland habitat underlain by serpentine substrates associated with this species. No suitable habitat is present for this species.
two-fork clover	FE		**Not Present**. The Action Area is highly developed and contains exposed or disturbed ground and bank. There are no scrub or serpentine substrates associated with this species present in the Action Area. No suitable habitat is present for this species.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**

*** Key to status codes:**

FE	Federal Endangered
FT	Federal Threatened
FC	Federal Candidate
FD	Federal Delisted
NMFS	National Marine Fisheries Service - Species of Concern

****Potential species occurrence definitions:**

Present: Species is observed on the site or has been recorded (i.e., CNDDB, other reports) on the site recently.

Not Present. Habitat on and adjacent to the site is clearly unsuitable for the species requirements (foraging, breeding, cover, substrate, elevation, hydrology, plant community, site history, disturbance regime).

Unlikely. Few of the habitat components meeting the species requirements are present, and/or the majority of habitat on and adjacent to the site is unsuitable or of very poor quality. The species has a low probability of being found on the site.

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Appendix C

Essential Fish Habitat Assessment

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Appendix C: Supplemental Essential Fish Habitat Information

The proposed Action is located within an area designated as Essential Fish Habitat (EFH) for Pacific Salmonids. Several other EFH areas occur outside of the Action Area, within adjacent marine habitats, however, no work will occur in these habitats. Work associated with the Action Area is anticipated to directly benefit salmonid EFH. Details of the location, purpose, and description of the proposed Action, along with minimization and avoidance measures, are discussed in the Biological Assessment. A table of EFH within the Action Area is provided below.

Essential Fish Habitat	Effect Determination
Pacific Salmon	**Not Likely to Destroy or Adversely Modify**

Background

The Magnuson-Stevens Act (as amended by the Sustainable Fisheries Act) requires FMPs to "describe and identify essential fish habitat…, minimize to the extent practicable adverse effects on such habitat caused by fishing, and identify other actions to encourage the conservation and enhancement of such habitat" (§303(a)(7)). The Magnuson-Stevens Act defines EFH as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." NMFS interpreted this definition in its regulations as follows: "waters" include aquatic areas and their associated physical, chemical, and biological properties that are used by fish, and may include areas historically used by fish where appropriate; "substrate" includes sediment, hard bottom, structures underlying the waters, and associated biological communities; "necessary" means "the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem"; and "spawning, breeding, feeding, or growth to maturity" covers the full life cycle of a species (§303(a)(7)). A brief description of each FMP for the Action Area is provided below.

The Pacific salmon FMP covers two species in California; Chinook salmon (*Oncorhynchus tshawytscha*) and coho salmon (*O. kisutch*). EFH for Pacific salmon means those waters and substrates necessary for production needed for a healthy ecosystem and to support a sustainable fishery. Central California Coast Distinct Population Segment steelhead are found within San Francisquito Creek, however neither Chinook nor Coho salmon are currently found within San Francisquito Creek.

Analysis of Effects to EFH

Direct Effects

If water is not present at the time the Project is initiated, no direct effects are anticipated to EFH as it will not currently be serving as habitat.

If water is present, the Action may result in temporary loss of function of the Action Area as a migratory corridor or as foraging habitat. To minimize temporary effects to EFH, the Project is scheduled to begin no earlier than May 1 to coincide with the period of time when San Francisquito Creek typically goes dry naturally. This timing allows outmigrating fish a chance to freely leave the system while water is present, eliminating any effects to migratory corridors and giving the stream time to naturally dry down, avoiding impacts to potential rearing habitat. If water is present

and flowing, it will be bypassed in order to maintain habitat suitability downstream, also mitigating any effect to habitat suitability.

Indirect Effect

The Action will potentially affect salmonid EFH by enhancing habitat suitability through installing woody debris and increasing habitat complexity through the Project Area. Installation of a timber or log cribwall that will be interspersed with plantings and gravels will add habitat structure to an area currently devoid of cover and is likely to increase high flow refugia for salmonids in the creek.

The enhancement of habitat within the creek will directly benefit EFH. Improvements proposed above address habitat suitability in San Francisquito Creek. Because the Action will increase habitat function, it is likely to have a small beneficial effect on Salmonid EFH.

Interrelated and Interdependent Effects

Once completed, the Project is anticipated to be free of the need for maintenance. While the timber crib wall may disintegrate over 75 to 100 years, the trees planted within the Project Area will stabilize the bank by holding gravels and generally slowing flow of water along the bank, negating the need to refurbish the cribwall. As such, no additional phases to this Project are anticipated. Because this Project represents the end of the foreseeable work, no interrelated or interdependent effects are anticipated.

Cumulative Effects

No additional phases of this Project are anticipated once construction is complete. Maintenance of the structure is not anticipated within the foreseeable future as the structures are designed to either survive a 100 year flood, or to be replaced by a natural growth of trees planted within the Project Area. The only future Projects potentially known for the San Francisquito Creek drainage are yet to be determined following a flood control feasibility investigation lead by the Corps (SFBJV 2019). As only the feasibility study has been released, no specific projects are known to be scheduled. In addition, Stanford has announced plans to either open up, or remove the Searsville Dam which currently represents the upstream end of anadromy for San Francisquito Creek (BSD 2019, Mercury News 2015). No specific date or timeline could be found during investigation for this report to say when Stanford expects to accomplish, removal or breaching of the dam.

Conclusion

The Project is designed to avoid adverse direct effects to EFH and would result in a small indirect benefit to habitat complexity, therefore EFH would either not be affected, or would have a slight positive effect at the conclusion of the Project.

Appendix D

Site Photos

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Photograph 1. Photo depicts the approximately 30-foot tall near vertical bank failure along San Francisquito Creek. Evidence of slumped debris and matted or destroyed vegetation can be seen on the east bank. The crib wall will be installed along the east bank to protect against future erosion and provide long-term stabilization. Photograph taken February 22, 2019.

Photograph 2. Photo depicts flow of stream immediately downstream of Project Area. Photograph taken March 21, 2019.

Photograph 3. View looking northwest along top of bank of creek. Photo depicts installation of concrete shear pin wall and set back from the top of bank. Cribwall work would occur along the lower sections of bank depicted here. Photograph taken March 21, 2019.

Photograph 4. View looking southeast along top of bank of the creek within the Project Area. Photo depicts completed Phase I sheer pin wall construction. Photograph taken May 13, 2019.

Photograph 5. Photo depicting point bar stream feature immediately downstream of bank failure. Photograph taken February 22, 2019.

Photograph 6. Photograph looking downstream depicting acceleration of bank failure during 2016-2017 rainy season. Photograph taken March 23, 2017.

Photograph 7. Photograph of overhanging woody vegetation downstram of the Project Area. Photograph taken March 21, 2019.

Photograph 8. View of approximate location of temporary access route. Photo located upstream of erosion area. Photograph taken March 21, 2018.

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Appendix E

Plan Set

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CHILDREN'S HEALTH COUNCIL

CREEK BANK STABILIZATION PROJECT: PHASE II

PALO ALTO, CALIFORNIA

STATEMENT OF PURPOSE

THIS PROJECT WILL PROVIDE 275 LINEAR FEET OF BANK STABILIZATION ALONG SAN FRANCSQUITO CREEK THROUGH LOG CRIB WALL AND RIPARIAN PLANTINGS. IT WILL BENEFIT THE CREEK BY PROVIDING SLOPE STABILITY AND SALMONID HABITAT.

REGULATORY CONTEXT

PROJECT GOALS AND THE DESIGN OF THE PROJECT HAVE BEEN DEVELOPED UNDER THE GUIDANCE OF THE FOLLOWING:

- SAN FRANCISQUITO CREEK JOINT POWERS AUTHORITY
- STANFORD UNIVERISTY
- US ARMY CORPS OF ENGINEERS
- US FISH AND WILDLIFE SERVICE
- CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE
- CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
- SANTA CLARA VALLEY WATER DISTRICT

AS SUCH THE PROJECT IS SUBJECT TO CONDITIONS OF APPROVAL AND RESTRICTIONS THAT WERE PUT IN PLACE TO PROTECT SENSITIVE HABITAT TYPES AND SPECIAL STATUS SPECIES.

THE PROJECT WILL BE PERFORMED WITH PERMITS AND/OR CONSULTATIONS FROM THE FOLLOWING AGENCIES:

- US ARMY CORPS OF ENGINEERS
- US FISH AND WILDLIFE SERVICE
- CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE
- CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
- CITY OF PALO ALTO

CHARACTERIZATION OF THE PROJECT

1. TOE STABILIZATION - THE CHANNEL TOE WILL BE PROTECTED BY LARGE ALLUVIUM COBBLES AND BOULDERS BURIED UNDERNEATH THE CREEK BED. THIS MATERIAL WILL BE THE FOUNDATION OF THE CRIB WALL.

2. ROOTWADS - THE CHANNEL TOE WILL INCLUDE ROOTWADS ALONG THE EXISTING POOL OF THE CREEK IN ORDER TO REDUCE WATER VELOCITIES AND PROVIDE FISH HABITAT.

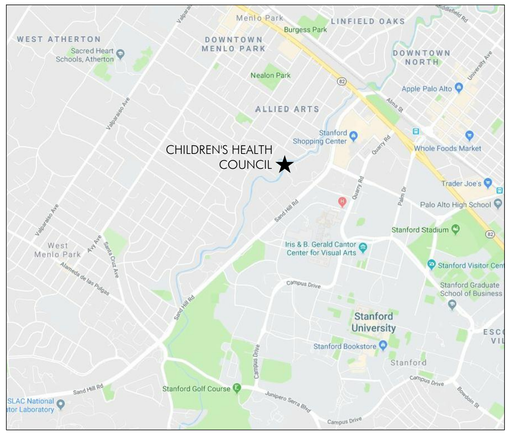
3. LOWER CHANNEL BANK - A NEW CHANNEL BANK WILL BE INSTALLED CONSISTING OF A CRIB WALL WITH A SLOPE OF 1:1 AND STABILIZED BY THREADED REBAR PINS. A MIXTURE OF COARSE ALLUVIUM (GRAVEL TO COBBLE SIZED MATERIAL) WILL BE PLACED BEHIND THE CRIB WALL AND WITHIN THE CRIB WALL CAVITIES. THE CRIB WALL WILL BE ANCHORED TO THE EXISTING CREEK BANK WITH HELICAL ANCHORS.

4. UPPER CHANNEL BANK - ABOVE THE CRIB WALL, THE CHANNEL BANK WILL BE GRADED TO A MAXIMUM SLOPE OF 2:1 (H:V) AND PLANTED WITH NATIVE TREES, SHRUBS, AND GRASSES.

EARTHWORK QUANTITIES

THE PROJECT INVOLVES THE EXCAVATION OF LANDSLIDE DEPOSITION OF ARTIFICIAL FILL MATERIAL, ALLUVIUM SILTY SAND, AND ALLUVIUM GRAVELLY SAND WHICH WILL BE HAULED OFF THE PROJECT SITE. LARGER ALLUVIUM ROCK SUCH AS BOULDERS AND COBBLES SHALL BE PURCHASED AND DELIVERED TO THE PROJECT SITE. ENGINEERED FILL MATERIAL SHALL CONSIST OF ALLUVIUM COBBLE AND GRAVEL AND SHALL BE PURCHASED AND DELIVERED TO THE SITE.

- CUT = 1370 CU. YDS. (HAUL OFF SITE)
- IMPORT BOULDERS = 330 CU. YDS.
- IMPORT COBBLES = 220 CU. YDS.
- IMPORT ENGINEERED FILL = 1780 CU. YDS.

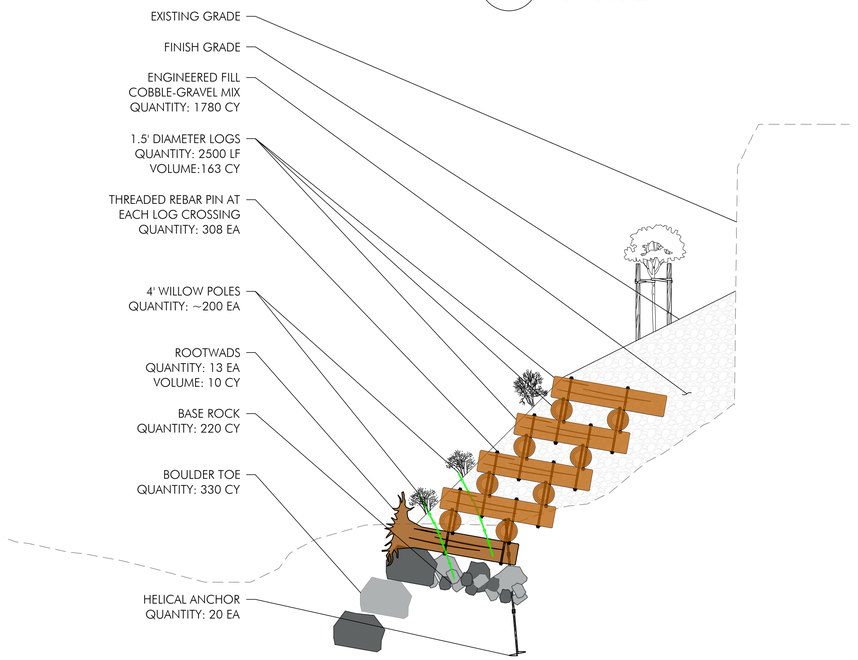


1 VICINITY MAP

NOT TO SCALE

2 LOCATION PLAN

NOT TO SCALE



3 TYPICAL SECTION

SCALE: 1 " = 5'

PROJECT SCHEDULE

THIS DESIGN IS INTENDED TO BE CONSTRUCTED DURING ONE SUMMER CONSTRUCTION SEASON (MAY 1 THROUGH OCTOBER 15TH).

UTILITIES

THERE MAY BE UNKNOWN UNDERGROUND ELECTRICAL AND WATER LINES LOCATED WITHIN THE PROJECT BOUNDARY. THE CONTRACTOR WILL CONTACT A UTILITY COMPANY TO MARK UNDERGROUND UTILITIES AND/OR CONFIRM THAT THERE ARE NO ADDITIONAL UNDERGROUND UTILITIES.

FEMA FLOODPLAIN NOTES

- THIS PROJECT IS LOCATED WITHIN A FEMA DESIGNATED FLOODWAY.
- WORK WITHIN THE 100-YEAR FLOODPLAIN WILL NOT INCREASE RISK OF FLOODING.
- WATER SURFACE PROFILES NOTED WITH "FEMA" ARE FROM THE 2014 FLOOD INSURANCE STUDY

LOCATION DESCRIPTION

THE PROPERTY IS LOCATED AT 650 CLARK WAY, PALO ALTO, CALIFORNIA 94304

SURVEY CONTROL

HORIZONTAL DATUM: NAD83, CALIFORNIA STATE PLANE ZONE III, U.S. SURVEY FEET
VERTICAL DATUM: NAVD88, U.S. SURVEY FEET

CONTROL POINTS

POINT #	ELEVATION	NORTHING	EASTING	DESCRIPTION
1268	91.70	1987341.30	6074099.86	CP 1
1930	89.75	1987221.26	6074226.76	CP 2
1969	76.77	1987174.17	6075603.01	BM 458
1972	86.02	1986864.21	6074480.60	CP 3

DESIGNED FOR

CHILDREN'S HEALTH COUNCIL
650 CLARK WAY
PALO ALTO, CALIFORNIA 94304
CONTACT: TERRY BOYLE

LEAD CONSULTANT

WRA, INC.
2169-G E. FRANCISCO BLVD.
SAN RAFAEL, CA 94901
CONTACT: BRIAN BARTELL
(415) 424-7588
BARTELL@WRA-CA.COM

SHEET INDEX

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(415) 454-8868 Phone
info@wra-ca.com

CREEK BANK STABILIZATION PROJECT - PHASE II
CHILDREN'S HEALTH COUNCIL
PALO ALTO, CALIFORNIA

NOT FOR CONSTRUCTION

Date	Issues And Revisions	No.
03/27/19	CONCEPT	
08/19/19	30% DESIGN	

PROJECT #27109
DRAWN BY: ACS
CHECKED BY: BSS, RBB
ORIGINAL DRAWING SIZE: 24 X 36

TITLE

Sheet

G-1.0

Path: L:\Acad 2000 Files\27000\27109\CAD\dwg\30% Design\27109 G-1 Title.dwg

SITE PLAN LEGEND

SYMBOL	DESCRIPTION
	PROPERTY LINE
(100)	(E) CONTOUR (2 FT)
100	PROPOSED CONTOUR (2 FT)
	STAGING AREA
	FLOW
LOG	LIMIT OF GRADING
LOD	LIMIT OF DISTURBANCE
	EXISTING TREE
	EXISTING TREE TO BE REMOVED
	TEMPORARY ACCESS ROUTE

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CREEK BANK STABILIZATION PROJECT - PHASE II

CHILDREN'S HEALTH COUNCIL
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N
0 20
SCALE: 1 " = 20 '

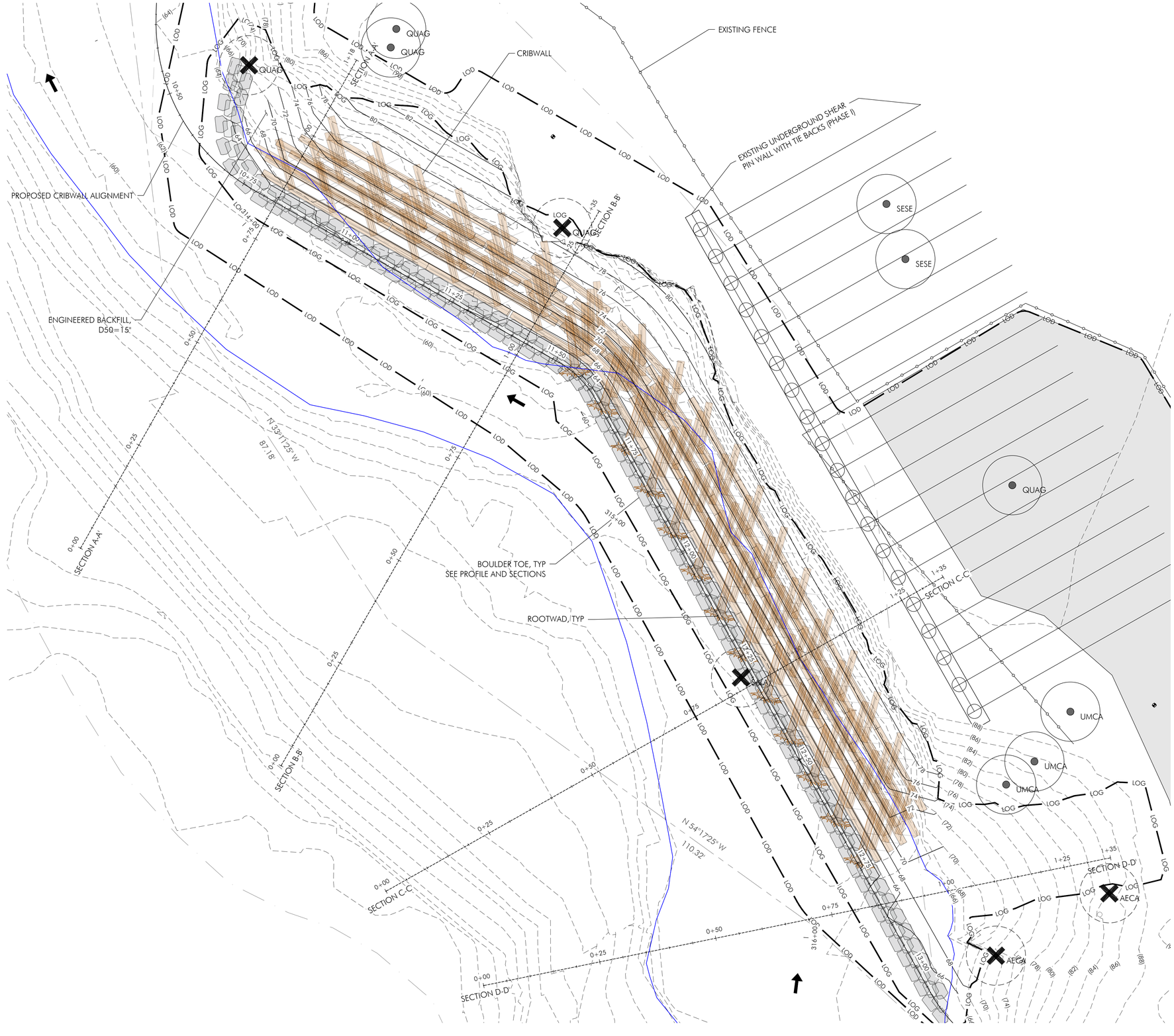
SITE PLAN

Sheet

C-2.0

GRADING LEGEND

SYMBOL	DESCRIPTION
	PROPERTY LINE
(100)	(E) CONTOUR (2 FT)
100	PROPOSED CONTOUR (2 FT)
	STAGING AREA
	FLOW
LOG	LIMIT OF GRADING
LOD	LIMIT OF DISTURBANCE
	ORDINARY HIGH WATER
	EXISTING TREE
	EXISTING TREE TO BE REMOVED



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CREEK BANK STABILIZATION PROJECT - PHASE II

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ORIGINAL DRAWING SIZE: 24 X 36

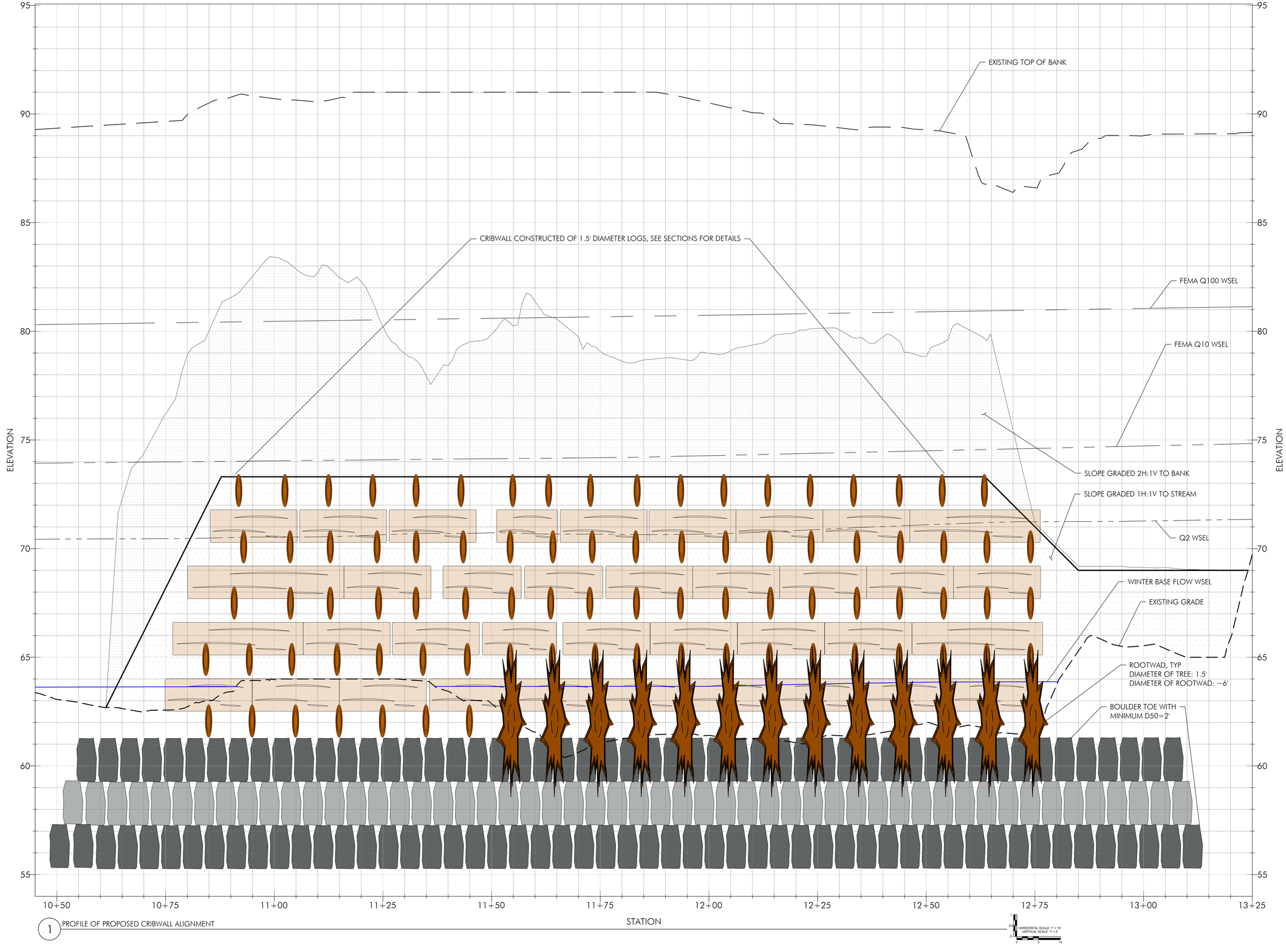
N

0 10
SCALE: 1 " = 10 '

GRADING PLAN

Sheet

C-2.1



1 PROFILE OF PROPOSED CRIBWALL ALIGNMENT

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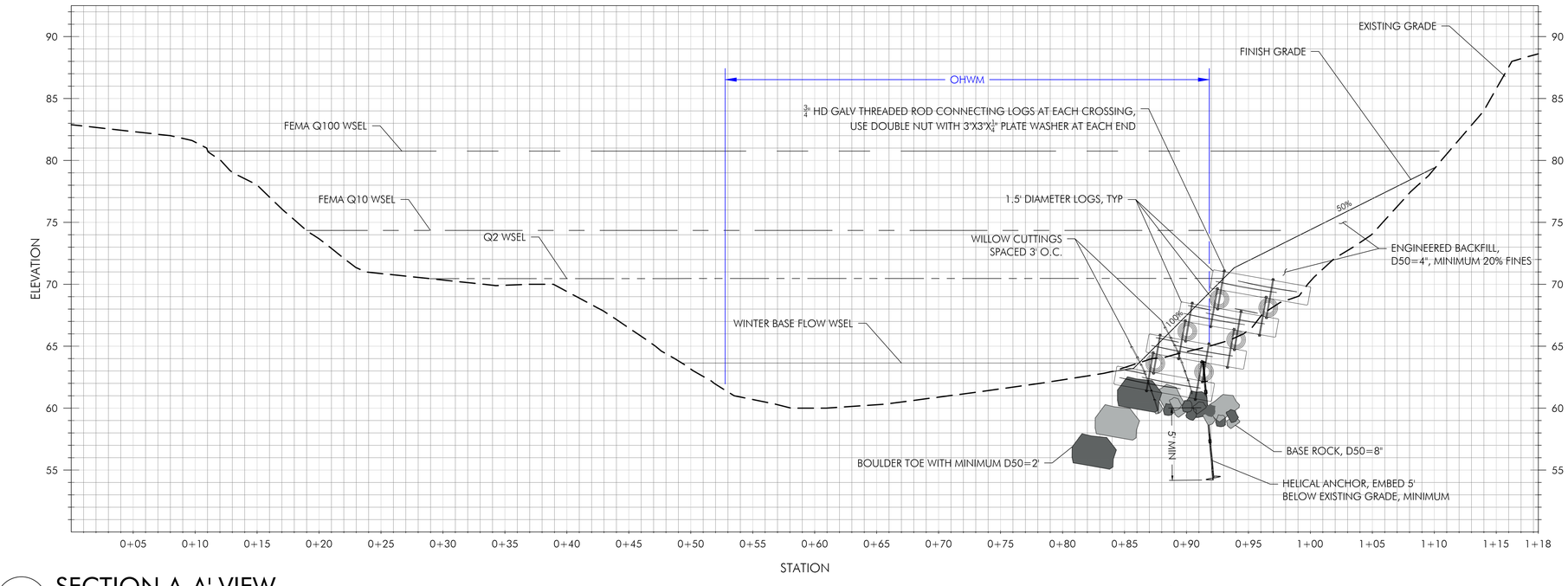
ORIGINAL DRAWING SIZE: 24 X 36

PROFILE

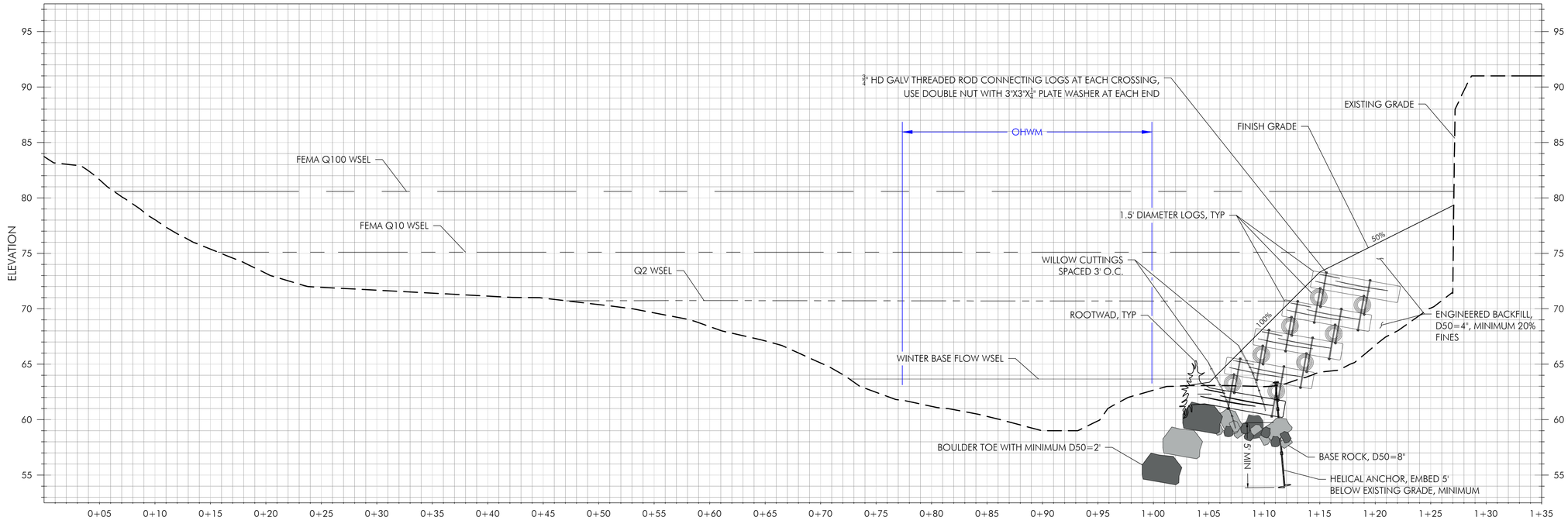
Sheet

C-3.0



1 SECTION A-A' VIEW

HORIZONTAL SCALE: 1" = 5'
VERTICAL SCALE: 1" = 5'



2 SECTION B-B' VIEW

HORIZONTAL SCALE: 1" = 5'
VERTICAL SCALE: 1" = 5'

NOTE: CONNECTIONS SHOWN ARE NOT IN THE SAME VERTICAL PLANE

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CREEK BANK STABILIZATION PROJECT - PHASE II

CHILDREN'S HEALTH COUNCIL
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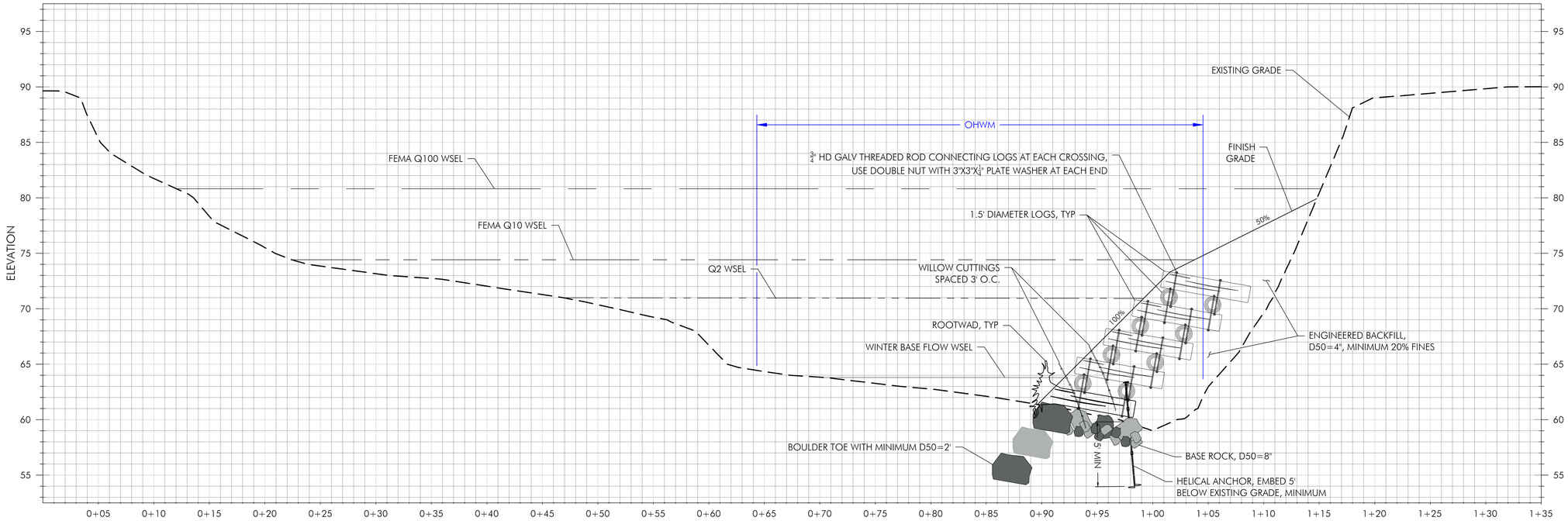
ORIGINAL DRAWING SIZE: 24 X 36

SECTIONS

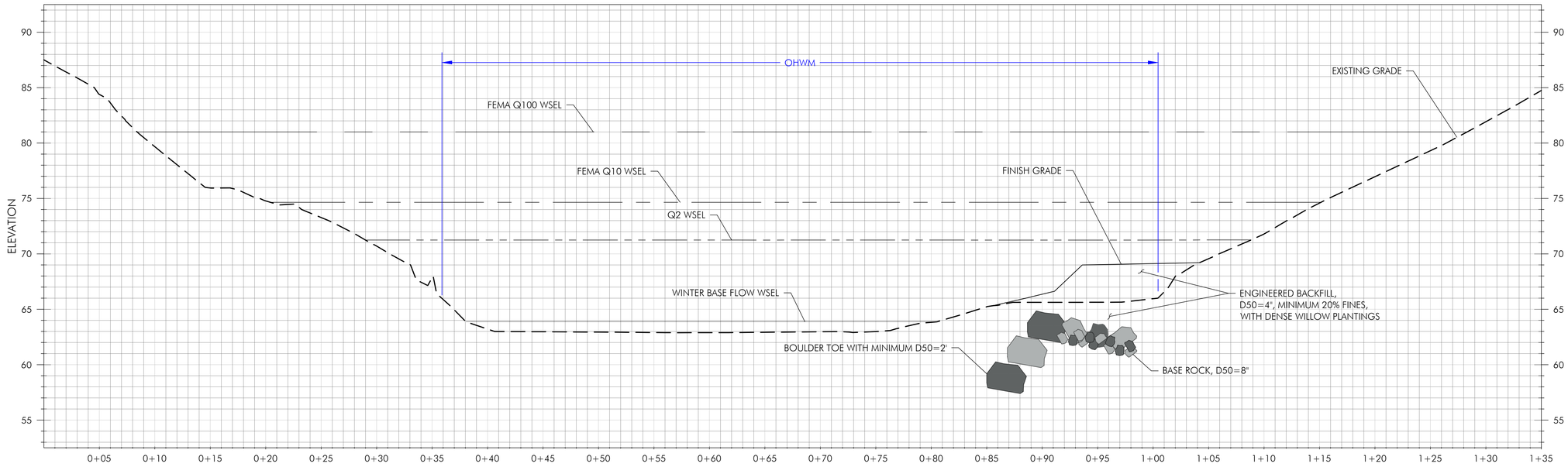
Sheet

C-3.1



C SECTION C-C' VIEW

HORIZONTAL SCALE: 1" = 5'
VERTICAL SCALE: 1" = 5'



D SECTION D-D' VIEW

HORIZONTAL SCALE: 1" = 5'
VERTICAL SCALE: 1" = 5'

NOTE: CONNECTIONS SHOWN ARE NOT IN THE SAME VERTICAL PLANE

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CREEK BANK STABILIZATION PROJECT - PHASE II

CHILDREN'S HEALTH COUNCIL
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CHECKED BY: BSS, RBB
ORIGINAL DRAWING SIZE: 24 X 36

SECTIONS

Sheet

C-3.2

PLANTING LEGEND

SYMBOL	DESCRIPTION
	PROPERTY LINE
(100)	(E) CONTOUR (2 FT)
100	PROPOSED CONTOUR (2 FT)
LOG	LIMIT OF GRADING
	CHANNEL ALIGNMENT
	TREE PROTECTION FENCING
TREE TAG NUMBER / TREE IDENTIFIER	EXISTING TREE
	EXISTING TREE TO BE REMOVED
	PROPOSED RIPARIAN PLANTING AREA 1 (CRIB WALL WITH LIVE WILLOW CUTTINGS)
	PROPOSED RIPARIAN PLANTING AREA 2 (UP TO Q10) — HYDROSEED
	PROPOSED RIPARIAN PLANTING AREA 3 (Q10 TO Q100) — HYDROSEED

TREE IDENTIFIER	BOTANICAL NAME	COMMON NAME
ACDE	ACACIA DEALBATA	SILVER WATTLE
ACMA	ACER MACROPHYLLUM	BIGLEAF MAPLE
AECA	AESCULUS CALIFORNICA	CALIFORNIA BUCKEYE
AIAL	AILANTHUS ALTISSIMA	TREE OF HEAVEN
EUGL	EUCALYPTUS GLOBULUS	BLUE GUM EUCALYPTUS
QUAG	QUERCUS AGRIFOLIA	COAST LIVE OAK
SALA	SALIX LAEVIGATA	RED WILLOW
SANI	SAMBUCUS NIGRA SSP. CAERULEA	BLUE ELDERBERRY
SESE	SEQUOIA SEMPERVIRENS	COAST REDWOOD
UMCA	UMBELLULARIA CALIFORNICA	CALIFORNIA BAY

PLANTING LIST

RIPARIAN AREA 1 (0.02 ACRES)

BOTANICAL NAME	COMMON NAME	SIZE	SPACING (OC FEET)	QUANTITY
SALIX LASIOLEPIS	ARROYO WILLOW	4' POLE CUTTINGS	3	95
SALIX EXIGUA	SANDBAR WILLOW	4' POLE CUTTINGS	3	95

RIPARIAN AREA 2 (0.056 ACRES)

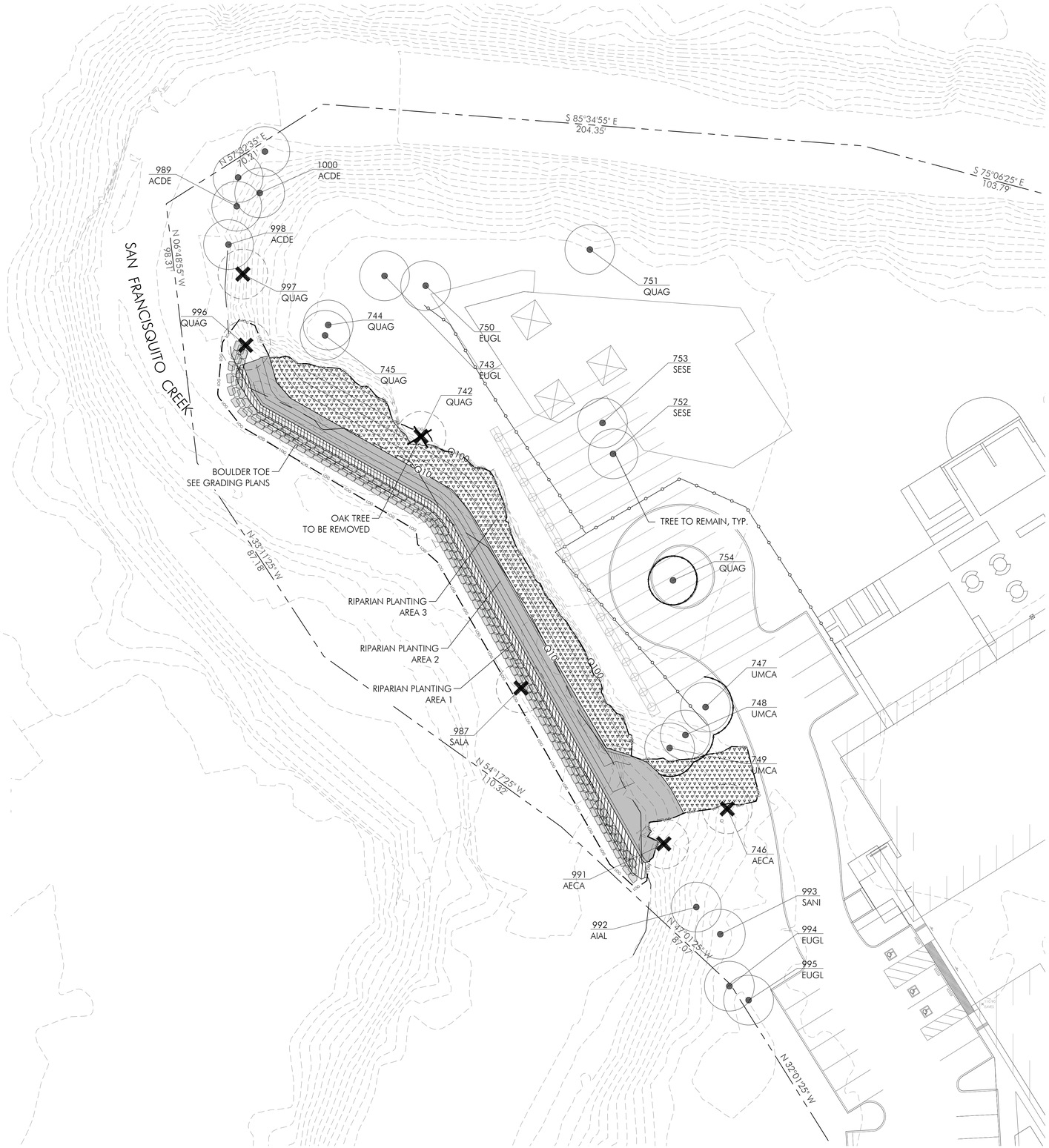
BOTANICAL NAME	COMMON NAME	SIZE	SPACING (OC FEET)	QUANTITY
ALNUS RHOMBIFOLIA	WHITE ALDER	5 GAL	10	8
SALIX LAEVIGATA	RED WILLOW	4' POLE CUTTINGS	3	95
SALIX LASIOLEPIS	ARROY WILLOW	4' POLE CUTTINGS	3	95
SAMBUCUS NIGRA SPP. CAERULIA	BLUE ELDERBERRY	16" DEEPOT	6	16

RIPARIAN AREA 3 (0.07 ACRES)

BOTANICAL NAME	COMMON NAME	SIZE	SPACING (OC FEET)	QUANTITY
AESCULUS CALIFORNICA	CALIFORNIA BUCKEYE	15 GAL	12	5
QUERCUS AGRIFOLIA	COAST LIVE OAK	15 GAL	12	4
ROSA CALIFORNICA	CALIFORNIA WILD ROSE	1 GAL	6	9
RUBUS URSINUS	CALIFORNIA BLACKBERRY	1 GAL	6	11
SYMPHORICARPUS ALBUS	COMMON SNOWBERRY	1 GAL	4	11

HYDROSEED MIX

BOTANICAL NAME	COMMON NAME
ACHELLIA MILLEFOLIUM	YARROW
BROMUS CARINATUS	CALIFORNIA BROME
ELYMUS GLAUCUS	BLUE WILDRYE
FESTUCA CALIFORNICA	CALIFORNIA FESCUE
HORDEUM BRACHYANTHERUM	MEADOW BARLEY
LEYMUS TRITICOIDES	CREEPING WILD RYE
POA SECUNDA	NATIVE PINE BLUEGRASS



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CREEK BANK STABILIZATION PROJECT - PHASE II

CHILDREN'S HEALTH COUNCIL
PALO ALTO, CALIFORNIA

NOT FOR CONSTRUCTION

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N
0 20
SCALE: 1 " = 20 '

PLANTING PLAN

Sheet

C-4.0

EROSION CONTROL LEGEND

SYMBOL	DESCRIPTION
	PROPERTY LINE
(100)	(E) CONTOUR (2 FT)
100	PROPOSED CONTOUR (2 FT)
	STAGING AREA
	FLOW
LOG	LIMIT OF GRADING
LOD	LIMIT OF DISTURBANCE
	EXISTING TREE
	EXISTING TREE TO BE REMOVED
SW	STRAW WATTLE
	COIR FIBER MATTING
	EXISTING CURB

NOTES:

1. CONTRACTOR SHALL COMPLY WITH NPDES CONSTRUCTION GENERAL PERMIT.
2. CONTRACTOR SHALL COMPLY WITH CAL TRANS FIBER ROLL (TYPE 2) STANDARDS. SEE SHEET C-6.1.
3. CONTRACTOR SHALL COMPLY WITH CAL TRANS ROLLED EROSION CONTROL PRODUCTS MODIFIED TO USE WOOD STAKES. SEE SHEET C-6.2.
4. ALL MATERIALS SHALL BE BIODEGRADABLE

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EROSION CONTROL PLAN

Sheet

C-5.0

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CREEK BANK STABILIZATION PROJECT - PHASE II

CHILDREN'S HEALTH COUNCIL
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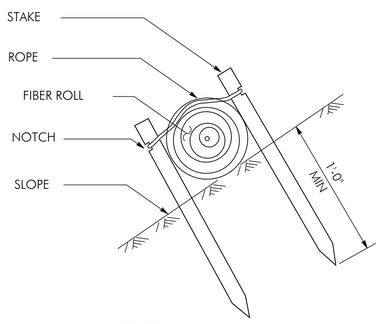

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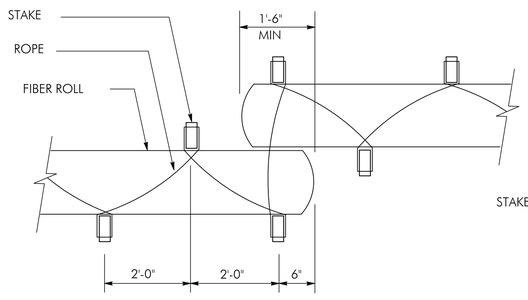
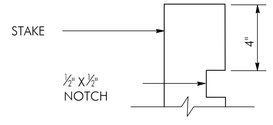


PLAN

FIBER ROLL
(TYPE 2)

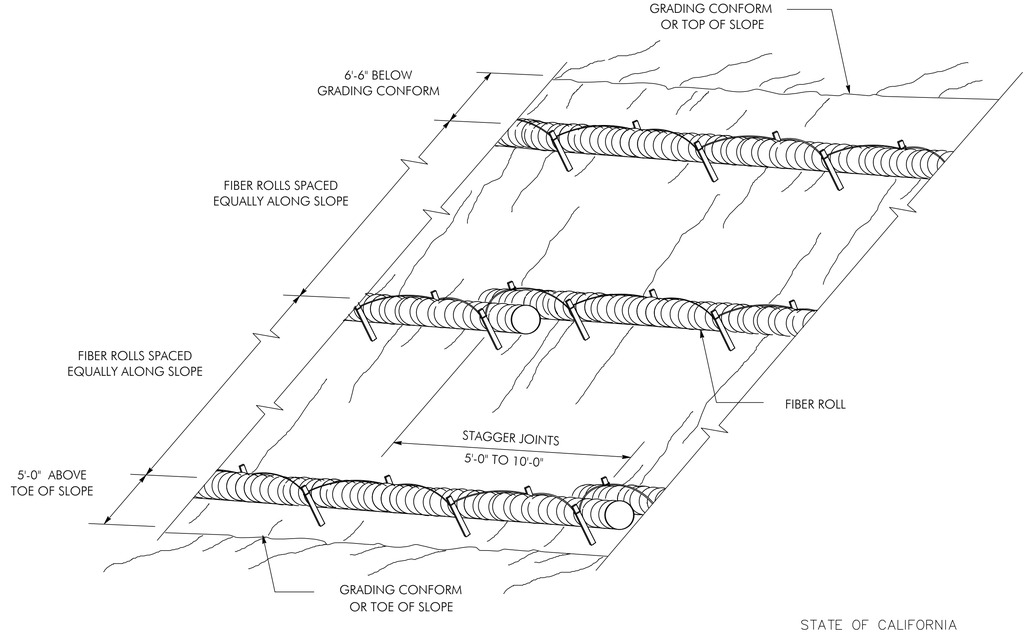


ELEVATION

STAKE NOTCH DETAIL

NOTES:

1. FIBER ROLL SPACING VARIES DEPENDING UPON SLOPE INCLINATION.
2. INSTALLATIONS SHOWN IN THE PERSPECTIVES ARE FOR SLOPE INCLINATION OF 10:1 AND STEEPER.



PERSPECTIVE

FIBER ROLL (TYPE 2)

NOT FOR CONSTRUCTION

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

EROSION CONTROL DETAILS (FIBER ROLL)

NO SCALE

RNSP H51 DATED APRIL 3, 2009 SUPERSEDES NSP H51 DATED DECEMBER 1, 2006
THAT SUPPLEMENTS THE STANDARD PLANS BOOK DATED MAY 2006.

REVISED NEW STANDARD PLAN RNSP H51

EROSION CONTROL DETAILS

Sheet

C-5.1

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CREEK BANK STABILIZATION PROJECT - PHASE II

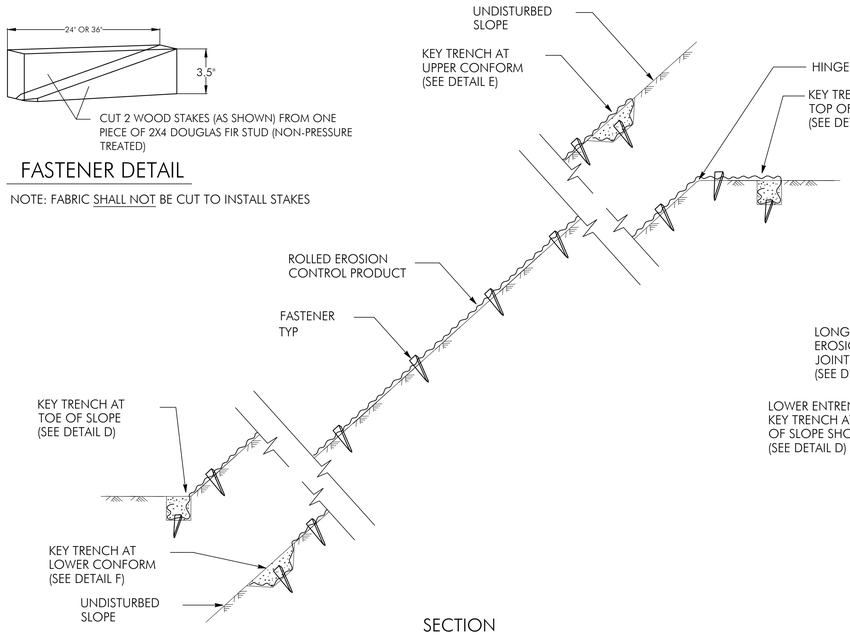
CHILDREN'S HEALTH COUNCIL
PALO ALTO, CALIFORNIA

NOT FOR CONSTRUCTION

CUT 2 WOOD STAKES (AS SHOWN) FROM ONE PIECE OF 2X4 DOUGLAS FIR STUD (NON-PRESSURE TREATED)

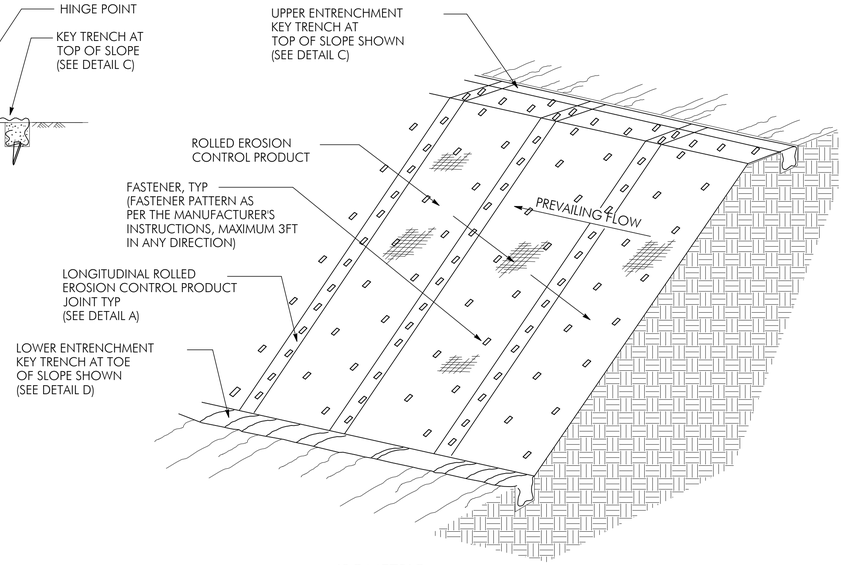
FASTENER DETAIL

NOTE: FABRIC SHALL NOT BE CUT TO INSTALL STAKES



SECTION

ROLLED EROSION CONTROL PRODUCT ON SLOPE WITH VARIOUS KEY ENTRENCHMENTS

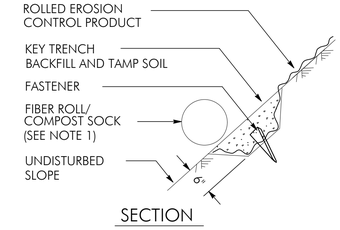


ISOMETRIC

ROLLED EROSION CONTROL PRODUCT ON SLOPE

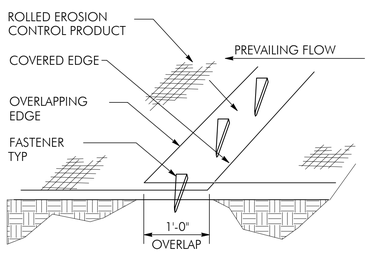
NOTE:

1. FIBER ROLL/COMPOST SOCK SHOWN FOR REFERENCE PURPOSES ONLY.
2. IF TRANSVERSE ROLLED EROSION CONTROL PRODUCT JOINTS ARE REQUIRED ON SLOPES, SEE DETAIL B.



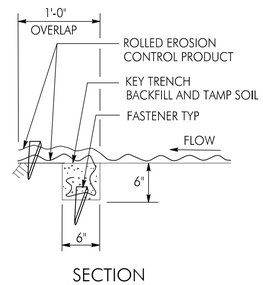
SECTION

DETAIL F
KEY TRENCH AT LOWER CONFORM



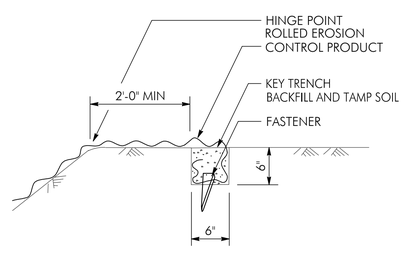
PERSPECTIVE

DETAIL A
LONGITUDINAL ROLLED EROSION CONTROL PRODUCT JOINT



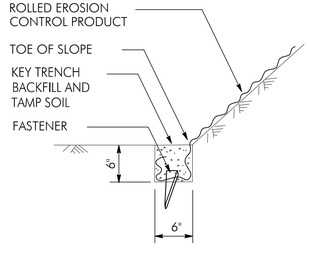
SECTION

DETAIL B
TRANSVERSE ROLLED EROSION CONTROL PRODUCT JOINT



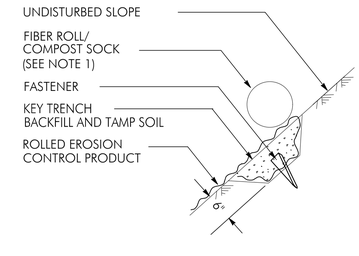
SECTION

DETAIL C
KEY TRENCH AT TOP OF SLOPE



SECTION

DETAIL D
KEY TRENCH AT TOE OF SLOPE



SECTION

DETAIL E
KEY TRENCH AT UPPER CONFORM

NOTE: THIS DRAWING SHEET IS A CAL TRANS DETAIL FOR ROLLED EROSION CONTROL PRODUCT MODIFIED TO USE WOOD STAKE FASTENERS.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

ROLLED EROSION CONTROL PRODUCT

NO SCALE

NSP H53 DATED JUNE 5, 2009 SUPPLEMENTS
THE STANDARD PLANS BOOK DATED MAY 2006.

NEW STANDARD PLAN NSP H53

Date	Issues And Revisions	No.
03/27/19	CONCEPT	
08/19/19	30% DESIGN	

PROJECT #27109
DRAWN BY: ACS
CHECKED BY: BSS, RBB
ORIGINAL DRAWING SIZE: 24 X 36

EROSION CONTROL DETAILS

Sheet

C-5.2

Appendix F

Dewatering Plan

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Memorandum

To: Terry Boyle
Children's Health Council
650 Clark Way
Palo Alto, CA 94304

From: Andrew Smith, Ben Snyder, and Bianca Clarke

Date: December 18, 2019

Subject: Dewatering Plan, San Francisquito Creek Bank Stabilization Project, Palo Alto, California

The primary responsibilities of the dewatering plan are to (1) Provide a safe working area for construction crews and equipment; (2) minimize impacts to the environment such as turbidity for aquatic species and noise for local community; (3) Restore the creek to its original condition prior to de-watering.

WRA, Inc. is proposing a temporary creek bypass/dewatering plan for construction access for the bank stabilization efforts for the Children's Health Center. Prior to the construction of any dewatering structures, fish screens would be installed above the proposed upstream dam location as well as below the downstream dam location. WRA, Inc. would coordinate with the qualified fisheries biologist during the fish relocation activities to avoid conflicts as well as to ensure all fish have been relocated.

A gravity system is proposed to divert the water in the creek by using sandbags, plastic sheeting, and re-usable pipes. A sandbag dam would be placed at the upstream end of the project site approximately around station 316+50. A similar sandbag dam would be placed at the lower end of the Creek, approximately around station 312+00 to prevent any water from re-entering the work area. Plastic sheeting would be used to prevent seepage through the sandbags. The re-usable pipes would be used to drain water from the upstream sandbag dam to the downstream sandbag dam. The pipe size would be appropriate to capture the creek flow rate. We intend to use twelve (12) inch diameter pipes but could potentially reduce that size if the flows decrease at the time of construction. The conceptual layout of the dewatering plan is shown in Figure 1.

Any nuisance water within the site, between the upper dam and lower dam, would be pumped with a submersible pump and hoses into a filtration bag to clean the water. The nuisance water would be pumped up into the brush area so it can dissipate into the ground. Please refer to the attached diagrams for locations of sandbag dams and pipes. All water would be clean and filtered prior to being released back into the creek system. The contractor would dewater the site prior to the start of any construction within the creek.

All pumps would be placed in a containment tray and be fueled away from the creek channel. The pumps would be tied to a tree or stake to avoid movement caused by the vibration.

All dewatering measures and dams shall be removed at the end of the project and the creek shall be restored to its original conditions at the dam locations. The dams would be removed slowly to avoid any erosion or turbidity.

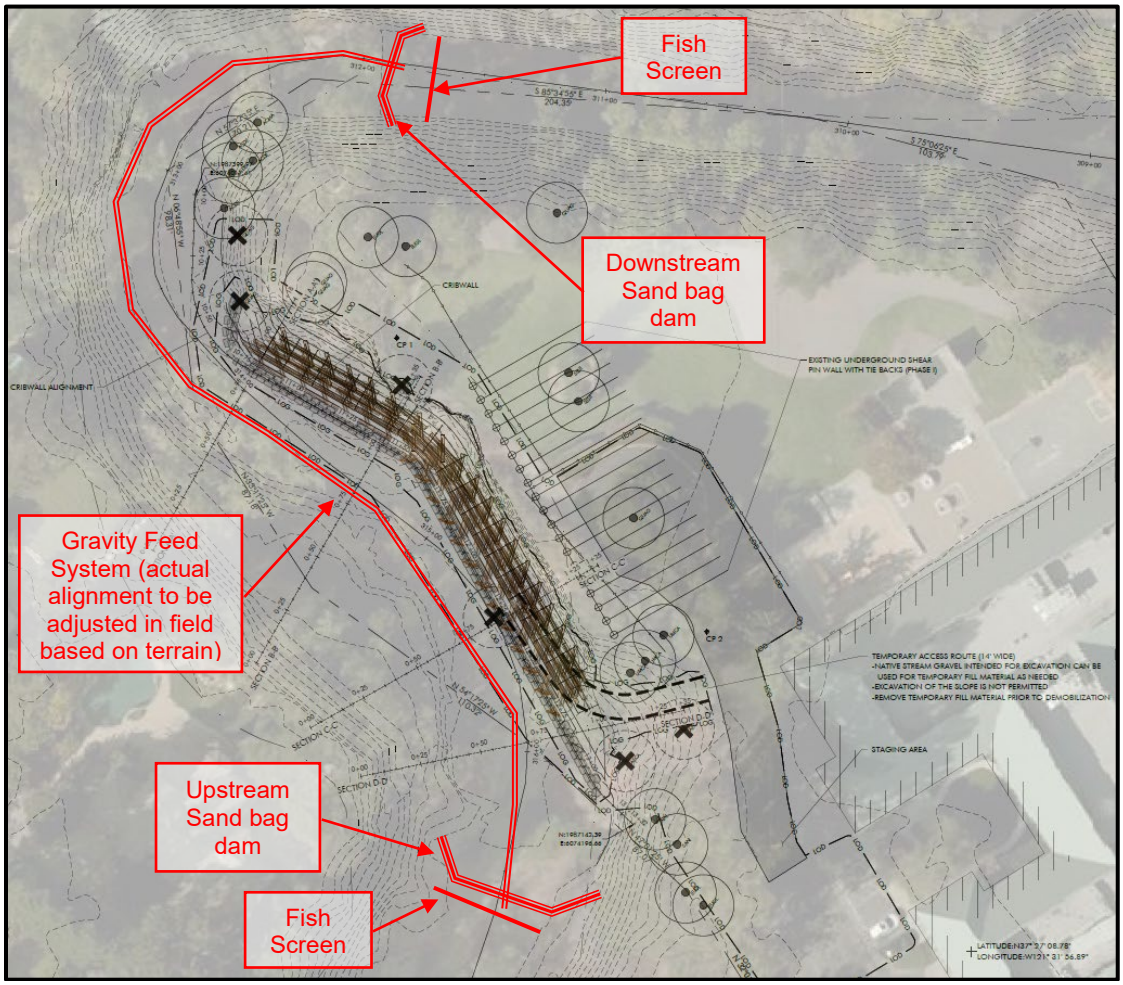

Figure 1: Dewatering Plan

Appendix G

Fish Rescue Plan

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Fish Rescue and Relocation Plan

The purpose of this letter is to outline the procedures and equipment that will be used in the event that fish rescue and relocation operations are required during the dewatering of San Francisquito Creek as part of the CHC Project (Project). The Project will occur on an approximately 275 linear foot section of San Francisquito Creek, located on the border of San Mateo and Santa Clara Counties, California (Project Area). Fish capture and relocation is anticipated to be authorized for federal listed species including steelhead (*Oncorhynchus mykiss*), by the National Marine Fisheries Service (NMFS) Biological Opinion (BO) for the Project. The resumes for Nick Brinton and Stewart DesMeules, the fisheries biologists responsible for leading the capture and relocation effort, are attached with this document (Attachment A). Additional qualified biologists may assist with the capture and relocation effort.

Additional details provided by the contractor on the approach for dewatering have been reviewed prior to drafting this document. Based on the draft dewatering plan, the primary responsibilities of WRA during fish rescue and relocation are to (1) ensure that the Project Area is sufficiently isolated to prevent fish from entering the Project Area before dewatering is initiated (install exclusion nets); (2) complete with the capture and relocation of fish within the Project Area prior to pumping of remnant water; and (3) report the results of the rescue and relocation.

Minimization and Avoidance Measures

Any measures specified in the NMFS BO will be adhered to, the measures below are those from the NMFS Programmatic Biological Opinion for Restoration Projects (WCR-2015-3755) and will be used to guide the methods stated in this plan.

1) The work area boundaries, including access routes, shall be the clearly marked in the field before any work begins and shall be the minimum size required to complete the project.

2) All work will occur between May 1 and October 15 to avoid impacts to migrating salmonids. The seventy-two hour weather forecasts from the National Weather Service shall be consulted prior to starting any phase of the project that may result in sediment run-off to the stream. All associated erosion control measures must be kept on-site and be in place prior to the onset of precipitation.

3) Any work using equipment located within the stream channel shall be performed in isolation from the flowing stream. Cofferdams used to divert water shall be constructed with clean materials that will not themselves cause turbidity. If a work site is to be temporarily dewatered by pumping, intakes shall be completely screened with wire mesh not larger than ¼ inch to prevent fish and amphibians from entering the pump system. Note that this size mesh is specified in the NMFS 1997 criteria for screening when waters do not contain fry life stages.

4) Fish relocation shall be performed by a qualified fisheries biologist. Rescued fish shall be moved to the nearest appropriate site outside of the Project Area with favorable habitat conditions. A record shall be maintained of all fish rescued and moved. The record shall include the date of capture and relocation, the method of capture, the location of the relocation site in relation to the project site, and the number and species of fish captured and relocated.

5) No debris, soil, silt, sand, cement, concrete, or washings thereof, or other construction related materials or wastes, oil or petroleum products or other organic or earthen material shall be allowed to enter into or be placed where it may be washed by rainfall or runoff into waters of the State. When operations are completed, any excess material shall be removed from the work area where such material may be washed into waters of the State.

6) Appropriate BMPs shall be incorporated into the project to minimize the re-suspension and discharge of sediments and other pollutants downstream and to prevent channel or streambank erosion or destabilization once the project has been completed.

Methodology

The following section outlines the methodology that will be employed by the Project during fish rescue and relocation activities. The methodology incorporates the anticipated dewatering approach, WRA's previous experience conducting fish rescue and relocation activities, and input from Project Permits. Any fish rescue shall occur in advance of dewatering in case multiple days are required for the relocation effort.

Relocation Sites

Prior to the start of dewatering and fish salvage operations; the qualified biologist will identify a suitable downstream relocation site within the same stream as the Project Area to release collected fish. The relocation site will have suitable flow, depth, and cover to allow fish relocated to the area to recover and freely move away as desired. The relocation site will be far enough away from the Project Area to limit the potential for additional disturbance to the individuals associated with restoration activities. More than one relocation site may be used if a large number of fish are collected within the Project Area, in order to reduce disturbance and crowding of fish currently occupying the selected habitat. The site selection and distance from the Project Area will be based on professional judgment of the fisheries biologists, site conditions and access at the time of the relocation.

If a relocation site is not available immediately downstream of the Project Area either due to dry conditions or private property restrictions, steelhead will be relocated to the perennial pool just below the Searsville Dam. The Searsville Dam and property immediately downstream is owned by Stanford (who also owns the property where the Project is located) and would provide a suitable relocation site for steelhead if none are available downstream.

Fish Exclusion

Once a suitable relocation site has been determined, the process of installing the block nets or screens will commence. Block nets or screens with 1/8 to 1/4 inch mesh will be deployed across the creek as the upstream and downstream fish exclusion barriers. Any nets or screens shall

span both the width of the wetted channel as well as the entire depth of the water column. Additionally, nets or screens will stand at least 1 foot above the water, and will be secured at the bottom (e.g. cobble may be added to the lower edge to prevent passage beneath). This will prevent fish from being able to jump over, or pass beneath the exclusion barriers. Nets or screens will most likely be supported by t-posts driven by hand into the bed of the creek. Any exclusion materials will be removed at the end of the Project.

General Equipment and Procedure for Capture

Following the placement of the block nets, fish capture and relocation shall begin. Due to the variety of habitat features within the Project Area it is anticipated that electrofishing will be the main method of collection. Electrofishing parameters will follow the NOAA Guidelines for Electrofishing Waters Containing Salmonids Listed under the Endangered Species Act. At least one netter or fish transfer personnel will accompany the biologist running the elctrofisher to capture fish and transfer/monitor captured fish recovery. Equipment used by the crew would likely include one electrofisher, long handled dip nets with soft nylon mesh, as well as aquarium nets. If seining is used at any time, seine nets will be made of similar 1/8 to 1/4 inch soft knotless nylon mesh and will range in size from 4 feet to 20 feet in length, by 4 feet tall.

Collected fish will be temporarily held in buckets before being placed in specially designed relocation coolers. This will allow any excess sediment to be washed off the fish before placing them in the coolers and it will allow biologists to monitor recovery of each fish before being placed in the cooler. Relocation coolers are designed to hold and transport special-status species that require maintained cool and well-oxygenated water; and have been used to safely hold various salmonids including steelhead as well as other native species such as Sacramento splittail (*Pogonichthys macrolepidotus*), and tidewater goby (*Eucyclogobius newberryi*). Water temperature within the coolers will be monitored, and two aerators capable of aerating 10-15 gallons of water each will be used per cooler (each cooler has a capacity of approximately 10 gallons).

If water temperature within coolers exceeds a 2 °C change over the ambient stream temperature, all fish will be released and relocation activities will halt for the day. Because work is scheduled to occur during the summer and fall, relocation activities will be scheduled to occur in the early morning when temperatures are most favorable and stress on fish is minimized.

Dewatering

Once all fish have been collected or when collection efforts are no longer effective, the biologist may declare the Project Area sufficiently cleared to begin the dewatering process. Dewatering will follow the contractor provided dewatering plan, but is generally anticipated to begin with installation of the upstream cofferdam, and bypass pipe(s), followed by the downstream cofferdam. Once the upstream cofferdam is in place, it is anticipated that the site will almost entirely dewater naturally, as pools in the Project Area are limited. However, it is likely that some small pools of water may remain within the Project Area and would require further dewatering. During this process, the biologist will monitor the dewatering and will collect any fish which may have been hidden under cover but are now exposed. If any remaining pools need to be dewatered with the aid of pumps, small portable pumps may be used (size estimate for pumps would be ¾ - 1 ½ inches diameter). Any pumps used in-channel for this phase of dewatering will be sufficiently screened to prevent entrainment of fish. When the biologist is confident that no special-status fish remain within the Project Area, the remaining water will be allowed to be pumped from the

site and the rescue will be considered complete.

Processing

Holding time will be minimized, and releases will be conducted as necessary to limit unnecessary stress from overcrowding or temperature fluctuations in the coolers. Any steelhead encountered will be placed in separate coolers, and segregated by size to minimize opportunities for predation. Water temperature, dissolved oxygen, and salinity will be taken at the predetermined release locations, and compared to conditions within the coolers. Fish will be suitably acclimated during the release procedure to limit shock. Data on species encountered, relative size will be estimated by age class, total number, and release times will be collected.

Decontamination

Prior to any work on the Project, and following completion, all equipment used within the Project Area will be sufficiently cleaned and decontaminated to prevent the spread of invasive species. WRA uses HDQ Neutral, a generic formulation of Quat-256 for decontamination to minimize the potential for spread of disease or invasive species. After decontamination, all equipment will be allowed to air dry prior to use elsewhere.

Mortality Procedures

In the event that a dead or fatally wounded steelhead is encountered, it will be collected in a zip-lock bag, and will be frozen as soon as possible. Alternatively, the carcass may be preserved in 200 proof ethanol. Any carcasses will be retained by the biologist and made available to NMFS upon completion of the relocation.

Reporting

After completing the fish rescue and relocation, a brief summary report will be prepared and submitted to NMFS. The report will, at minimum contain the following information:

- dates when the relocation occurred,
- personnel conducting the relocation,
- methods used including electrofisher settings,
- location of the relocation site(s),
- ambient conditions at the time in the Project Area, at the relocation sites, and in coolers during holding,
- number of each species collected as well as approximate age class, and
- an estimate of survival and mortality.
- Photographs of the work area and operations will also be included.

ENVIRONMENTAL CONSULTANTS

Attachment A: Fisheries Biologist Resumes

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Nicholas Brinton
Associate &
Fisheries Biologist
brinton@wra-ca.com
o: 415.524.7248
c: 909.275.2358
Years of Experience: 7

Education
BS Wildlife, Fish and Conservation Biology, UC Davis, 2012

Technical Training:
Cal-Nevada AFS Fish Passage and Screening Criteria Workshop Sacramento, California, 2015.

BCM Bat Survey Techniques. Portal Arizona. 2016

Smith-Root Electrofishing Principals and Safety Certification 2019

Mine Safety and Health Administration Part 46 Certified Surface Miner

Professional Affiliations/ Certifications

Member: American Fisheries Society

Nick earned his undergraduate degree in Wildlife, Fish and Conservation Biology from the University of California, Davis. Prior to coming to work with WRA, Nick worked in a variety of locations from the Sierra Nevada Mountains and the Central Valley of California gaining an array of experience with various California fish and amphibian species.

With WRA, Nick performs a variety of specialized permitting tasks leading Section 7 and Section 10 consultation with federal agencies, as well as Section 2081 and 1602 permitting with the state. He also performs protocol level surveys, fish passage assessments, as well as habitat and water quality assessments. He has specialized in fisheries related issues and has performed fish rescues on numerous state and federal listed species including steelhead and Coho salmon. He is certified to operate electrofishing equipment, and leads electrofishing efforts for WRAs fisheries projects. In addition, Nick has gained a wide array of experience with California tiger salamander and California red-legged frog. He acts as a project manager for numerous projects with special-status amphibians and has lead relocation efforts as well as trained staff to perform species specific procedures for surveys and relocation.

Representative Projects

Fisheries

Mare Island Ship Yard Dry Dock Fish Salvage, Vallejo, California, 2014-Present
Both government and private ships needing repair are brought to the dry docks at the former Mare Island Naval Shipyard. In accordance with permit requirements by the USFWS, NMFS, and CDFW, biologists are required to be present during final stages of dewatering to salvage (rescue) stranded fish from the dry dock. Captured fish are placed in aerated holding coolers, identified to species, enumerated and measured before being returned to the Mare Island Channel of the Napa River. Nick is the lead fisheries biologist for this operation. His primary responsibility for this project is in leading and overseeing field crews that conduct the salvage operations. He also coordinates with resource agency personnel ensuring permit compliance, and writes technical reports following each salvage event. He is authorized to handle and relocate longfin smelt, Delta smelt, steelhead, winter and spring-run Chinook salmon as well as green sturgeon at this site. To date he has performed more than 125 salvages at this site. This project is ongoing.

East Russian Gulch Fish Passage Restoration Project, Sonoma County, California, 2019
WRA worked with The Wildlands Conservancy to help implement a fish rescue and relocation prior to the start of restoration work to remove two fish passage barriers on East Russian Gulch Creek, which prevented the upstream migration of returning adult steelhead. In a remote setting, WRA lead the two-day operation to rescue steelhead from approximately 300 feet of stream before the start of restoration work. During the two-day effort, WRA biologists relocated nearly 50 steelhead and more than 30 California giant salamanders. Nick acted as both the project manager, and lead biologist for

a team of biologists to conduct the work. Due to the extreme habitat complexity, methods primarily relied on electrofishing. The project was completed on time, and within all stated parameters of the biological opinion.

National Park Service Electrofishing Surveys, Muir Woods, Mill Valley California, 2019
As part of the monitoring efforts within the National Park system, NPS fisheries crews annually sample Redwood Creek within Muir Woods in order to monitor the population of Central California Coast steelhead and Central California Coast Coho salmon which occur in the creek. Nick assisted with the electrofishing survey in 2019 which resulted in the capture and handling of both Coho and steelhead.

Olema-Bolinas Road Flood Control Project, Marin County, California, 2017 - 2019
WRA works with Marin County to help implement various projects when projects are likely to encounter protected species and special approval is needed to help relocate or capture those species. At mile marker 0.18 a box culvert funnels Lewis Gulch beneath Olema-Bolinas Road and out to Bolinas Lagoon. In 2017, and 2019 storms caused severe flooding of the area and plugged the culvert with sediment. Prior to the rainy season in 2018 and 2020, the County sought to perform maintenance to remedy flooding issues. Nick was approved by NMFS to perform the fish relocation activities, and by the USFWS to perform California red-legged frog preconstruction surveys and relocations as outlined in the project Biological Opinions. Using seine and dip nets, Nick, with the assistance of Kallie Kull from Marin County, captured and successfully relocated nearly 30 steelhead between these two efforts, as well as numerous California red-legged frogs. All of the captured fish and amphibians were successfully relocated. No mortality was observed and the project finished on schedule.

Lower Miller Creek Channel Maintenance, San Rafael, California, 2016-2019
The Las Gallinas Valley Sanitary district regularly removes accumulated sediments from the channel within Lower Miller Creek. As part of the project mitigation efforts, a fish salvage is required in order to salvage and relocate any native fish in the proposed work area which stretches approximately ½ mile in length. Nick was approved as the lead fisheries biologist for the project and has organized, executed and reported all of the associated salvage work on Lower Miller Creek for the last three years. All work was conducted in accordance with project permits and the project is now completed.

San Geronimo Creek Flood Control and Habitat Restoration Project, Marin County, California, 2019
WRA worked with The Marin resource Conservation District (MRCD) to help implement a fish rescue and relocation prior to the start of restoration work. The goal of the Project was to enhance fish cover through a reach of San Geronimo Creek with the addition of large woody debris. WRA lead the three-day operation to rescue steelhead and Coho salmon from approximately 400 feet of stream before the start of restoration work. During the effort, WRA biologists relocated approximately 350 steelhead and 50 Coho salmon, primarily through electrofishing. Nick acted as both the project manager, and oversaw the project while biologist Stewart DesMeules was charged with conducting the rescue work. The project was completed on time, and within all stated parameters of the biological opinion.

Napa County Resource Conservation District, Rotary Screw Trap, Napa County, California, 2018-2019
The Napa County Resource Conservation District (NRCD) is an organization that promotes watershed-based stewardship of natural resources throughout the greater Napa County area. NRCD monitors Central California Coast Distinct Population Segment steelhead and fall-run Chinook salmon populations by collecting data on the number of fish migrating to the ocean each year through the operation of a rotary screw trap on the Napa River. The trap is typically operated February through May, and WRA involvement with the trap involves identifying the species and numerating the captured fish. For target species, such as lamprey and salmonids, additional biological information is collected which involves measuring the species length, weigh, and collecting genetic samples through fin clips. In addition, steelhead are pit-tagged to track the potential return of adult animals. Nick was approved by

NMFS and CDFW to act as a lead biologist on the project. Over the course of this project Nick handled several dozen steelhead, hundreds of Chinook salmon, and several thousand lamprey.

Novato Creek Maintenance and Sediment Removal, San Rafael, California, 2014 - Present
The Marin County Flood Control District conducts regular maintenance within the lower portions of Novato Creek as well as within Warner and Arroyo Avichi Creeks. Before work can begin a fisheries biologist must clear each reach to assure that steelhead are not present. Nick lead a team of volunteers who systematically cleared and relocated any native or special-status fish encountered in the creeks. During the salvage work, multiple *Oncorhynchus mykiss* were encountered and successfully relocated without injury.

Lucas Valley Bridge Emergency Repair, San Rafael, California, 2018
Following winter storms in November 2017, erosion at the Lucas Valley Road Bridge required emergency repairs in order to maintain functionality of the bridge. WRA was contracted to salvage and relocate steelhead from Miller Creek before emergency repair operations could begin. Nick led the team of fisheries biologists and county volunteers for this project, successfully relocating 47 steelhead. No mortality was documented among steelhead and the project was completed on time. Methodology used for this project relied primarily on electrofishing.

Westside Basin, Santa Clara, California, 2017
The City of Santa Clara sought to dredge a stormwater retention basin within city limits to bring it back to full operational capacity. A streambed alteration agreement was required for the project and as part of the measures stipulated in the SAA, a fish rescue plan and field effort was required. Nick wrote the fish rescue plan, as well as the invasive species removal plan for the project, both of which were approved by CDFW. During the field effort Nick led the weeklong effort and designed a special fyke trap to catch fish within the basin when traditional means were not feasible. Nearly 1,000 fish composed of common carp, bluegill, largemouth bass and goldfish were encountered. No native fish were encountered during the fish salvage and all non-native fish were euthanized and disposed of in accordance with CDFW's permit requirements. This project has been completed.

San Geronimo Creek Fish Passage and Habitat Improvement Project, San Rafael, California, 2016
As part of a fisheries restoration grant, this project sought to eliminate a major fish passage barrier and enhance fish habitat by using large woody debris. As part of the restoration effort, a fish rescue and relocation was required in order to capture and relocate Coho salmon and steelhead within or immediately downstream of the work area. Under the supervision of a CDFW biologist, Nick assisted with the fish rescue effort which successfully relocated over 400 Coho salmon and steelhead. Methods for rescue and relocation primarily relied upon electroshocking.

Napa Dry Bypass, Napa, California, 2014
The Napa Dry Bypass is part of a series of flood control projects headed by the Army corps of Engineers designed to divert 100 year flows around the oxbow reach of the Napa River to avoid flooding the Soscol Gateway area in downtown Napa. Nick was approved as a lead fisheries biologist on this project and conducted multiple fish salvage operations for longfin smelt, and steelhead. Nick also assisted in otter trawl surveys and fish exclusion work which were required during pile driving operations. He has also been involved with this project by monitoring compliance and construction activities including monitoring during the use of an impact hammer for pile driving. In addition, he assisted in the design and implementation of the environmental awareness training program to comply with various permit conditions.

Healdsburg Veterans Memorial Dam Spillway Repair, Healdsburg, California, 2014
The Healdsburg Veterans Memorial Dam is a flashboard dam located within the city of Healdsburg on the Russian River. The dam is installed seasonally to create a temporary recreational lake. For this project, Nick was approved as the lead fisheries biologist, and biological monitor. He conducted pre-construction surveys for breeding birds as well as Pacific pond turtle. Turtles were identified near to the project area. As the lead fisheries biologist he lead

a team of biologists who performed multiple fish salvages within the project area following de-watering events. All steelhead encountered during the salvages were successfully relocated. He conducted pre-construction checks, environmental trainings, and water quality monitoring throughout the course of the project. The project was completed in compliance with permits conditions.

US Forest Service, Tahoe National Forest, 2013
The Tahoe National Forest covers over one million acres and is home to 23 species of fish. Nick worked as a fisheries technician performing more than 200 hours of electrofishing and seine surveys throughout the forest for both population trend analysis, and range expansion surveys. He has handled several thousand fish during this project including: Lahontan cutthroat trout, rainbow trout, and brown trout. As part of this project he performed surveys on two watersheds to using the US Forest Service Basinwide Survey protocol to map, classify and measure current habitat conditions. He also performed habitat assessment surveys in those same watersheds for Sierra mountain yellow-legged frog and successfully identified adults, sub-adults and larval forms of the species.

Slinkard Creek, Walker, California, 2012
Slinkard Creek is a tributary of the West Walker River and is located within the state wildlife refuge of Slinkard Valley. It contains one of the few remaining populations of federally threatened Lahontan cutthroat trout (LCT) as well as a large population of non-native brook trout. In cooperation with CDFW, Nick was contracted by California Trout to facilitate the removal of brook trout from Slinkard Creek to enhance conditions for LCT. Nick designed a series of portable Alaskan weirs to divide Slinkard Creek into reaches which were then systematically cleared of all fish using a backpack electrofisher. LCT were retained in the creek, and allowed to repopulate reaches once all brook trout were removed. Nick logged approximately 80 hours of time using a backpack electrofisher on this project while electroshocking, and capturing over 300 LCT. Mortality among LCT was exceptionally low (<1 percent) and approximately 1 kilometer of creek was restored during the season which he worked on this project.

UC Davis, Fangue Laboratory, Davis California, 2011-2012
Research in the Fangue lab focused on understanding the physiological specializations that allow animals to survive in complex environments. As part of his work with the laboratory, Nick conducted experiments to assess the physiological responses to conditions such as critical thermal, stimuli aversion and entrainment of native fishes. The fish used in such experiments were cared for in a hatchery that he helped to maintain and construct additions to. Species cared for included: northern DPS green sturgeon, fall-run Chinook salmon, hardhead and Sacramento splittail.

Fisheries (Observation/Monitoring)

Bon Air Bridge Rehabilitation, Larkspur, California
Bon Air Bridge spans Corte Madera Creek, providing an important link between Magnolia Avenue, Larkspur's main street, and the northeast side of the city. The bridge will be replaced by a new bridge, correcting structural deficiencies to provide a stable and safe structure. Nick was approved by NMFS to act as the lead biologist for fish exclusion operations. Additionally he has lead the fisheries observation compliance monitoring during pile driving operations. As part of his duties he has trained and overseen numerous observers on marine mammal and fisheries observing practices. This project is ongoing.

Frenchman's Creek Water District, San Mateo County
Frenchman's Creek Water District (FCWD) is a small water service provider located north of Half Moon Bay along coastal San Mateo County. A CDFW 1602 permit allows for the temporary installation of a flashboard dam and water withdrawal from the system for agricultural purposes. Nick serves as a fisheries biologist for this project, which involves monitoring flow, water quality sampling, as well as habitat connectivity and condition for steelhead

during the diversion period. He also assists with permit compliance, and annual reporting. This project is currently ongoing.

Red Rocks Warehouse Creosote Removal and Pacific Herring Habitat Restoration Project, Richmond, California

WRA helped to prepare plans for monitoring light availability and turbidity to protect local eelgrass beds during the removal of creosote pilings and other anthropomorphic materials from the dilapidated Red Rocks Warehouse facility. Nick assisted in conducting a light and turbidity monitoring studies following National Marine Fisheries Service (NMFS) protocols. The project used a WRA vessel to deploy light monitoring loggers and collect turbidity samples during work to assure that pile removal operations were not impacting nearby eelgrass beds. Nick was also and approved to monitor for Pacific herring, and performed surveys in compliance with construction permits.

Port of Oakland Maintenance Dredging, Oakland, California

Maintenance dredging of the Port of Oakland Inner and Outer Harbor Channels was necessary to maintain passageways for the active port. Pacific herring is a protected commercial fishery, and dredging operations within the Pacific herring spawning season were unavoidable and required observers to assure operations did not occur during spawning events. Nick was a CDFW approved observer for the Project. No spawn events or Pacific herring activity was noted during dredge activities. All Project activities were completed in compliance with the Project's Pacific Herring Work Window Waiver.

Port of Richmond Inner Harbor Maintenance Dredging, Richmond, California

Maintenance dredging for the Port of Richmond was conducted in the winter of 2014 to maintain passageways for heavy ships entering and exiting the port. Pacific herring is a protected fishery, and dredging operations within the harbor overlapped with the Pacific herring spawning season. Nick acted as an approved CDFW observer for the Project. During operations, two spawning events occurred within or adjacent to the Project Area. Nick observed the spawning events aided crews with required procedures to maintain compliance and avoid impacts to the spawn. All Project activities were completed in compliance with the Project's Pacific Herring Work Window Waiver.

STEWART DESMEULES
Fisheries Biologist
desmeules@wra-ca.com
o: 415.454.8868 x2040
c: 207.380.6138

Years of Experience: 7

Education
B.A. Biology, Wheaton College, 2010

Professional Affiliations/ Certifications
Commercial Unmanned Aerial Vehicle (UAV) Pilot with Part 107 License

American Fisheries Society

NMFS Certified Commercial Fisheries/ Marine Mammal Observer

Specialized Training
Cal-Neva AFS / TWS: Tidewater Goby Management & Ecology Workshop

TWS Environmental DNA: A Practical Workshop

TWS Drone Regulation and Technology: A Workshop for Biologists

NMFS Northeast Fisheries Observer Program Trained

Special Recognitions/ Publications
Poster Presentation: Fisheries Observer Retention Strategies presented at the International Fisheries Observing and Monitoring Conference 2016

Co-author: American Eel potting presentation: American Fisheries Society Conference 2014

Stewart DesMeules holds a B.A. in Biology from Wheaton College in Massachusetts. Prior to joining WRA, Stewart worked with the National Oceanic and Atmospheric Administration (NOAA) Fisheries Observer Program on the East Coast. During his time with WRA, Stewart has managed and worked on a diversity of fisheries and wildlife related projects including permitting, endangered species consultation, protected species surveys, mitigation and conservation banking, habitat evaluation, assessments, and species sampling.

Stewart has experience with environmental permitting including Endangered Species Act Section 7 and Essential Fish Habitat consultation, California Department of Fish and Wildlife (CDFW) Streambed Alteration Agreements, CDFW Incidental Take Permits (2081), and biological resource assessments prepared for the California Environmental Quality Act (CEQA). Stewart performs a variety of specialized tasks, including biological monitoring, amphibian surveys, fish relocation, electrofishing, fish passage evaluation, construction monitoring, and redd and carcass spawner surveys. He holds a FAA Remote Pilot License, and has logged over 70 hours in flights. In addition, he has experience monitoring for Pacific herring spawning activity, and marine mammal observing.

Representative Projects

Napa County Resource Conservation District, Rotary Screw Trap, Napa County, California

The Napa County Resource Conservation District (NRCD) is an organization that promotes watershed-based stewardship of natural resources throughout the greater Napa County area. NRCD monitors Central California Coast Distinct Population Segment steelhead and fall-run Chinook salmon populations by collecting data on the number of fish migrating to the ocean each year through the operation of a rotary screw trap on the Napa River. The trap is typically operated February through May, and WRA involvement with the trap involves identifying the species and numerating the captured fish. For target species, such as lamprey and salmonids, additional biological information is collected which involves measuring the species length, weigh, and collecting genetic samples through fin clips. In addition, steelhead are pit-tagged to track the potential return of adult animals. Stewart was approved by NMFS and CDFW to act as a lead biologist on the project. Over the course of this project Stewart handled dozens of steelhead, hundreds of Chinook salmon, and several thousand lamprey in addition to many other native and non-native species.

Redd and Carcass Spawning Survey Work, Pt. Reyes Station, California

Stewart worked with the National Park Service staff to complete redd and carcass spawning surveys for Coho salmon in Pt. Reyes National Seashore. Work involved traversing sections of creek monitoring for Coho salmon and other salmonids. Encountered reds were measured and marked with GPS after being evaluated for condition. Encountered Coho salmon carcasses were sampled for otoliths and DNA. Live fish had their locations marked with GPS and were visually measured. In addition, water quality measurements and depths were taken incrementally over the survey area. Survey work is ongoing.

Mare Island Ship Yard Dry Dock Fish Salvage, Vallejo, California
Government, commercial, and private ships needing repair are brought to the dry docks at the former Mare Island Naval Shipyard. In accordance with permit requirements of USFWS, National Marine Fisheries Service (NMFS), and CDFW, biologists are required to be present during final stages of dewatering to rescue stranded fish from the dry dock. Captured fish are placed in aerated holding coolers, identified to species, counted, and measured before being returned to the Mare Island Channel of the Napa River. Stewart leads this operation, compiles data from fish salvages and writes technical reports following each salvage event. He is authorized to handle and relocate longfin smelt, Delta smelt, steelhead, fall, late-fall, winter and spring-run Chinook salmon as well as green sturgeon at this site. He is also assisting with preparation of renewal of NMFS and USFWS permits for the project. This project is ongoing.

Butte Sink Mitigation Bank, Colusa County, California, 2019
The Butte Sink Mitigation Bank is an approximately 350-acre mix of agriculture and riparian habitat in Colusa County, California. The site is located along the western bank of Butte Creek and at the terminus of the Colusa Bypass, which diverts high flows from the Sacramento River into the site. The project is designed to create, restore, and preserve a mix of riparian, wetland, and off channel floodplain habitat. Target species for the bank include a mix of protected salmonid species that occur in Sacramento River and Butte Creek, including protected spring and winter-run Chinook salmon, and steelhead. WRA is leading the effort to develop the conservation bank, which includes concept design, baseline biological surveys, habitat evaluation, prospectus development, and permitting. Stewart has assisted in biological surveys on the site, installation of hydrological data loggers, as well as providing technical fisheries support for various aspects of the permitting and habitat evaluation process. He has also conducted drone flights of the property to aid in hydrological analysis.

Santa Clara River Habitat Restoration, Los Angeles County, California
Stewart assisted with a fisheries restoration project including a feasibility study and conceptual design development for the restoration of fish habitat at a confidential location along the Santa Clara River. Habitat for Santa Ana sucker, unarmored threespine stickleback, and Arroyo chub were assessed as part of this project, and Stewart worked with hydrologists to recommend habitat restoration measures. His work included a habitat assessment, and report preparation. This project is ongoing.

Refinery Marine Terminal Ridgway's Rail Surveys, Martinez, California
Stewart has performed biological monitoring for a well installation project at a refinery marine terminal on Suisun Bay. The primary special-status species of concern for the project are the federal endangered California Ridgway's Rail and Salt-marsh Harvest Mouse. Stewart conducted protocol level surveys for California clapper rails as part of ongoing remediation at this project under the supervision of federal recovery permit holder Jason Yakich (TE-58760A-0). This project is ongoing.

Union City Sanitary District Outfall Improvements California Ridgway's Rail Survey
Stewart conducted passive surveys for California clapper rails as part of an emergency outfall improvements project under the supervision of federal recovery permit holder Jason Yakich (TE-58760A-0). The survey effort was undertaken to determine the presence of breeding rails in the vicinity of the proposed project. Stewart has positively identified multiple CRR during this project.

Burrow Exclusion and Burrowing Owl Surveys, Newark, California
The project is at a remediation property in Alameda County, California, where burrowing owl is known to occur in the vicinity of the Project Area, and take avoidance surveys are required year-round by project permits and

California Department of Fish and Wildlife (CDFW). Stewart surveyed the area and collapsed burrows that weren't being used by burrowing owl to prevent colonization on the site. Stewart assisted in the installation of one-way exclusion doors on site. He positively identified two burrowing owls as part of the project.

Small Mammal Trapping Study, Mare Island, Vallejo, California
A study was conducted to investigate the presence of salt marsh harvest mice at a remediated Marine Corps firing range on Mare Island in Solano County, California, and to collect genetic samples of any captured harvest mice for ongoing population genetics research. Stewart assisted Wildlife Biologist Katie Smith with the checking, setting and baiting of over 150 Sherman live traps. Species encountered included house mice, California voles, western harvest mice, and salt marsh harvest mice.

Treasure Island/Yerba Buena Island Redevelopment, San Francisco, California
The Treasure Island and Yerba Buena Island Redevelopment Project involves the conversion of 460 acres of the former Naval Base Treasure Island to mixed-use development, parks, and open space sponsored by the City of San Francisco and a consortium of private developers. It is one of the largest and most visible projects in the San Francisco Bay Area in the last 30 years. The project requires shoreline improvements and construction of a new ferry terminal located within an existing Anchorage Zone designated by the U.S. Coast Guard. In accordance with project permits, Stewart conducted over 60 hours of nesting bird surveys on both Treasure Island and Yerba Buena Island, successfully identifying numerous active nests. In addition to nesting bird surveys, Stewart has conducted pre-demolition bat inspections of buildings on the site. He also assists with post survey reporting. This project is ongoing.

McClellan Ranch West Parking Area Project. Cupertino, California
As part of a project for the City of Cupertino, Stewart conducted pre-construction surveys for California red-legged frog, western pond turtle, San Francisco dusky-footed woodrat, Santa Cruz black salamander, California Giant Salamander, pallid bat, long-eared owl, and Nicklin's Peninsula Snail. Work for this project was authorized through a California Department of Fish and Wildlife 1600 Stream Bed Alteration Agreement (SAA), and Stewart worked as a CDFW approved biological monitor and assisted with compliance of the SAA. As part of pre-construction activities, Stewart guided and monitored the installation of an amphibian exclusion fence along the riparian edge of the project site, and performed construction monitoring. He also completed post monitoring reports. This project is ongoing.

Bon Air Bridge Replacement Dewatering and Fish Salvage, Larkspur, California
Bon Air Bridge spans Corte Madera Creek, providing an important link between Magnolia Avenue, Larkspur's main street, and the northeast side of the city. The bridge is scheduled to be replaced by a new bridge, correcting structural deficiencies to provide a stable and safe structure. Stewart was an approved biologist to monitor dewatering of coffer dams on Corte Madera creek during the beginning phases of the Bon Air Bridge Replacement Project. He was present during the final stages of dewatering and removed stranded fish from the coffer dam with an elongated dip net, identified them, and released them back into the creek. Additionally, Stewart has performed exclusion fence monitoring and pre-work inspections of salt marsh vegetation within the project area for Salt Marsh Harvest Mouse presence.

Cargill Salt, Newark, Redwood City, California
One of two sea salt works left in the United States, Cargill contains approximately 8,000 acres of evaporation ponds devoted to salt production in South San Francisco Bay, California. Stewart is a USFWS approved biologist, assisting Cargill with compliance monitoring, including Western Snowy Plover, Salt-marsh Harvest

Mouse, California Clapper Rail, and Least Tern surveys, as well as intermittent vegetation monitoring. As part of compliance monitoring, Stewart has positively identified over 15 Western Snowy Plovers, including two chicks. Additionally, Stewart is assisting Cargill with permitting efforts as they relate to protected fish species, including Longfin Smelt, Green Sturgeon, Steelhead and other wildlife. This project is ongoing.

Marin County Flood Control and Water Conservation District, Marshall-Petaluma Bridge Repair, Point Reyes Station, California
In summer of 2018, WRA was contracted to capture and relocate native fish species from Nicasio Creek. This work took place prior to dewatering a portion of the creek for maintenance. During the two day effort, over 1,500 native fish were encountered and relocated out of the work area. Stewart's primary role in this project was to conduct the fish rescue, utilizing primarily electrofishing and block nets to capture fish. Prior to release, fish were held in aerated coolers and monitored for water quality. All electrofishing was conducted following National Marine Fisheries Service guidelines for e-fishing.

Eelgrass Surveys in Tomales Bay, California
Stewart has conducted numerous eelgrass surveys in Tomales Bay, California in support of commercial development projects in the area. Stewart has assisted with the preparation of documentation to fulfill the requirements of CEQA review for potential impacts to eelgrass and other Essential Fish Habitat (EFH). He continues to perform monitoring services to meet mitigation requirements.

Pier 70 Redevelopment, South San Francisco, California
The Pier 70 redevelopment project lies on the San Francisco waterfront. A 28-acre portion of the Pier 70 Project is planned for demolition and surveys are required in the spring and summer of 2018, prior to build-out of the Project. Currently, the site is developed with numerous buildings which are scheduled for demolition so that reconstruction of the site can occur. Stewart served as Biologist, conducting surveys for both nesting birds and bat roosts throughout the site. Overall surveys covered approximately 12 buildings of various construction, and stages of decay, as well as adjacent undeveloped habitats. This project is ongoing.

Facebook Campus Expansion, Menlo Park, California
As Facebook continues to expand, the corporation's need for new office space adjacent to its Menlo Park headquarters is insatiable. WRA continues to provide biological services, including planning, nesting bird surveys and pre-demolition surveys to support the expanding campus. Stewart conducted pre-construction nesting bird surveys in 2018

Foothill Yellow-legged Frog Surveys, Multiple Counties, California
In spring of 2018 and 2019, Stewart assisted WRA Biologist Brian Freiermuth in conducting egg mass surveys for foothill yellow-legged frog (FYLF) in Sonoma, Mendocino and Lake Counties, CA. Dozens of FYLF in all life stages were detected during the surveys. Habitat assessments and impact analyses for FYLF were also conducted as part of this work. Total duration of these surveys exceeded 100 hours. In addition to spring surveys, Stewart has conducted daytime presence/absence surveys for metamorphosed FYLF in the late summer under an approved CDFW protocol (5 hours).

City of Burlingame Stormwater Drain Maintenance, Burlingame, California
As part of the Burlingame Stormwater Maintenance Project, rehabilitation of concrete lined stormwater channels and installation of flap gates on stormwater outfalls was completed in 2018. Dewatering of the channels was conducted under a CDFW Streambed Alteration Agreement and a Regional Water Quality Control Board permit.

Stewart worked to monitor the channel during the dewatering process for aquatic species, including California red-legged frog, San-Francisco garter snake, and Ridgway's rail. He also performed visual checks on turbidity levels and monitored BMP's.

Ridge Top Ranch Wildlife Conservation Bank, Solano County, California
Ridge Top Ranch, LLC (RTR) is an approved conservation bank on over 280 acres of high quality California red-legged frog and callippe silverspot butterfly mitigation habitat located within Solano County, California. WRA, in consultation with the USFWs and under 10(a)(1)(A) Recovery Permit TE-212445-0, successfully translocated California red-legged frogs to created habitat within the RTR Wildlife Conservation Bank. WRA has been involved throughout the process, from selecting donor sites and planning habitat creation, to translocation of egg masses and monitoring the frogs to ensure that establishment at the receiving site was successful. In the summer of 2018, Stewart assisted WRA Biologist and recovery permit holder Rob Schell in the capture, handling, measurement and pit-tagging of more than 25 adult CRLF. Survey time for the site visit was approximately 5 hours. Stewart also assisted WRA Biologist Brian Freiermuth in counting California red-legged frog egg masses and performed site checks on mesh enclosures containing egg masses. In addition to egg masses, over 20 adult California red-legged frogs were identified over the course of multiple nighttime surveys, with over 15 hours of nighttime surveys logged. Stewart has also performed vegetation control within the site. This project is ongoing.

Marin County Flood Control and Water Conservation District, Lucas Valley Bridge Emergency Repair, San Rafael, California
Following winter storms in November 2017, erosion at the Lucas Valley Road Bridge required emergency repairs in order to maintain functionality of the bridge. WRA was contracted to capture and relocate steelhead from Miller Creek before emergency repair operations could begin. Stewart assisted the team of fisheries biologists and county volunteers for this project, successfully relocating 47 steelhead. No mortality was observed among steelhead and the project was completed on time. Methodology used for this project relied primarily on electrofishing.

Port of Oakland Maintenance Dredging, Oakland, California
Maintenance dredging of the Port of Oakland Inner and Outer Harbor Channels was necessary to maintain passageways for the active port. Pacific herring is a protected commercial fishery, and dredging operations within the Pacific herring spawning season were unavoidable and required observers to assure operations did not occur during spawning events. Stewart was a CDFW approved observer for the Project. This project is ongoing.

Niebaum-Coppola Estate Winery, L.P., Bear Canyon Creek Fish Passage Maintenance Project and Biological Construction Monitoring, Rutherford, California
WRA assisted the Napa Resource Conservation District with biological monitoring during sediment removal activities for a reservoir on Bear Creek, in Napa County. Work for this project was authorized through a California Department of Fish and Wildlife 1600 Stream Bed Alteration Agreement (SAA), and Stewart worked as a biological monitor and assisted with compliance of the SAA. Protected species known for the area included foothill yellow-legged frog, pallid bat, Pacific pond turtle, and steelhead. No protected species were injured during the monitoring. Sediment control measures were monitored to minimize sediment flowing offsite.

Avian Surveys for Confidential Client, Lake County, California
A confidential client contracted WRA to conduct a biological resources assessment of a recently purchased property in Lake County in order to determine the full extent of wildlife that occupied the property. Stewart was part of the wildlife team that was tasked with surveying for and identifying special-status species throughout the

property including golden and bald eagle and special-status amphibians. In total, five eagle nests were located over two months of surveys. Additionally, Stewart assisted in visual encounter amphibian surveys. Other special-status species including foothill yellow-legged frog, western pond turtle, tricolored blackbird, white-tailed kite and yellow-headed blackbird were identified on site.

Young Ranch Bay Checkerspot Butterfly Surveys, Santa Clara County, California
Young Ranch is an approximately 2,100 acre ranch in the Coyote Hills just southeast of San Jose, California. WRA is managing a biological resources assessment of the property, including a butterfly-specific habitat suitability analysis for the federally endangered Bay checkerspot butterfly (BCB), as well as annual surveys for both BCB and burrowing owl. Stewart's chief involvement in this project is to conduct adult BCB surveys in an effort to document on-site habitat use and provide information for the development of a land use plan. During surveys, he has identified many individual BCB, observed behavior and plants if nectaring or resting, and provided GPS locations which are being used in a GIS corridor analysis.

Drone Work

Santa Clara River Habitat Restoration, Los Angeles County, California
Stewart flew UAV missions at this location in support of fisheries restoration efforts that included a feasibility study and conceptual design development for the restoration of fish habitat at a confidential location along the Santa Clara River. Habitat for Santa Ana sucker, unarmored threespine stickleback, and Arroyo chub were assessed as part of this project, and Stewart worked with hydrologists to provide high quality imagery and elevation mapping to support restoration designs. This project is ongoing.

Butte Sink Mitigation Bank UAV Survey, Colusa County, California, 2019
The Butte Sink Mitigation Bank is an approximately 350-acre mix of agriculture and riparian habitat in Colusa County, California. The site is located along the western bank of Butte Creek and at the terminus of the Colusa Bypass, which diverts high flows from the Sacramento River into the site. The project is designed to create, restore, and preserve a mix of riparian, wetland, and off channel floodplain habitat. Target species for the bank include a mix of protected salmonid species that occur in Sacramento River and Butte Creek, including protected spring and winter-run Chinook salmon, and steelhead. WRA is leading the effort to develop the conservation bank, which includes concept design, baseline biological surveys, habitat evaluation, prospectus development, and permitting. Stewart has flown the site using a UAV on multiple occasions, particularly in response to flooding events to document the extent of inundation and provide footage to inform models.

Elsie Gridley Mitigation Bank UAV Survey, Dixon, California 2018
The Elsie Gridley Mitigation Bank is the largest mitigation bank in California at more than 1,800 acres, and is a central component of the largest contiguous vernal pool preserve in the United States. The bank is approved by five different agencies and covers two different Army Corps Districts. In addition, the bank sells both numerous species credits such as California tiger salamander, vernal pool crustaceans, Swainson's hawk, and burrowing owl, as well as wetland credits to offset impacts under the Clean Water Act. Utilizing a UAV (unmanned aerial vehicle) Stewart flies the site on a routine basis in order to acquire aerial imagery which could be used to assess restoration progress.

Confidential Client UAV Survey, Sacramento County, California

A WRA client in Sacramento County required surveys to determine the extent of wetland establishment adjacent to a piece of developed property. Utilizing a UAV (unmanned aerial vehicle) Stewart flew the site in order to acquire aerial imagery which could be used to assess wetland growth.

Antonio Mountain Ranch Mitigation/Conservation Bank UAV Survey, Placer County, California
The Antonio Mountain Ranch Mitigation/Conservation Bank is a proposed approximately 800-acre wetland and protected species mitigation bank in Placer County. The bank serves as offsite mitigation for impacts to wetlands and non-wetland waters, including vernal pool and swale complexes, seasonal and perennial wetlands, and streams, and as a conservation bank, pursuant to federal and California Endangered Species Acts (for special-status vernal pool branchiopods in Placer County and surrounding counties). Swainson's hawk and tricolored blackbird habitat credits are also provided for covered activities under the Placer County Conservation Plan. Utilizing a UAV (unmanned aerial vehicle) Stewart has flown the site multiple times in order to acquire aerial imagery which could be used to assess restoration progress.

Petersen Ranch Mitigation Bank, Leona Valley, California
The Petersen Ranch Mitigation Bank is the largest mitigation bank in California and was approved in May 2016. The bank is approximately 4,000 acres in size and approved by the Los Angeles District of the U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, California Department of Fish and Wildlife, and Lahontan Regional Water Quality Control Board. The bank consists of two different sites located in the Santa Clara River and Antelope Valley watersheds. Stewart has conducted UAV flights on the property for annual monitoring efforts.

Experience Prior to WRA

Massachusetts Division of Marine Fisheries, Lake Sabattia American Eel Mark Recapture Study, Taunton, Massachusetts
For the Massachusetts Division of Marine Fisheries, Stewart coordinated and conducted field work to assess American eel populations in water body prior to a downstream dam removal project. American eels were collected with modified gee traps using herring as bait. Trapping locations were chosen based on a previously completed habitat assessment. Traps were retrieved daily, using a 15 foot trailer launched boat. Water quality measurements were taken at each trapping locations. Once eels were caught, they were sedated, measured, injected with pit tags, and released.

Massachusetts Division of Marine Fisheries, Southeastern Massachusetts River Herring Count, Southeastern Massachusetts
For the Massachusetts Division of Marine Fisheries, Stewart conducted a river herring count during the spring runs, using primarily Smith Root electronic counters and video counters. He made bi-weekly visits to 8 counting stations to offload count data, take water quality measurements, and to maintain the fish counting platforms. Stewart conducted weekly sampling of individual river herring runs, taking 100 fish at a time for processing. Processing involved measuring, sexing, and extracting otoliths. Count data supplemented the Atlantic States Marine Fisheries Commission (ASMFC) river herring population assessment.

Massachusetts Division of Marine Fisheries, American Eel Monitoring, Southeastern Massachusetts

As part of the Massachusetts Division of Marine Fisheries young of year assessments for American eel, Stewart conducted standardized monitoring of glass eels under the coordination of ASMFC. The monitoring of the glass eels contributed to a coast-wide index of eel population relative abundance. Stewart installed eel ramps to aid in upstream migration, and monitored 9 sites, counting and taking length data on the American eels as they passed through. Over a half million eels have passed through the counting stations since they were installed in 2007.

City of New Bedford, Massachusetts, Marine Mammal Observing, New Bedford, Massachusetts
Underwater blasting occurred in New Bedford harbor before dredge work could be done to increase depth outside heavily trafficked fish processing plants. Fathom Resources LLC. was contracted to provide marine mammal observing services under the Marine Mammal Protection Act (MMPA). As a certified marine mammal observer, Stewart surveyed the area in and around the blasting site for any signs of marine mammals, and alerted the barge crew of their presence. Blasting schedules were delayed whenever a marine mammal was observed within the work area. No marine mammals were harmed during the blasting period.

Wells National Estuarine Research Reserve, Piping Plover Monitoring, Wells, Maine
Stewart assisted in Piping Plover nest monitoring along Laudholm Beach. He, along with other monitors identified numerous Piping Plover nests, chicks, and adults, and set up predator exclusion fencing. In total, Stewart identified over 20 Piping Plover nests, and over 100 adults and chicks. In addition, Stewart assisted with the installation and maintenance of symbolic fencing erected to prevent human and vehicle activity from disturbing nesting Piping Plovers.

Wells National Estuarine Research Reserve, Wading Bird Survey, Wells, Maine
Stewart coordinated and conducted a wading bird survey of restored estuary habitat over the course of a summer in Wells, Maine. Survey points were visited bi-weekly along restored sections of salt marsh, and at least one hour was spent as each location per visit. Bird species and numbers were tracked, and used to assess the success of restoration activities. Stewart was trained by Reserve staff on wading bird field identification and logged over 15 hours of surveys. Species encountered included herons, egrets, ibis, and non-wading bird species such as osprey, eagles, and shorebirds.

Wells National Estuarine Research Reserve, Larval Fish Survey, Wells, Maine
Stewart assisted with the implementation of a larval fish monitoring program that was established in 2008. The monitoring program seeks to track abundance and diversity of fish larvae, as well as investigating the seasonal and spatial patterns or larval fish assemblages. Stewart assisted reserve staff with plankton net tows on incoming ties within the Webhannet estuary, as well as processing those samples. Stewart used a microscope to identify and measure larval fish, as well as invertebrates present in the sample.

Lloyd Davis Anadromous Fish Trust, Annual Medomak River Herring Count, Waldoboro, Maine
Stewart managed over 30 volunteers to conduct an annual count of river herring on the Medomak River. He trained volunteers in fish counting procedures, and coordinated their counting schedule. All fish swimming upstream were channeled through a 3 foot wide white ramp using a set of nets. Volunteers then counted fish as they passed from above. Stewart was the point person for the count, and maintained the nets as needed, clearing debris from them daily, and ensuring they were properly anchored to only allow fish to swim through the ramp. He took weekly samples of river herring to collect scale samples from to provide to state fisheries biologists. Upon conclusion of the count, he compiled the count data for submission to the state of Maine.

Presentations

Poster Presentation: Fisheries Observer Retention Strategies presented at the International Fisheries Observing and Monitoring Conference 2016

Appendix H

Official Species Lists

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Species List - Intersection of USGS Topographic Quadrangles with NOAA Fisheries ESA Listed Specie

November 2016

X = Present on the Quadrangle		**ESA ANADROMOUS FISH** (E) = Endangered, (T) = Threatened							**ESA ANADROMOUS FISH CRITI**					
		STEELHEAD					Eulachon (T)	Southern DPS Green Sturgeon (T)	STEELHEAD					Eulachon
Quad Name	Quad Number	NC (T)	CCC (T)	SCCC (T)	SC (E)	CCV (T)			NC	CCC	SCCC	SC	CCV	
Palo Alto	37122-D2		X					X		X				

s, Critical Habitat, Essential Fish Habitat, and MMPA Species Data

ICAL HABITA	ESSENTIAL FISH HABITAT				MMPA SPECIES
Southern DPS Green Sturgeon	SALMON		Groundfish	Coastal Pelagic	MMPA Pinnipeds (see "MMPA Species" tab for list)
	Coho	Chinook			
X	X	X	X	X	X

ENVIRONMENTAL CONSULTANTS

Nicholas Brinton <brinton@wra-ca.com>

NMFS - Children's Health Council, San Francisquito Creek Bank Stabilization – Phase 2

NMFSWCRCA Specieslist - NOAA Service Account Thu, Jan 30, 2020 at 3:31 PM
<nmfswcrca.specieslist+canned.response@noaa.gov>
To: brinton@wra-ca.com

Receipt of this message confirms that NMFS has received your email to nmfswcrca.specieslist@noaa.gov. If you are a federal agency (or representative) and have followed the steps outlined on the California Species List Tools web page (http://www.westcoast.fisheries.noaa.gov/maps_data/california_species_list_tools.html), you have generated an official Endangered Species Act species list.

Messages sent to this email address are not responded to directly. For project specific questions, please contact your local NMFS office.

Northern California/Klamath (Arcata) 707-822-7201

North-Central Coast (Santa Rosa) 707-387-0737

Southern California (Long Beach) 562-980-4000

California Central Valley (Sacramento) 916-930-3600

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish And Wildlife Office
Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846
Phone: (916) 414-6600 Fax: (916) 414-6713

In Reply Refer To: January 30, 2020
Consultation Code: 08ESMF00-2020-SLI-0915
Event Code: 08ESMF00-2020-E-02908
Project Name: CHC

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, under the jurisdiction of the U.S. Fish and Wildlife Service (Service) that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the Service under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

Please follow the link below to see if your proposed project has the potential to affect other species or their habitats under the jurisdiction of the National Marine Fisheries Service:

http://www.nwr.noaa.gov/protected_species/species_list/species_lists.html

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Sacramento Fish And Wildlife Office
Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846
(916) 414-6600

Project Summary

Consultation Code: 08ESMF00-2020-SLI-0915

Event Code: 08ESMF00-2020-E-02908

Project Name: CHC

Project Type: LAND - FLOODING

Project Description: Children’s Health Council, San Francisquito Creek Bank Stabilization - Phase 2.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/37.44174163784042N122.17605555593572W

Counties: San Mateo, CA | Santa Clara, CA

Endangered Species Act Species

There is a total of 17 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

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

Birds

NAME	STATUS
California Clapper Rail *Rallus longirostris obsoletus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4240	Endangered
California Least Tern *Sterna antillarum browni* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/8104	Endangered
Marbled Murrelet *Brachyramphus marmoratus* Population: U.S.A. (CA, OR, WA) There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/4467	Threatened
Western Snowy Plover *Charadrius nivosus nivosus* Population: Pacific Coast population DPS-U.S.A. (CA, OR, WA), Mexico (within 50 miles of Pacific coast) There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/8035	Threatened
Yellow-billed Cuckoo *Coccyzus americanus* Population: Western U.S. DPS There is **proposed** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/3911	Threatened

Reptiles

NAME	STATUS
Green Sea Turtle *Chelonia mydas* Population: East Pacific DPS No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6199	Threatened
San Francisco Garter Snake *Thamnophis sirtalis tetrataenia* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/5956	Endangered

Amphibians

NAME	STATUS
California Red-legged Frog *Rana draytonii* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2891 Species survey guidelines: https://ecos.fws.gov/ipac/guideline/survey/population/205/office/11420.pdf	Threatened
California Tiger Salamander *Ambystoma californiense* Population: U.S.A. (Central CA DPS) There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2076	Threatened

Fishes

NAME	STATUS
Delta Smelt *Hypomesus transpacificus* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/321	Threatened

Insects

NAME	STATUS
Bay Checkerspot Butterfly *Euphydryas editha bayensis* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2320	Threatened
San Bruno Elfin Butterfly *Callophrys mossii bayensis* There is **proposed** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/3394	Endangered

Flowering Plants

NAME	STATUS
Fountain Thistle *Cirsium fontinale var. fontinale* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/7939	Endangered
Marin Dwarf-flax *Hesperolinon congestum* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/5363	Threatened
San Mateo Thornmint *Acanthomintha obovata ssp. duttonii* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/2038	Endangered
Showy Indian Clover *Trifolium amoenum* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6459	Endangered

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

Part 11. CEQA Documentation
(To be submitted under separate cover)

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Part 12. Project Plans

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CHILDREN'S HEALTH COUNCIL
CREEK BANK STABILIZATION PROJECT: PHASE II
PALO ALTO, CALIFORNIA

wra
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CREEK BANK STABILIZATION PROJECT - PHASE II
CHILDREN'S HEALTH COUNCIL
PALO ALTO, CALIFORNIA

NOT FOR CONSTRUCTION

STATEMENT OF PURPOSE
THIS PROJECT WILL PROVIDE 275 LINEAR FEET OF BANK STABILIZATION ALONG SAN FRANCSQUITO CREEK THROUGH LOG CRIB WALL AND RIPARIAN PLANTINGS. IT WILL BENEFIT THE CREEK BY PROVIDING SLOPE STABILITY AND SALMONID HABITAT.

REGULATORY CONTEXT
PROJECT GOALS AND THE DESIGN OF THE PROJECT HAVE BEEN DEVELOPED UNDER THE GUIDANCE OF THE FOLLOWING:
- SAN FRANCISQUITO CREEK JOINT POWERS AUTHORITY
- STANFORD UNIVERISTY
- US ARMY CORPS OF ENGINEERS
- US FISH AND WILDLIFE SERVICE
- CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE
- CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
- SANTA CLARA VALLEY WATER DISTRICT

AS SUCH THE PROJECT IS SUBJECT TO CONDITIONS OF APPROVAL AND RESTRICTIONS THAT WERE PUT IN PLACE TO PROTECT SENSITIVE HABITAT TYPES AND SPECIAL STATUS SPECIES.

THE PROJECT WILL BE PERFORMED WITH PERMITS AND/OR CONSULTATIONS FROM THE FOLLOWING AGENCIES:
- US ARMY CORPS OF ENGINEERS
- NATIONAL MARINE FISHERIES SERVICES
- US FISH AND WILDLIFE SERVICE
- CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE
- CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
- CITY OF PALO ALTO

CHARACTERIZATION OF THE PROJECT
1. TOE STABILIZATION - THE CHANNEL TOE WILL BE PROTECTED BY LARGE ALLUVIUM COBBLES AND BOULDERS BURIED UNDERNEATH THE CREEK BED. THIS MATERIAL WILL BE THE FOUNDATION OF THE CRIB WALL.

2. ROOTWADS - THE CHANNEL TOE WILL INCLUDE ROOTWADS ALONG THE EXISTING POOL OF THE CREEK IN ORDER TO REDUCE WATER VELOCITIES AND PROVIDE FISH HABITAT.

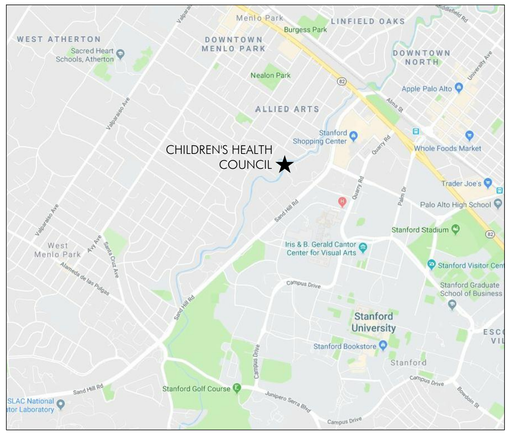
3. LOWER CHANNEL BANK - A NEW CHANNEL BANK WILL BE INSTALLED CONSISTING OF A CRIB WALL WITH A SLOPE OF 1:1 AND STABILIZED BY THREADED REBAR PINS. A MIXTURE OF COARSE ALLUVIUM (GRAVEL TO COBBLE SIZED MATERIAL) WILL BE PLACED BEHIND THE CRIB WALL AND WITHIN THE CRIB WALL CAVITIES. THE CRIB WALL WILL BE ANCHORED TO THE EXISTING CREEK BANK WITH HELICAL ANCHORS.

4. UPPER CHANNEL BANK - ABOVE THE CRIB WALL, THE CHANNEL BANK WILL BE GRADED TO A MAXIMUM SLOPE OF 2:1 (H:V) AND PLANTED WITH NATIVE TREES, SHRUBS, AND GRASSES.

EARTHWORK QUANTITIES
THE PROJECT INVOLVES THE EXCAVATION OF LANDSLIDE DEPOSITION OF ARTIFICIAL FILL MATERIAL, ALLUVIUM SILTY SAND, AND ALLUVIUM GRAVELLY SAND WHICH WILL BE RE-USED ON THE PROJECT SITE. LARGER ALLUVIUM ROCK SUCH AS BOULDERS AND COBBLES SHALL BE PURCHASED AND DELIVERED TO THE PROJECT SITE. ENGINEERED FILL MATERIAL SHALL CONSIST OF ALLUVIUM COBBLE AND GRAVEL AND SHALL BE PURCHASED AND DELIVERED TO THE SITE.

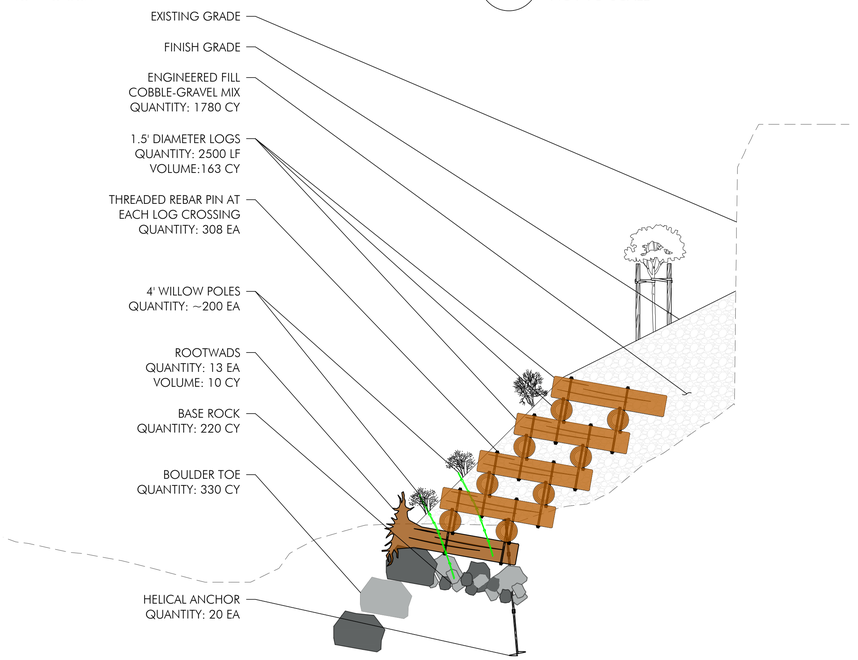
- CUT = 1370 CU. YDS. (HAUL OFF SITE)
- IMPORT BOULDERS = 330 CU. YDS.
- IMPORT COBBLES = 220 CU. YDS.
- IMPORT ENGINEERED FILL = 1780 CU. YDS.

FIELD MODIFICATIONS
NO FIELD MODIFICATIONS SHALL OCCUR WITHOUT WRITTEN CONSENT FROM THE LANDOWNER. ALL PROPOSED FIELD MODIFICATIONS SHALL BE SHOWN GRAPHICALLY ON CONSTRUCTION DOCUMENTS IN RED INK AND PRESENTED TO THE LANDOWNER FOR APPROVAL.



1 VICINITY MAP
NOT TO SCALE

2 LOCATION PLAN
NOT TO SCALE



3 TYPICAL SECTION

SCALE: 1 " = 5'

PROJECT SCHEDULE
THIS DESIGN IS INTENDED TO BE CONSTRUCTED DURING ONE SUMMER CONSTRUCTION SEASON (MAY 1 THROUGH OCTOBER 15TH).

UTILITIES
THERE MAY BE UNKNOWN UNDERGROUND ELECTRICAL AND WATER LINES LOCATED WITHIN THE PROJECT BOUNDARY. THE CONTRACTOR WILL CONTACT A UTILITY COMPANY TO MARK UNDERGROUND UTILITIES AND/OR CONFIRM THAT THERE ARE NO ADDITIONAL UNDERGROUND UTILITIES.

FEMA FLOODPLAIN NOTES
- THIS PROJECT IS LOCATED WITHIN A FEMA DESIGNATED FLOODWAY.
- WORK WITHIN THE 100-YEAR FLOODPLAIN WILL NOT INCREASE RISK OF FLOODING.
- WATER SURFACE PROFILES NOTED WITH "FEMA" ARE FROM THE 2014 FLOOD INSURANCE STUDY

LOCATION DESCRIPTION
THE PROPERTY IS LOCATED AT 650 CLARK WAY, PALO ALTO, CALIFORNIA 94304

SURVEY CONTROL
HORIZONTAL DATUM: NAD83, CALIFORNIA STATE PLANE ZONE III, U.S. SURVEY FEET
VERTICAL DATUM: NAVD88, U.S. SURVEY FEET

CONTROL POINTS

POINT #	ELEVATION	NORTHING	EASTING	DESCRIPTION
1268	91.70	1987341.30	6074099.86	CP 1
1930	89.75	1987221.26	6074226.76	CP 2
1969	76.77	1987174.17	6075603.01	BM 458
1972	86.02	1986864.21	6074480.60	CP 3

DESIGNED FOR
CHILDREN'S HEALTH COUNCIL
650 CLARK WAY
PALO ALTO, CALIFORNIA 94304
CONTACT: TERRY BOYLE

LEAD CONSULTANT
WRA, INC.
2169-G E. FRANCISCO BLVD.
SAN RAFAEL, CA 94901
CONTACT: BRIAN BARTELL
(415) 424-7588
BARTELL@WRA-CA.COM

Date	Issues And Revisions	No.
03/27/19	CONCEPT	
08/19/19	30% DESIGN	

SHEET INDEX

PROJECT #27109
DRAWN BY: ACS
CHECKED BY: BSS, RBB
ORIGINAL DRAWING SIZE: 24 X 36

TITLE
Sheet
G-1.0

Path: L:\Acad 2000 Files\27000\27109\CAD\dwg\30% Design\27109 G-1 Title.dwg

SITE PLAN LEGEND

SYMBOL	DESCRIPTION
	PROPERTY LINE
(100)	(E) CONTOUR (2 FT)
100	PROPOSED CONTOUR (2 FT)
	STAGING AREA
	FLOW
LOG	LIMIT OF GRADING
LOD	LIMIT OF DISTURBANCE
	EXISTING TREE
	EXISTING TREE TO BE REMOVED
	TEMPORARY ACCESS ROUTE

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CREEK BANK STABILIZATION PROJECT - PHASE II

CHILDREN'S HEALTH COUNCIL
PALO ALTO, CALIFORNIA

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SCALE: 1 " = 20 '

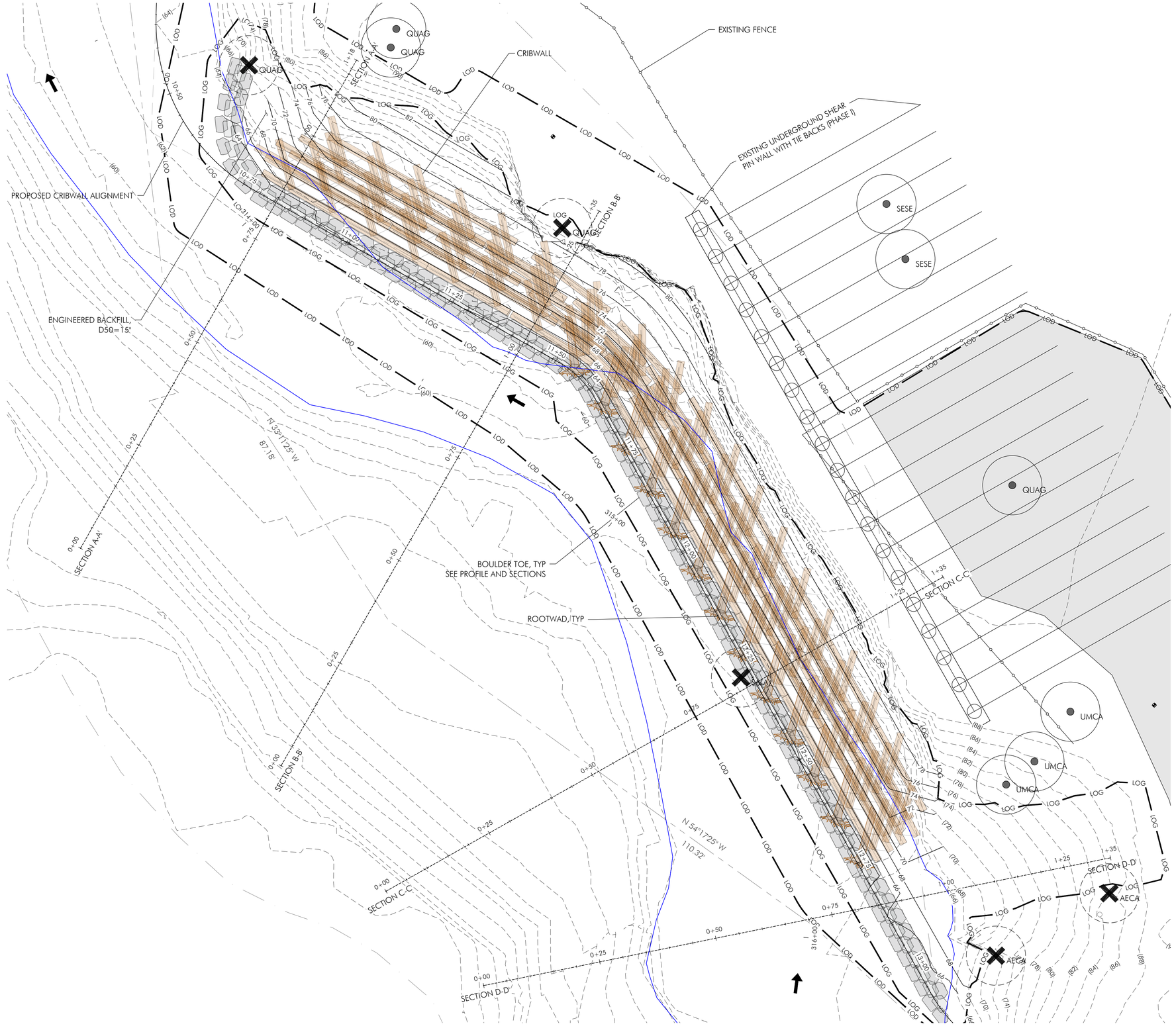
SITE PLAN

Sheet

C-2.0

GRADING LEGEND

SYMBOL	DESCRIPTION
	PROPERTY LINE
(100)	(E) CONTOUR (2 FT)
100	PROPOSED CONTOUR (2 FT)
	STAGING AREA
	FLOW
LOG	LIMIT OF GRADING
LOD	LIMIT OF DISTURBANCE
	ORDINARY HIGH WATER
	EXISTING TREE
	EXISTING TREE TO BE REMOVED



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ORIGINAL DRAWING SIZE: 24 X 36

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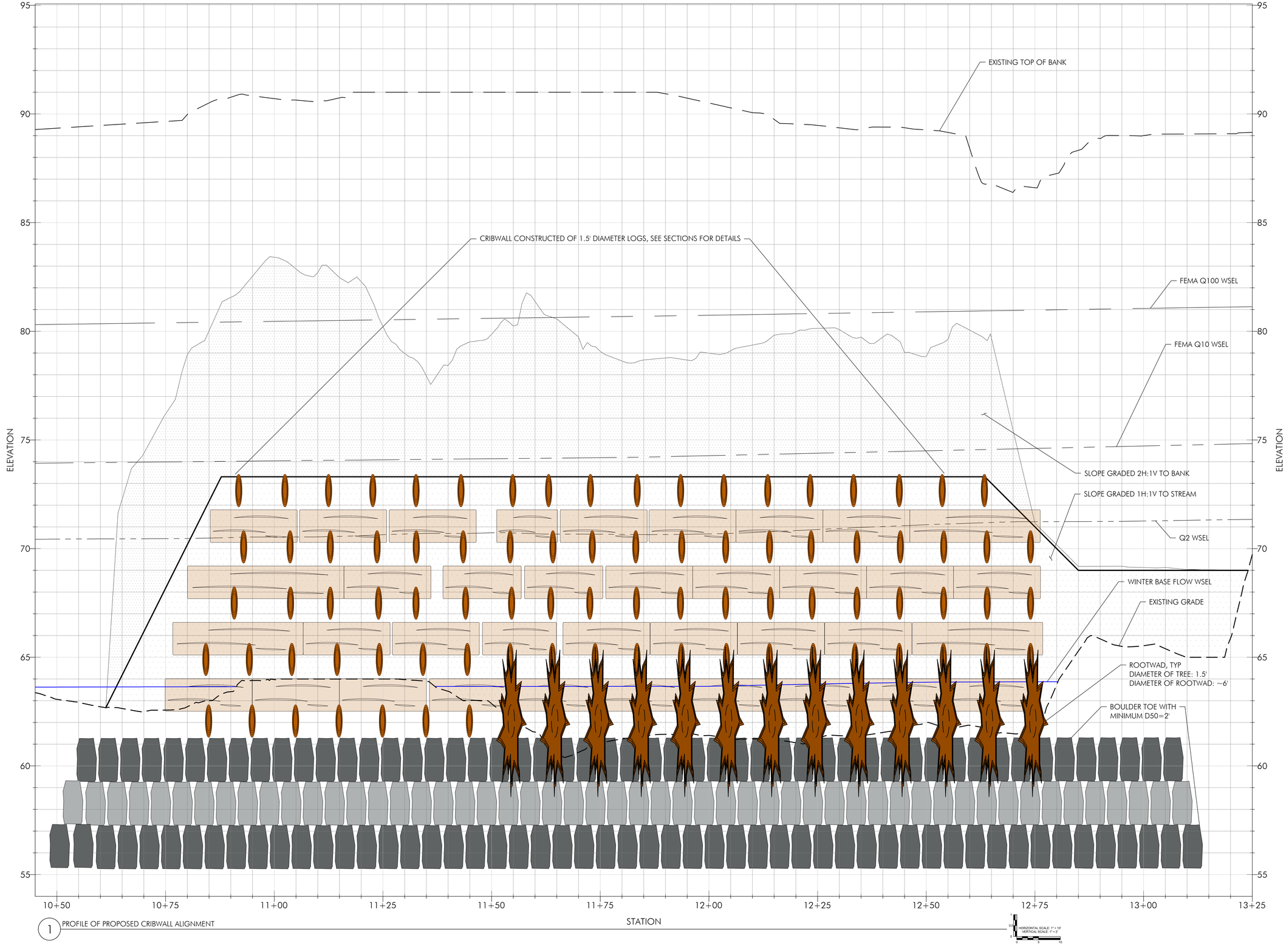
SCALE: 1 " = 10 '

GRADING PLAN

Sheet

C-2.1



1 PROFILE OF PROPOSED CRIBWALL ALIGNMENT

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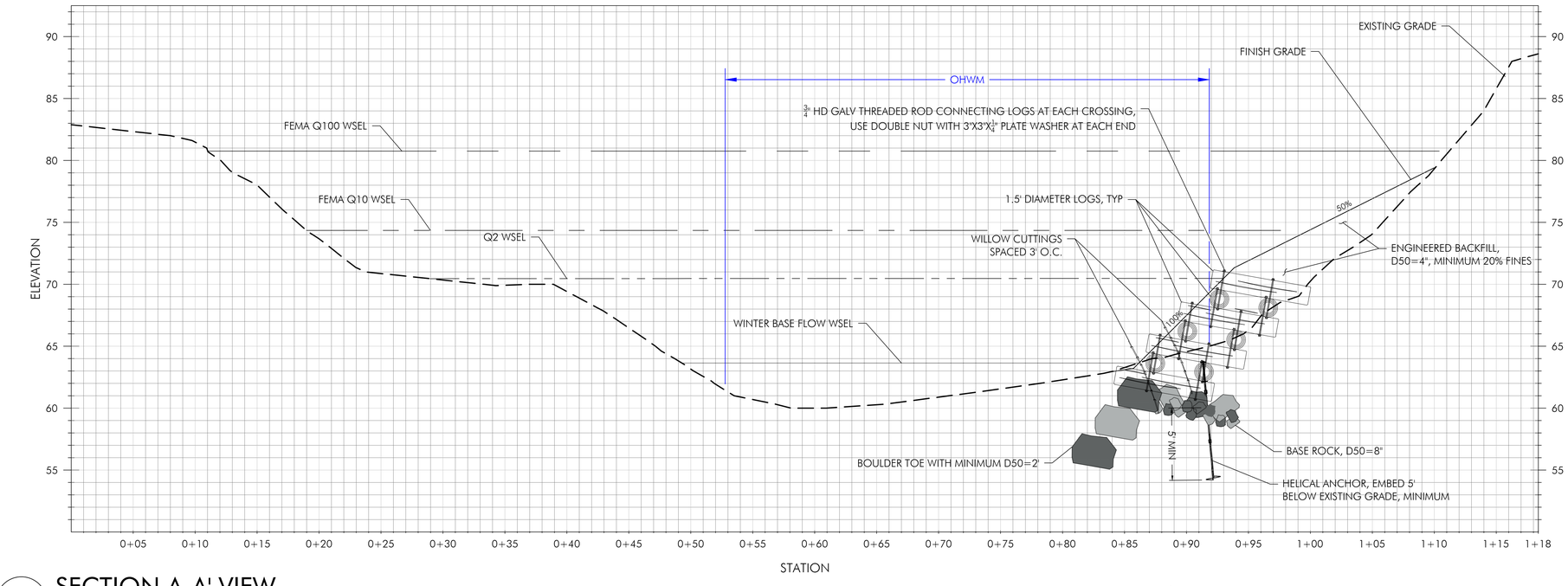
ORIGINAL DRAWING SIZE: 24 X 36

PROFILE

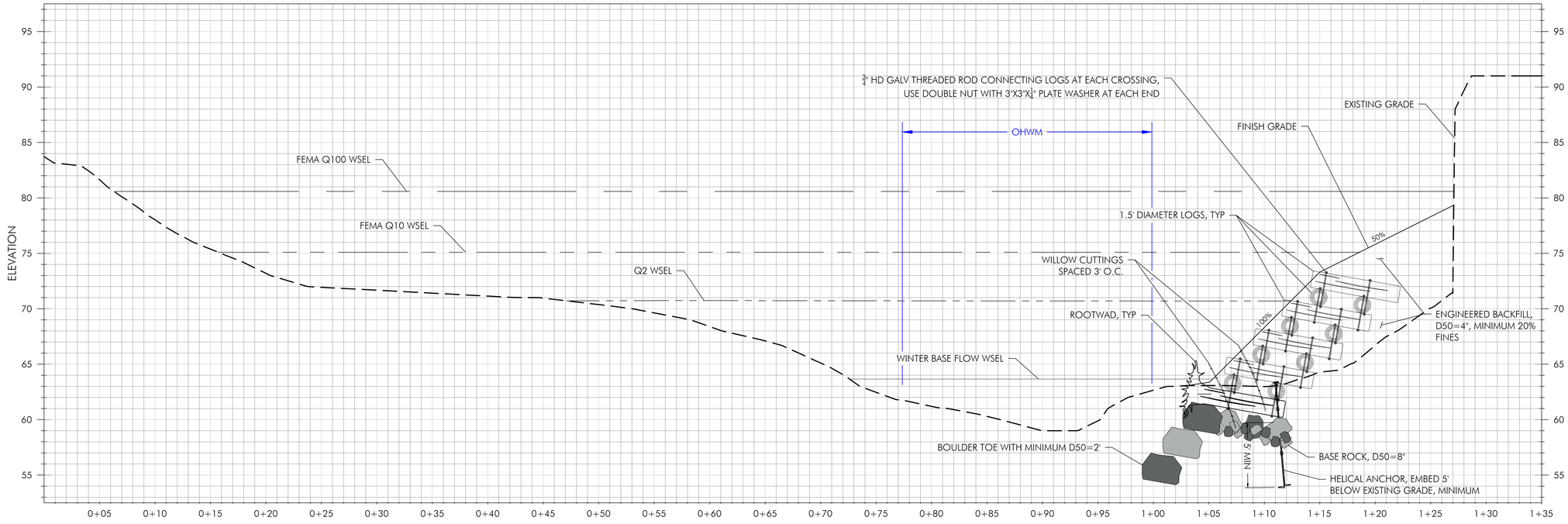
Sheet

C-3.0



1 SECTION A-A' VIEW

HORIZONTAL SCALE: 1" = 5'
VERTICAL SCALE: 1" = 5'



2 SECTION B-B' VIEW

HORIZONTAL SCALE: 1" = 5'
VERTICAL SCALE: 1" = 5'

NOTE: CONNECTIONS SHOWN ARE NOT IN THE SAME VERTICAL PLANE

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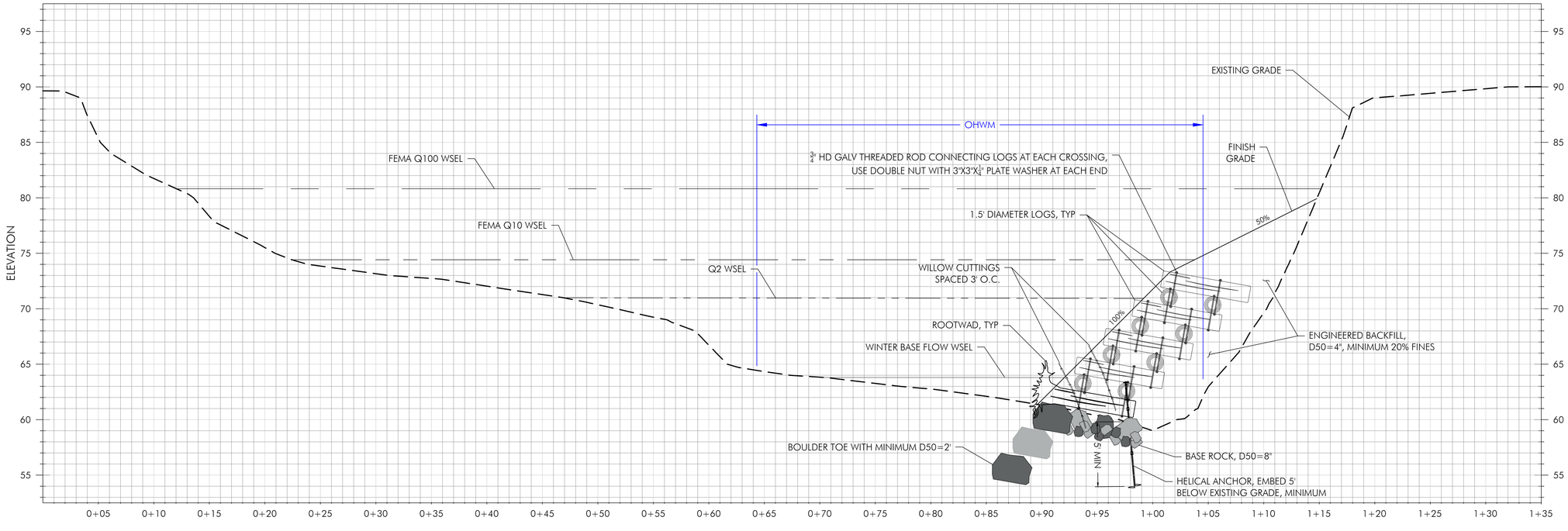
ORIGINAL DRAWING SIZE: 24 X 36

SECTIONS

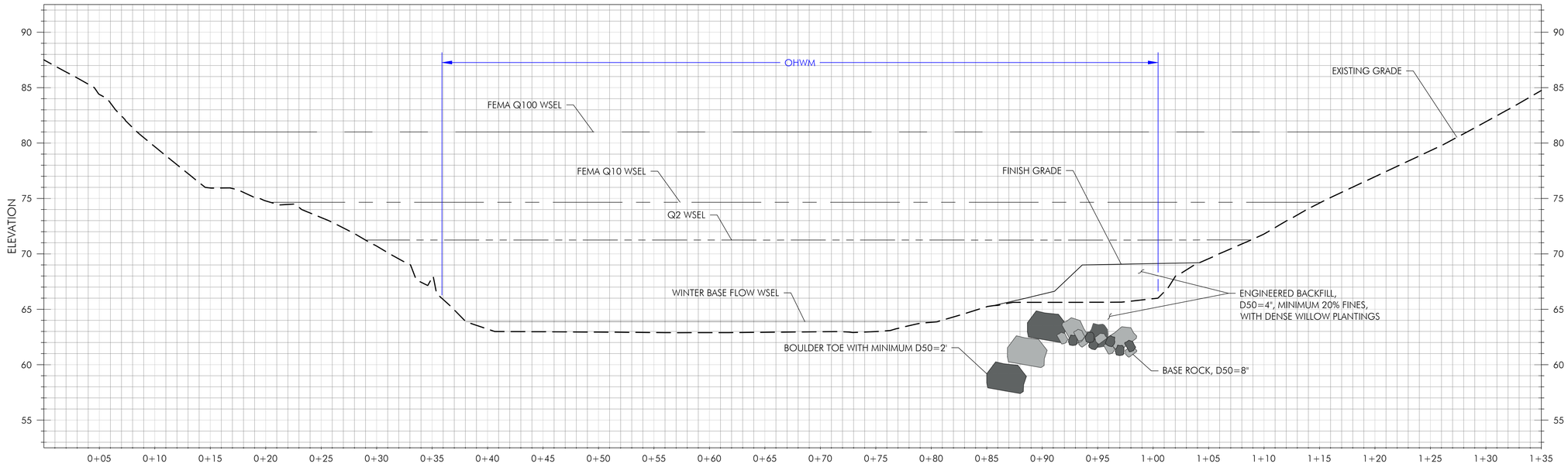
Sheet

C-3.1



C SECTION C-C' VIEW

HORIZONTAL SCALE: 1" = 5'
VERTICAL SCALE: 1" = 5'



D SECTION D-D' VIEW

HORIZONTAL SCALE: 1" = 5'
VERTICAL SCALE: 1" = 5'

NOTE: CONNECTIONS SHOWN ARE NOT IN THE SAME VERTICAL PLANE

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CREEK BANK STABILIZATION PROJECT - PHASE II

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ORIGINAL DRAWING SIZE: 24 X 36

SECTIONS

Sheet

C-3.2

PLANTING LEGEND

SYMBOL	DESCRIPTION
	PROPERTY LINE
(100)	(E) CONTOUR (2 FT)
100	PROPOSED CONTOUR (2 FT)
LOG	LIMIT OF GRADING
	CHANNEL ALIGNMENT
	TREE PROTECTION FENCING
TREE TAG NUMBER / TREE IDENTIFIER	EXISTING TREE
	EXISTING TREE TO BE REMOVED
	PROPOSED RIPARIAN PLANTING AREA 1 (CRIB WALL WITH LIVE WILLOW CUTTINGS)
	PROPOSED RIPARIAN PLANTING AREA 2 (UP TO Q10) — HYDROSEED
	PROPOSED RIPARIAN PLANTING AREA 3 (Q10 TO Q100) — HYDROSEED

TREE IDENTIFIER	BOTANICAL NAME	COMMON NAME
ACDE	ACACIA DEALBATA	SILVER WATTLE
ACMA	ACER MACROPHYLLUM	BIGLEAF MAPLE
AECA	AESCULUS CALIFORNICA	CALIFORNIA BUCKEYE
AIAL	AILANTHUS ALTISSIMA	TREE OF HEAVEN
EUGL	EUCALYPTUS GLOBULUS	BLUE GUM EUCALYPTUS
QUAG	QUERCUS AGRIFOLIA	COAST LIVE OAK
SALA	SALIX LAEVIGATA	RED WILLOW
SANI	SAMBUCUS NIGRA SSP. CAERULEA	BLUE ELDERBERRY
SESE	SEQUOIA SEMPERVIRENS	COAST REDWOOD
UMCA	UMBELLULARIA CALIFORNICA	CALIFORNIA BAY

PLANTING LIST

RIPARIAN AREA 1 (0.02 ACRES)

BOTANICAL NAME	COMMON NAME	SIZE	SPACING (OC FEET)	QUANTITY
SALIX LASIOLEPIS	ARROYO WILLOW	4' POLE CUTTINGS	3	95
SALIX EXIGUA	SANDBAR WILLOW	4' POLE CUTTINGS	3	95

RIPARIAN AREA 2 (0.056 ACRES)

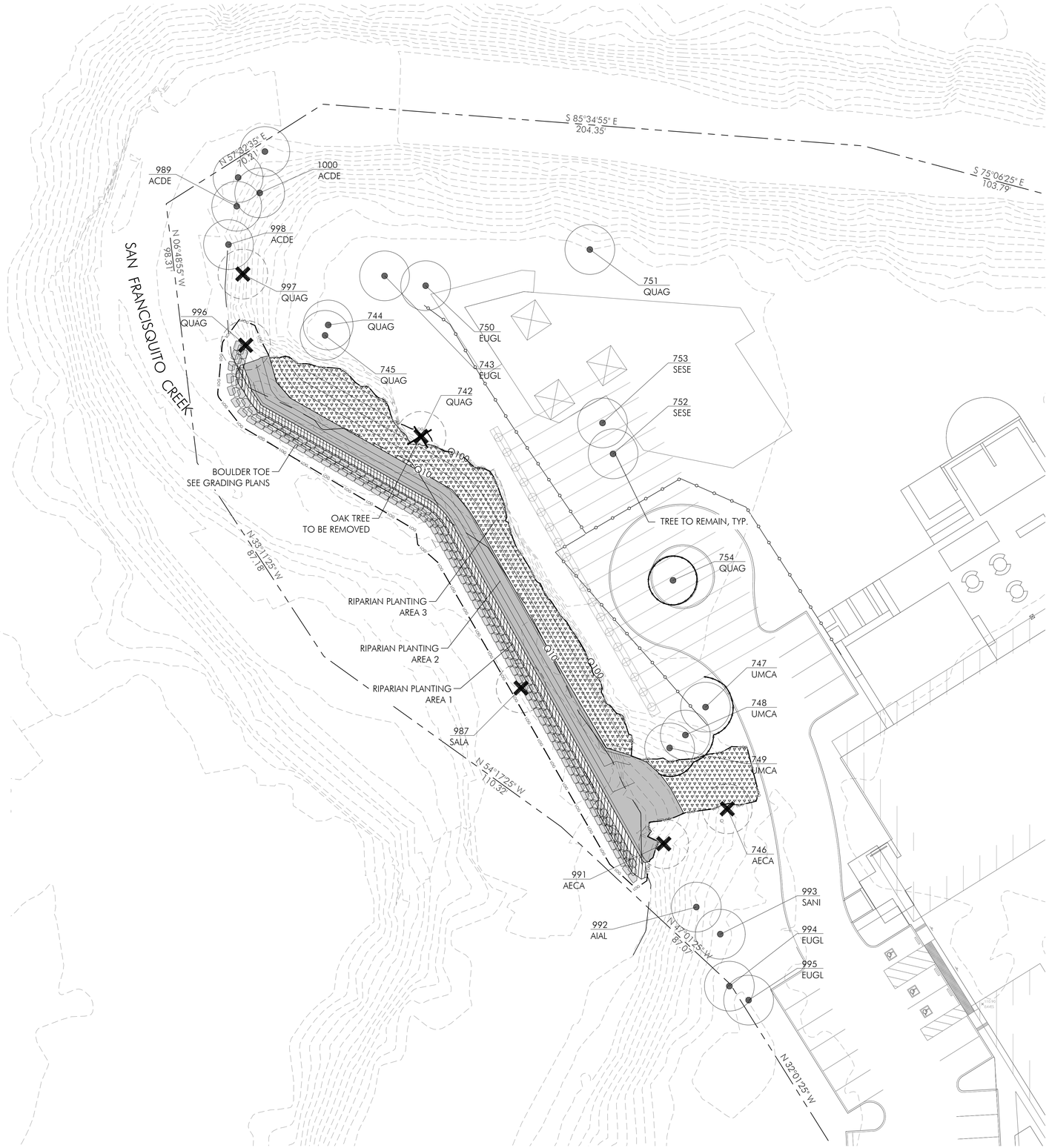
BOTANICAL NAME	COMMON NAME	SIZE	SPACING (OC FEET)	QUANTITY
ALNUS RHOMBIFOLIA	WHITE ALDER	5 GAL	10	8
SALIX LAEVIGATA	RED WILLOW	4' POLE CUTTINGS	3	95
SALIX LASIOLEPIS	ARROY WILLOW	4' POLE CUTTINGS	3	95
SAMBUCUS NIGRA SPP. CAERULIA	BLUE ELDERBERRY	16" DEEPOT	6	16

RIPARIAN AREA 3 (0.07 ACRES)

BOTANICAL NAME	COMMON NAME	SIZE	SPACING (OC FEET)	QUANTITY
AESCULUS CALIFORNICA	CALIFORNIA BUCKEYE	15 GAL	12	5
QUERCUS AGRIFOLIA	COAST LIVE OAK	15 GAL	12	4
ROSA CALIFORNICA	CALIFORNIA WILD ROSE	1 GAL	6	9
RUBUS URSINUS	CALIFORNIA BLACKBERRY	1 GAL	6	11
SYMPHORICARPUS ALBUS	COMMON SNOWBERRY	1 GAL	4	11

HYDROSEED MIX

BOTANICAL NAME	COMMON NAME
ACHELLIA MILLEFOLIUM	YARROW
BROMUS CARINATUS	CALIFORNIA BROME
ELYMUS GLAUCUS	BLUE WILDRYE
FESTUCA CALIFORNICA	CALIFORNIA FESCUE
HORDEUM BRACHYANTHERUM	MEADOW BARLEY
LEYMUS TRITICOIDES	CREEPING WILD RYE
POA SECUNDA	NATIVE PINE BLUEGRASS



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CREEK BANK STABILIZATION PROJECT - PHASE II

CHILDREN'S HEALTH COUNCIL
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PROJECT #27109
DRAWN BY:RFP, ACS
CHECKED BY: BSS, RBB
ORIGINAL DRAWING SIZE: 24 X 36

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0 20
SCALE: 1 " = 20 '

PLANTING PLAN

Sheet

C-4.0

EROSION CONTROL LEGEND

SYMBOL	DESCRIPTION
	PROPERTY LINE
(100)	(E) CONTOUR (2 FT)
100	PROPOSED CONTOUR (2 FT)
	STAGING AREA
	FLOW
LOG	LIMIT OF GRADING
LOD	LIMIT OF DISTURBANCE
	EXISTING TREE
	EXISTING TREE TO BE REMOVED
SW	STRAW WATTLE
	COIR FIBER MATTING
	EXISTING CURB

NOTES:

1. CONTRACTOR SHALL COMPLY WITH NPDES CONSTRUCTION GENERAL PERMIT.
2. CONTRACTOR SHALL COMPLY WITH CAL TRANS FIBER ROLL (TYPE 2) STANDARDS. SEE SHEET C-6.1.
3. CONTRACTOR SHALL COMPLY WITH CAL TRANS ROLLED EROSION CONTROL PRODUCTS MODIFIED TO USE WOOD STAKES. SEE SHEET C-6.2.
4. ALL MATERIALS SHALL BE BIODEGRADABLE

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EROSION CONTROL PLAN

Sheet

C-5.0

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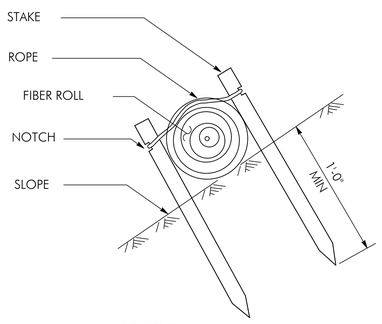

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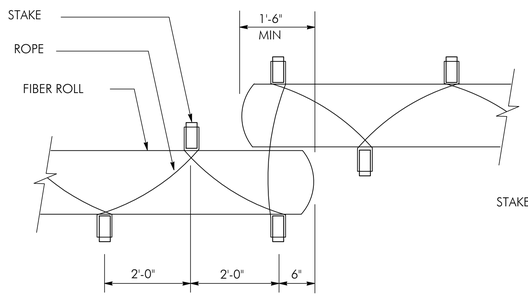
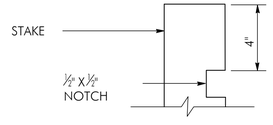


PLAN

FIBER ROLL
(TYPE 2)

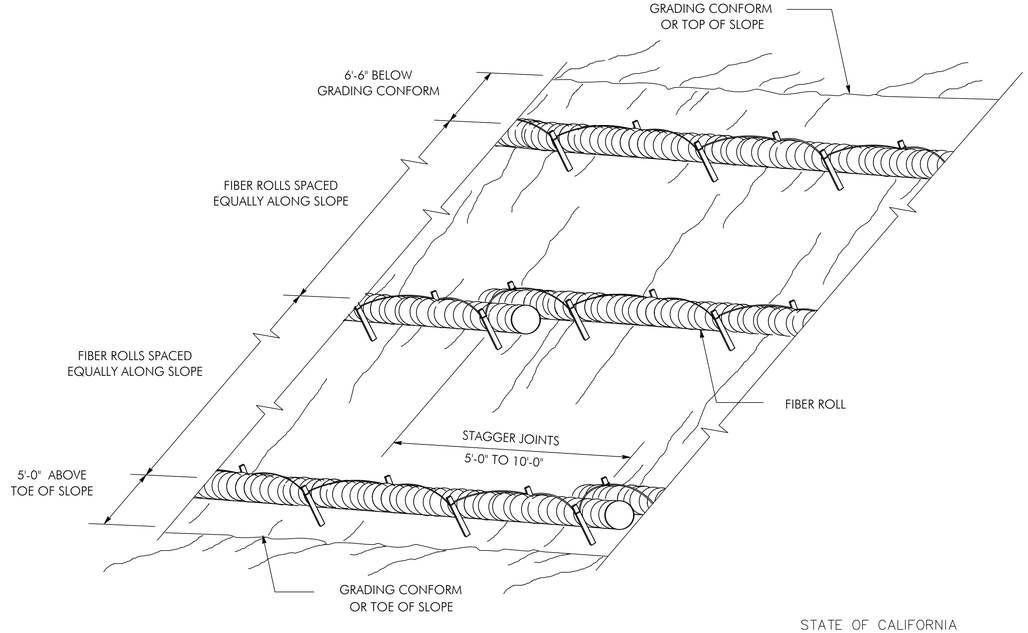


ELEVATION

STAKE NOTCH DETAIL

NOTES:

1. FIBER ROLL SPACING VARIES DEPENDING UPON SLOPE INCLINATION.
2. INSTALLATIONS SHOWN IN THE PERSPECTIVES ARE FOR SLOPE INCLINATION OF 10:1 AND STEEPER.



PERSPECTIVE

FIBER ROLL (TYPE 2)

NOT FOR CONSTRUCTION

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DRAWN BY: ACS
CHECKED BY: BSS, RBB
ORIGINAL DRAWING SIZE: 24 X 36

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

EROSION CONTROL DETAILS (FIBER ROLL)

NO SCALE

RNSP H51 DATED APRIL 3, 2009 SUPERSEDES NSP H51 DATED DECEMBER 1, 2006
THAT SUPPLEMENTS THE STANDARD PLANS BOOK DATED MAY 2006.

REVISED NEW STANDARD PLAN RNSP H51

EROSION CONTROL DETAILS

Sheet

C-5.1

wra
ENVIRONMENTAL CONSULTANTS
2169-G East Francisco Blvd.
San Rafael, CA 94901
(415) 454-8868 Phone
info@wra-ca.com

CREEK BANK STABILIZATION PROJECT - PHASE II

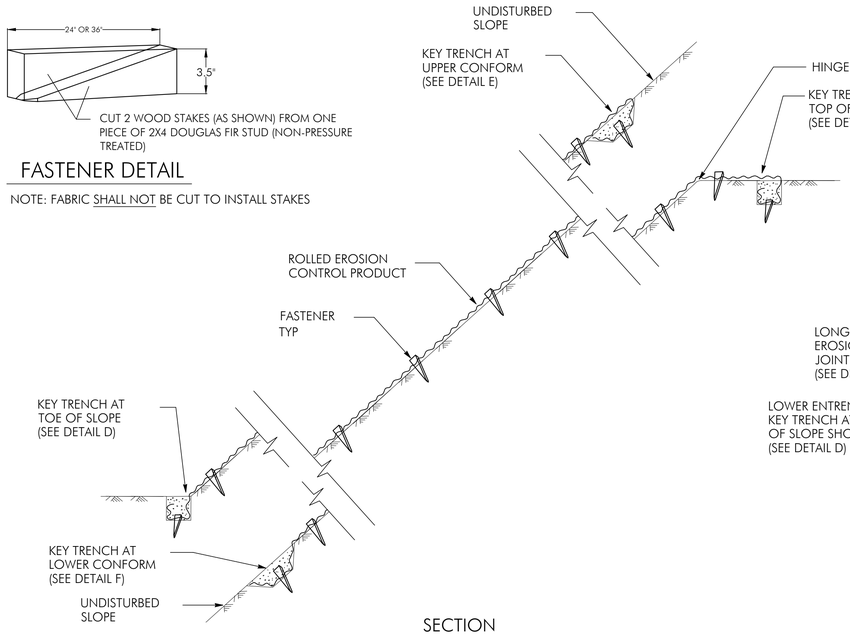
CHILDREN'S HEALTH COUNCIL
PALO ALTO, CALIFORNIA

NOT FOR CONSTRUCTION

CUT 2 WOOD STAKES (AS SHOWN) FROM ONE PIECE OF 2X4 DOUGLAS FIR STUD (NON-PRESSURE TREATED)

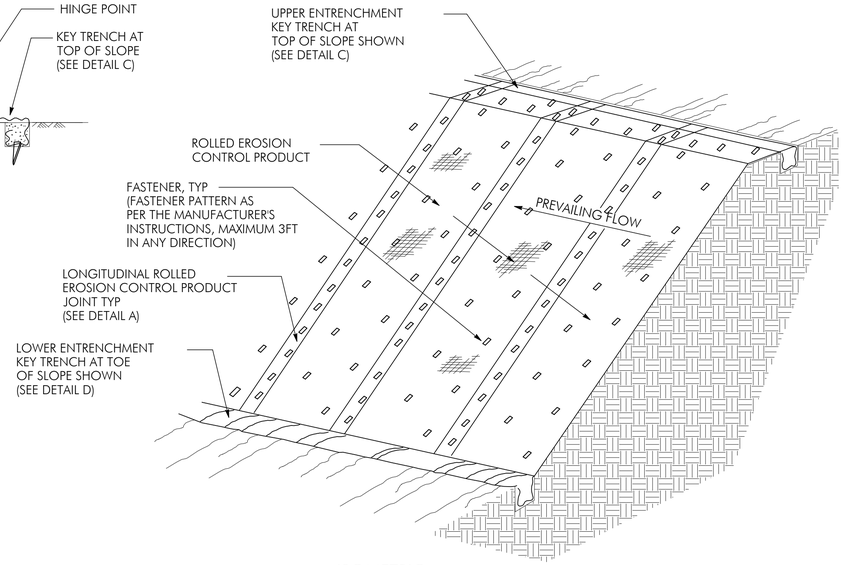
FASTENER DETAIL

NOTE: FABRIC SHALL NOT BE CUT TO INSTALL STAKES



SECTION

ROLLED EROSION CONTROL PRODUCT ON SLOPE WITH VARIOUS KEY ENTRENCHMENTS

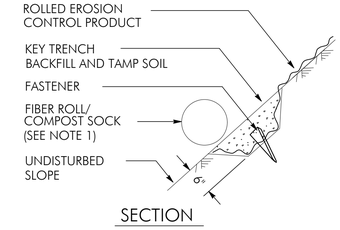


ISOMETRIC

ROLLED EROSION CONTROL PRODUCT ON SLOPE

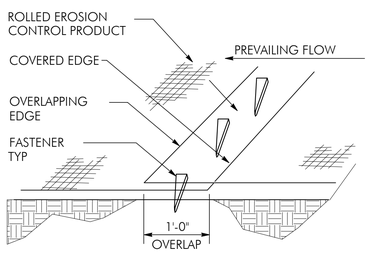
NOTE:

1. FIBER ROLL/COMPOST SOCK SHOWN FOR REFERENCE PURPOSES ONLY.
2. IF TRANSVERSE ROLLED EROSION CONTROL PRODUCT JOINTS ARE REQUIRED ON SLOPES, SEE DETAIL B.



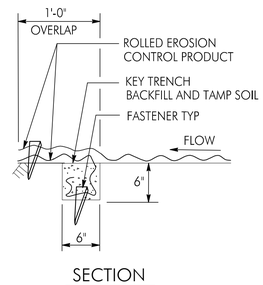
SECTION

DETAIL F
KEY TRENCH AT LOWER CONFORM



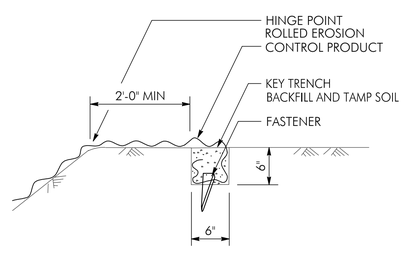
PERSPECTIVE

DETAIL A
LONGITUDINAL ROLLED EROSION CONTROL PRODUCT JOINT



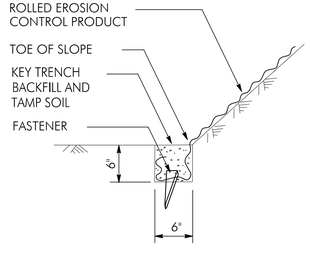
SECTION

DETAIL B
TRANSVERSE ROLLED EROSION CONTROL PRODUCT JOINT



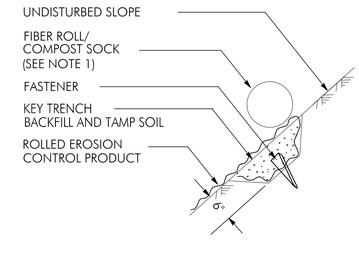
SECTION

DETAIL C
KEY TRENCH AT TOP OF SLOPE



SECTION

DETAIL D
KEY TRENCH AT TOE OF SLOPE



SECTION

DETAIL E
KEY TRENCH AT UPPER CONFORM

NOTE: THIS DRAWING SHEET IS A CAL TRANS DETAIL FOR ROLLED EROSION CONTROL PRODUCT MODIFIED TO USE WOOD STAKE FASTENERS.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

ROLLED EROSION CONTROL PRODUCT

NO SCALE

NSP H53 DATED JUNE 5, 2009 SUPPLEMENTS
THE STANDARD PLANS BOOK DATED MAY 2006.

NEW STANDARD PLAN NSP H53

Date	Issues And Revisions	No.
03/27/19	CONCEPT	
08/19/19	30% DESIGN	

PROJECT #27109
DRAWN BY: ACS
CHECKED BY: BSS, RBB
ORIGINAL DRAWING SIZE: 24 X 36

EROSION CONTROL DETAILS

Sheet

C-5.2

Part 13. Hydrology Study

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MEMORANDUM

To: Terry Boyle **From:** Ben Snyder, PE

cc: Justin Semion; Brian Bartell, RLA

Date: March 2, 2020

Subject: San Francisquito Creek Bank Stabilization – Phase 2 – 30% Design

---

This document was written to accompany the permit-level design for Phase 2 of rebuilding and stabilizing the bank along San Francisquito Creek. The concept of a living crib wall with rock toe protection was presented to representatives from Stanford University, California Department of Fish and Wildlife, National Marine Fisheries Service, US Fish and Wildlife Service, the Regional Water Quality Control Board, the US Army Corps of Engineers, and independent third party experts, who provided helpful feedback as we advanced the design from conceptual to the permitting level. Attached you will find the 30% Design Drawings and reports associated with this project. We have also included a brief summary of our analysis and design development process below.

1. Background

The banks of San Francisquito Creek, at the margin of the Stanford property leased to Children's Health Council (CHC), are at high risk for erosion, and are identified as a high priority for stabilization in the San Francisquito Creek Joint Powers Authority (JPA, 2000) Bank Stabilization and Revegetation Master Plan (JPA, 2000). Erosion of the channel banks on the CHC property accelerated during the 2016 – 2017 rainy season, resulting in the loss of approximately 50 horizontal feet of the creek bank and 7,500 square feet of the outdoor learning area, which poses a danger to public safety and property, if left unmanaged. The channel banks in the area of accelerated erosion are approximately 30 feet high, with a vertical face and some undercut portions of the bank. Existing soil behind the bank failure and directly adjacent to the outdoor learning area are cracking and near failure.

The project has been split into two phases, corresponding to work outside and inside the channel. Phase 1 was located beyond the top of the channel bank and consisted of concrete "shear pins" and steel tie-backs. The shear pins, which were installed in 2019, are set back from the creek bank by about 6 ft, and extend 20 ft vertically below the elevation of the existing creek bed. The Phase 1 project features are a line-of-last-defense against bank retreat and loss of property into the creek, but do not protect the existing character of San Francisquito Creek, which has significant ecological and cultural resources. Based on comments received from the San Francisquito Creek Joint Powers Authority and Santa Clara Valley Water District, the City of Palo Alto required in Condition of Approval #14 that in-channel improvements below the top of bank be designed and implemented prior to December of 2021.

Phase 2 of the project will be an in-channel living crib wall structure, designed to protect the toe of the existing bank, prevent future bank failure, and provide habitat for Steelhead trout. Phase 2 will meet stipulation #14 of the Conditions of Approval letter issued by the City of Palo Alto authorizing the shear pin wall project, which states:

> *…The purpose of this secondary project would be to minimize risk of future exposure to the shear pin wall, maintain or improve sediment transport by minimizing continued erosion along the base of the wall adjacent the subject property, and maintain or otherwise improve stream function.*

2. Design Constraints

Primary site constraints influencing the design include:

- No excavation of the existing bank is allowed by the property owner, Stanford University, due to the risk of disturbing cultural resources.
- San Francisquito Creek is considered critical habitat for Steelhead trout (*Oncorhynchus mykiss*) in the segments that adjoin the property, therefore, any work proposed within the channel will require special provisions to minimize potential impacts to the species.
- The project may not result in increased flood risk.
- The project may not increase risk of bank failure to neighboring properties.
- The property boundary of the parcel upon which CHC is located is delineated by the historic centerline of the creek channel, therefore any work that would potentially impact adjacent properties would require obtaining temporary or permanent easements on the adjacent properties.
- The Stanford-owned property located immediately to the southeast is subject to a conservation easement that does not allow construction of any kind.

3. Site Assessment

WRA engineers visited the site at 650 Clark Way in Palo Alto on October 11, 2018. We descended the steep, 30 foot high bank of San Francisquito Creek with the aid of rope, observed the recent bank failure, and walked the project area, which extends approximately 500 feet upstream and downstream of the project area as shown in Figure 1. The flagged locations of the Phase 1 shear pins designed by Cotton Shire were observed along the top of bank. Approximately 200 feet of bank failures were observed along the property.

Flows appear to impinge on the bank, which is comprised of a mixture of unconsolidated sandy gravel alluvium, and is sparsely vegetated. Toe scour was evident along much of the project area. There appears to be evidence of the formation of a pool along the main bank failure, which was likely followed by a land slide of the bank material into the pool. The channel bed is partially armored with large cobbles, particularly upstream of the bank failure. The bed along the Project Area appeared less armored, with several areas of exposed sand and gravel (Figure 2).

The combination of the height and steepness of the bank, sparse vegetation, evidence of recent incision, evidence of ongoing toe erosion, and the unconsolidated nature of the bank material strongly suggests that the bank will continue to retreat laterally unless it is adequately reinforced using engineered methods.

4. Data Collection and Review

A variety of pertinent site data and existing work was reviewed as part of the design process in order to characterize the site and identify any gaps or needs for additional information, including: the geotechnical site evaluation, topography, hydrology, and hydraulics. A robust description of the hydrologic and geomorphic setting was developed in the San Francisquito Creek Bank Stabilization and Revegetation Management Plan (JPA, 2000).

Sand layers were observed within the bank material along the toe of the bank failure. An active landslide is mapped near the middle of the bank failure (CSA 2017). No bedrock is exposed at the site and none was mapped during subsurface explorations.

Recent topographic data and hydrologic data were reviewed prior to developing the conceptual design. A topographic survey was completed by Cotton Shires and Associates, Inc. and covered the width of San Francisquito Creek channel along the project area, extending approximately 100 ft upstream and downstream of the recent bank failure (CSA, 2017). Topographic survey points collected by CSA were combined with topographic data from a 1-D hydraulic model developed by Noble Consultants, Inc. in order to create a digital terrain model of the site (Noble Consultants, Inc., 2010). The topographic data from the Noble model captured more channel length than was surveyed by CSA, allowing for more complete representation of the system in the digital terrain model.

5. Hydrology

The watershed is a mix of rural mountain streams with suburban settings in flatter areas. There are a number of tributary creeks including Bear Creek, Corte Madera Creek, and Los Trancos Creek. Major factors in the hydrology of the San Francisquito Creek include historical land use changes such as urbanization, agriculture, and logging. There are also multiple structures impacting flows throughout the system. The largest structure is likely the Searsville Dam on Corte Madera Creek. Detailed information about the watershed is available in the Master Plan (JPA, 2000).

Historical flow records are useful for defining the local flow regime, particularly discharge magnitudes, which tend to control erosion and sedimentation processes and may be used to aid in defining jurisdictional zones, such as ordinary high water and the 100-year flood elevation. The United States Geologic Survey (USGS) has operated stream gage #11165400 on San Francisquito Creek near Stanford University intermittently since 1930. Streamflow statistics provided estimates of discharge magnitude for events ranging from mean annual flow to a 500-year event (USGS, 2019).

The Federal Emergency Management Agency published a Flood Insurance Study for San Francisquito Creek in 2014 (FEMA, 2014), which included peak flow values for 10-, 50-, 100- and 500-yr events and backwater profiles in the Project Area for 10- and 100-year events. An update to the FIS was released in 2019, which omitted the backwater profiles (FEMA, 2019).

The hydrology for this report was defined by data presented in the 2014 Flood Insurance Study and from USGS stream gauge #11164500. Stipulation #16 of the City of Palo Alto Conditions of Approval for the project stated that FEMA-approved hydrology and hydraulics are to be used to define the 100-year event. Therefore, the data from FEMA is used to define the 100-year event peak discharge and backwater surface profile. Discharge magnitudes are presented in Table 1.

6. Hydraulics

Project features were evaluated using hydraulic modeling to ensure that the project would not increase flood risk, would be stable under design conditions with an allowable factor of safety, and would not increase risk of bank failure along adjacent properties. Our analysis made use of both one-dimensional (1D) and two-dimensional (2D) models, with the 1D model primarily being used for assessment of the water surface profile, and 2D model used to evaluate shear and velocity distributions in the study area. Methods and results of each approach are discussed in the following sections.

6.1 One-Dimensional Hydraulics

A one-dimensional (1D) hydraulic model was developed by Schaaf and Wheeler to evaluate the hydraulics of Phase 1 of the bank stabilization project, and included San Francisquito Creek from well above the project area down to San Francisco Bay. This model was provided to WRA with permission from Children's Health Council to use for evaluating Phase 2. The model included existing conditions geometry, in addition to proposed conditions for the Phase 1 project, assuming that the remaining channel cross section had been eroded to the alignment of the Phase 1 shear pins. The 1D model geometry was modified by WRA to represent existing conditions in the project area as surveyed in 2016, as well as proposed conditions based on the WRA design. The model was run using the FEMA 100-year discharge, 8,330 cfs. 100-yr water surface elevations are presented in Table 2.

The existing conditions model developed by WRA predicts water surface elevations lower than those published by FEMA. This is likely due to the bank failure that occurred at the CHC property, which increased cross sectional area, and flow conveyance. Construction of Phase 2 is expected to increase water surface elevations upstream of the project by as much as 0.4 feet. Backwater effects of greater than 0.1 feet are expected to extend as far as 1,000 feet upstream of the project.

This area of San Francisquito Creek is in a FEMA Zone A (FEMA, 2019). Increases in 100-year water surface are generally acceptable in these zones, as long as there is no increase in flood risk. The 100-year flood is expected to be well below the top of bank in this area, and this minor increase in predicted water surface elevation will not result in damage to any insured properties (FEMA, 2014). Furthermore, both the existing condition modeling and proposed condition modeling show a backwater surface well below the FEMA 100-year backwater surface profile, which was based on the channel geometry before the bank failure.

6.2 Two-Dimensional Hydraulics

WRA developed a two-dimensional hydrodynamic model using US Army Corps of Engineers software HEC-RAS v. 5.0.6 to evaluate flow conditions at the site and identify suitable bank stabilization measures. Model geometry was created using the digital terrain model of existing conditions developed by Cotton Shires and Associates (CSA) for the Phase 1 project. A rectilinear mesh of 10 ft grid cells was created for the project area. The manning's roughness value used for the project area was a composite value of 0.043. The model was run using an adjustable time step controlled by the Courant condition and "full

momentum" solver in order to evaluate the distribution of flow velocity and shear within the project area. The use of the full momentum solver resulted in an increase in predicted water surface elevations, but only the official FEMA backwater profile will be used for defining the 100-yr floodplain. Model results will not be used to redefine flood insurance rate maps.

The hydraulic modeling for the 100-year event shows flow velocities to be over 8 feet per second and through the project area. The shear stress values range from 0.5 to 1.8 pounds per square foot. These hydraulic values are well within the parameters of stabilized streambank using rock slope protection and a live crib wall. The shear and velocity values indicate that rock toe protection with median particle diameter of at least 12 inches will be required.

A plan view of 10-year model results showing existing conditions and proposed condition velocity distribution is presented in Figure 4 and Figure 5, respectively. A plan view of model results showing existing conditions and proposed condition shear distribution is presented in Figure 6 and Figure 7, respectively. A section view of existing conditions velocity and shear across the channel near the middle of the project area is presented in Figure 8 and Figure 9, respectively. A section view of proposed conditions velocity and shear across the channel near the middle of the project area is presented in Figure 10 and Figure 11, respectively. A comparison of existing and proposed conditions of the terrain and water surface elevations for the 2-year, 10-year, and 100-year storm events is presented in Figure 12.

7. Crib Wall Description

WRA developed a live log crib wall design along the bank failure, incorporating feedback from 3rd party reviewers, the interagency review team, and Stanford University, the property owner. Crib walls have a natural aesthetic, provide immediate erosion protection, and support the establishment of woody plant species. This method has been found to be highly effective on the outside bend of streams where there are high velocities and where a wall is needed to stabilize the toe. Crib walls can have a slope of up to 0.25:1 (horizontal to vertical) and can withstand flows of up to 12 feet per second. No other "soft" bank stabilization measures meet those criteria. Boulder grade control will be required to prevent the channel from undercutting the crib wall.

The design calls for toe protection at the base of the slope using large boulders and cobbles. Additional rock is used as the foundation of the crib wall structure. The design involves stacking 1.5' diameter logs in a fashion similar to a log cabin but instead of building a vertical wall, this structure has a 1:1 slope. The first level of the crib wall uses tie-back logs, which are logs set into the bank, braced to absorb the impact of the streamflow. The first level of the crib wall also includes rootwads along the natural pool of the creek shown in Sheet C-3.0 of the drawings. These rootwads provide interstitial spaces for fish habitat. The second layer of the crib consists of two rows of logs parallel to the streamflow connecting the first layer of tie-back logs. Each log is pinned to the logs below using steel bolts, nuts, and washers to provide redundancy in structural loading. Helical anchors will be driven into the soil and connected to the crib wall to prevent the overall structure from moving laterally. The third layer of crib wall is similar to the first layer using tie-back logs and the fourth layer will match the second layer and so on. Live willow cuttings are inserted in the voids between logs to provide riparian habitat, reduce water velocities along the crib wall and grow complex root structures around the crib wall providing additional stability. Logs will be placed until the desired height of bank protection is achieved. The bank above the crib wall will be graded at a 2:1 slope from the top of the crib wall to the existing bank. Native riparian plantings will be installed and established to provide additional habitat value and soil stability. Non-planted areas will receive native riparian hydroseed targeted for the local ecosystem.

8. Next Steps

Once City and resource agency comments on the permit application package are received, additional design details will be defined prior to construction, including the final gradation of rock toe protection. A detailed force-balance analysis will be developed. Sizing calculations and gradations for varying rock types will be fine-tuned in conjunction with material available in nearby quarries.

Hydrodynamic modeling will be performed to evaluate the proposed crib all and grade control structures, and refine the design to ensure that it will be robust and not impact bank stability in neighboring properties. Additional documentation regarding the design, implementation and post-project success monitoring will be developed.

9. Tables

Table 1. Peak flow magnitudes for San Francisquito Creek

Recurrence Interval	Annual Exceedance Probability (%)	Discharge Magnitudes (cfs)	Reference
Winter Base Flow[1]	-	50	USGS Gage Site #11164500
Mean Annual Flood	100	811	Streamstats Site #11164500
2-yr	50	1,610	Streamstats Site #11164500
5-yr	20	3,100	Streamstats Site #11164500
10-yr	10	4,350	FIS Upstream of Middlefield Road
25-yr	4	5,610	Streamstats Site #11164500
50-yr	2	7,100	FIS Upstream of Middlefield Road
100-yr	1	8,330	FIS Upstream of Middlefield Road
200-yr	0.5	8,700	Streamstats Site #11164500
500-yr	0.2	9,850	FIS Upstream of Middlefield Road

[1]Winter Base Flow is based on historical data from the USGS Stream Gage

Table 2. 100-yr Water Surface Elevations for San Francisquito Creek (ft NAVD 88)

River Station	FEMA 2014 FIS	Existing Condition 1-D Model Results	Proposed Condition 1-D Model Results
(ft)	(ft)	(ft)	(ft)
31410	80.4	79.6	79.4
31509	80.7	80.1	80.1
31613	81.0	80.3	80.6

10. Figures

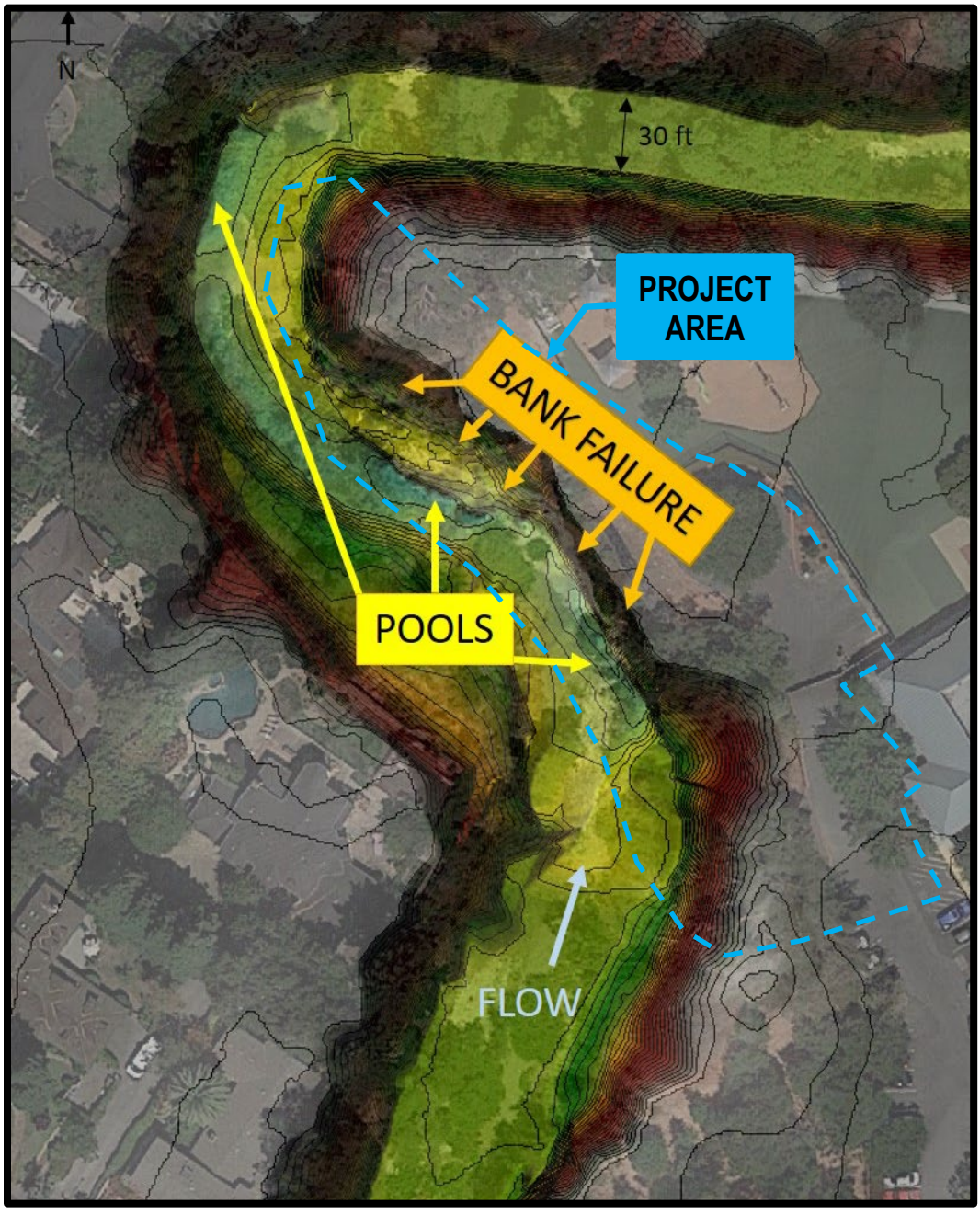

Figure 1. Aerial photograph overlain on topographic map showing bank failure and pools

Figure 2. Oblique view of project area as viewed from San Francisquito Creek, looking upstream

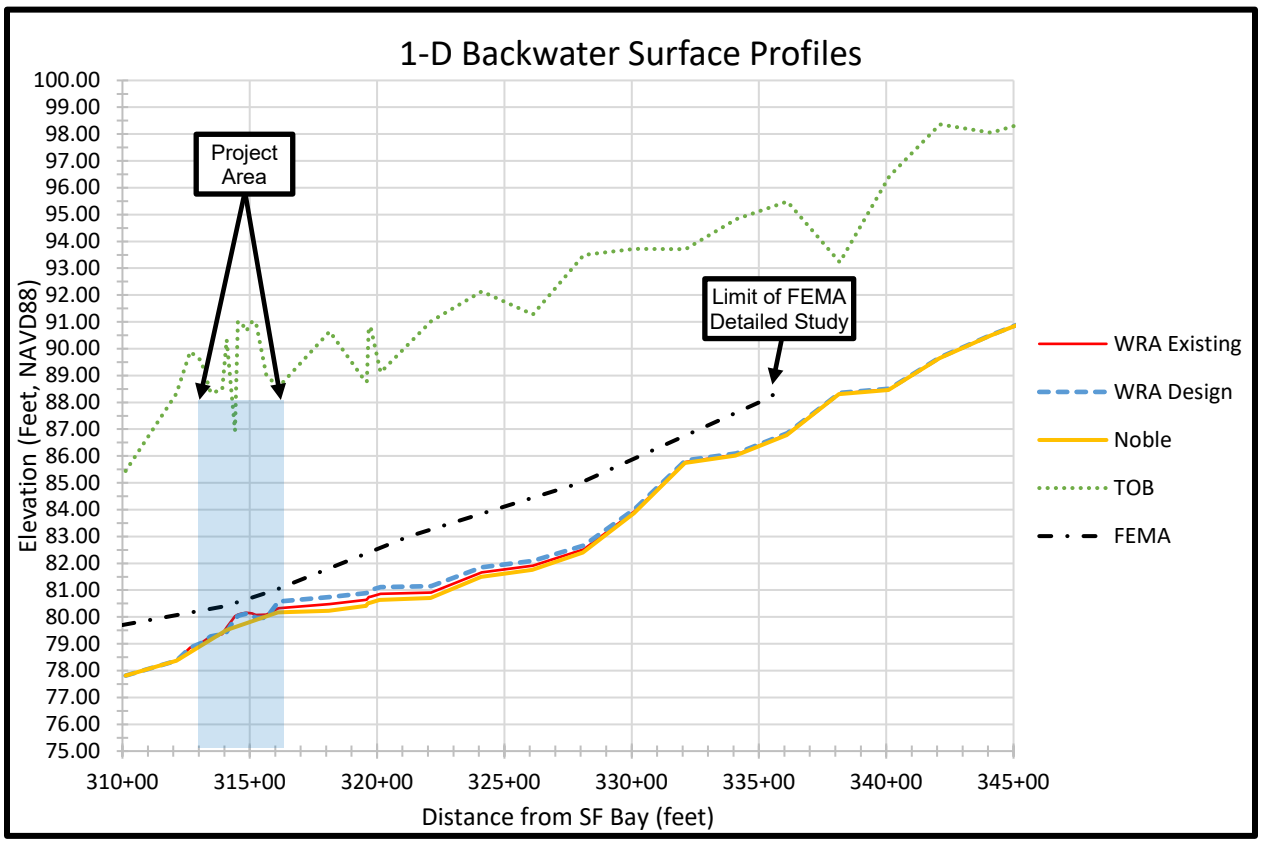

Figure 3. Backwater Surface Profiles from 1-D Modeling of 100-Year Storm Event

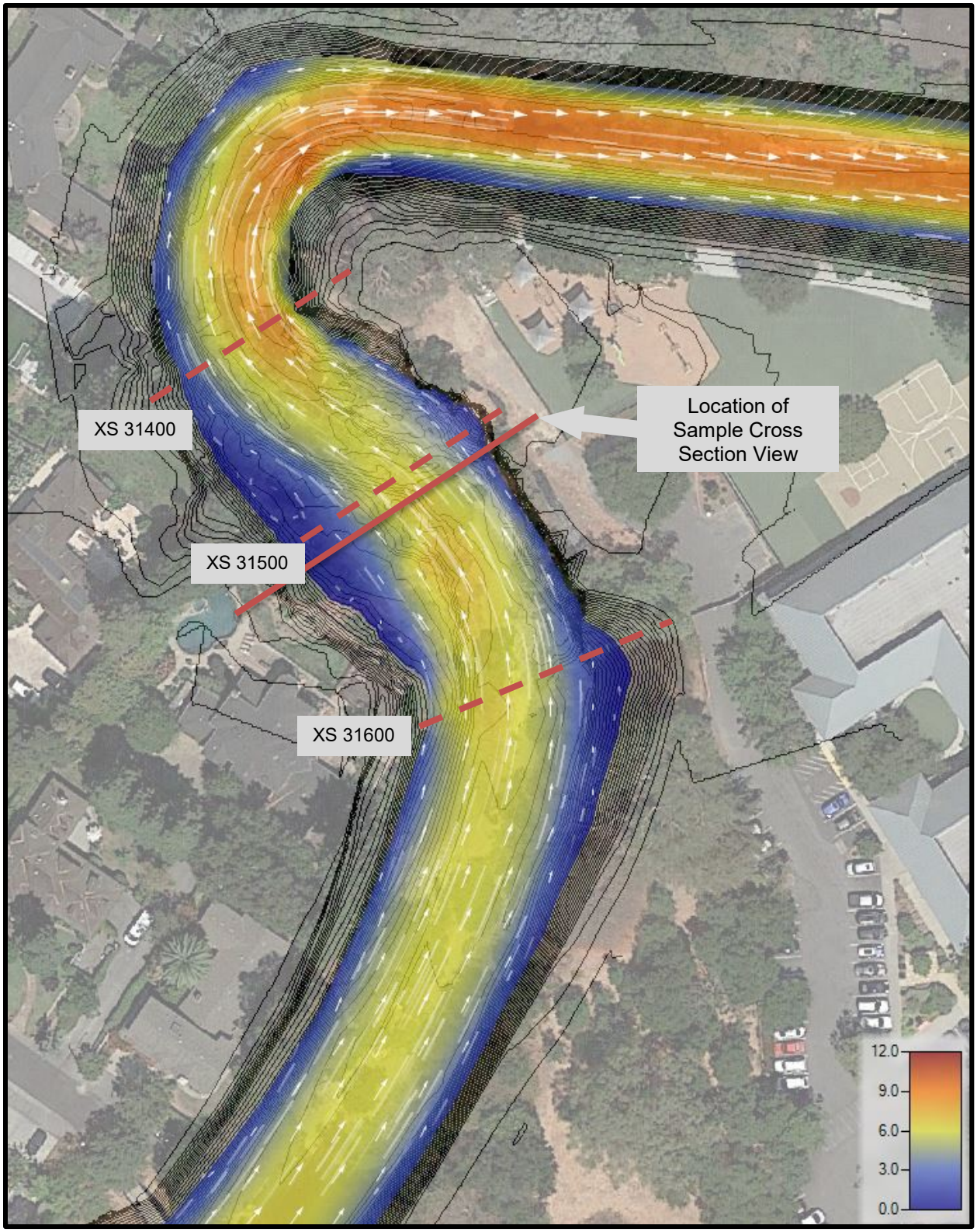

Figure 4 . Existing Conditions model of velocity (ft/s) for 10-year event

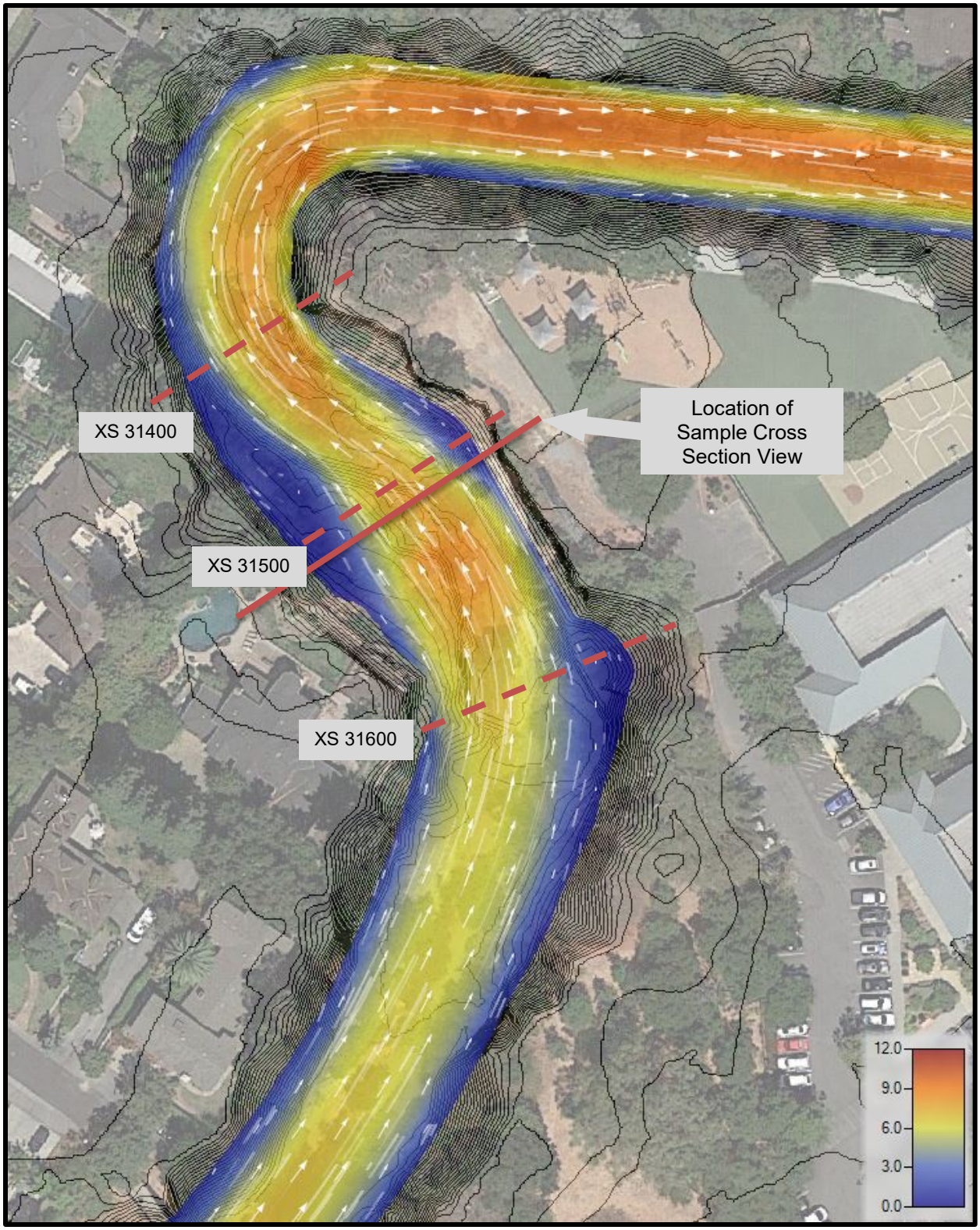

Figure 5 . Proposed Conditions model of velocity (ft/s) for 10-year event

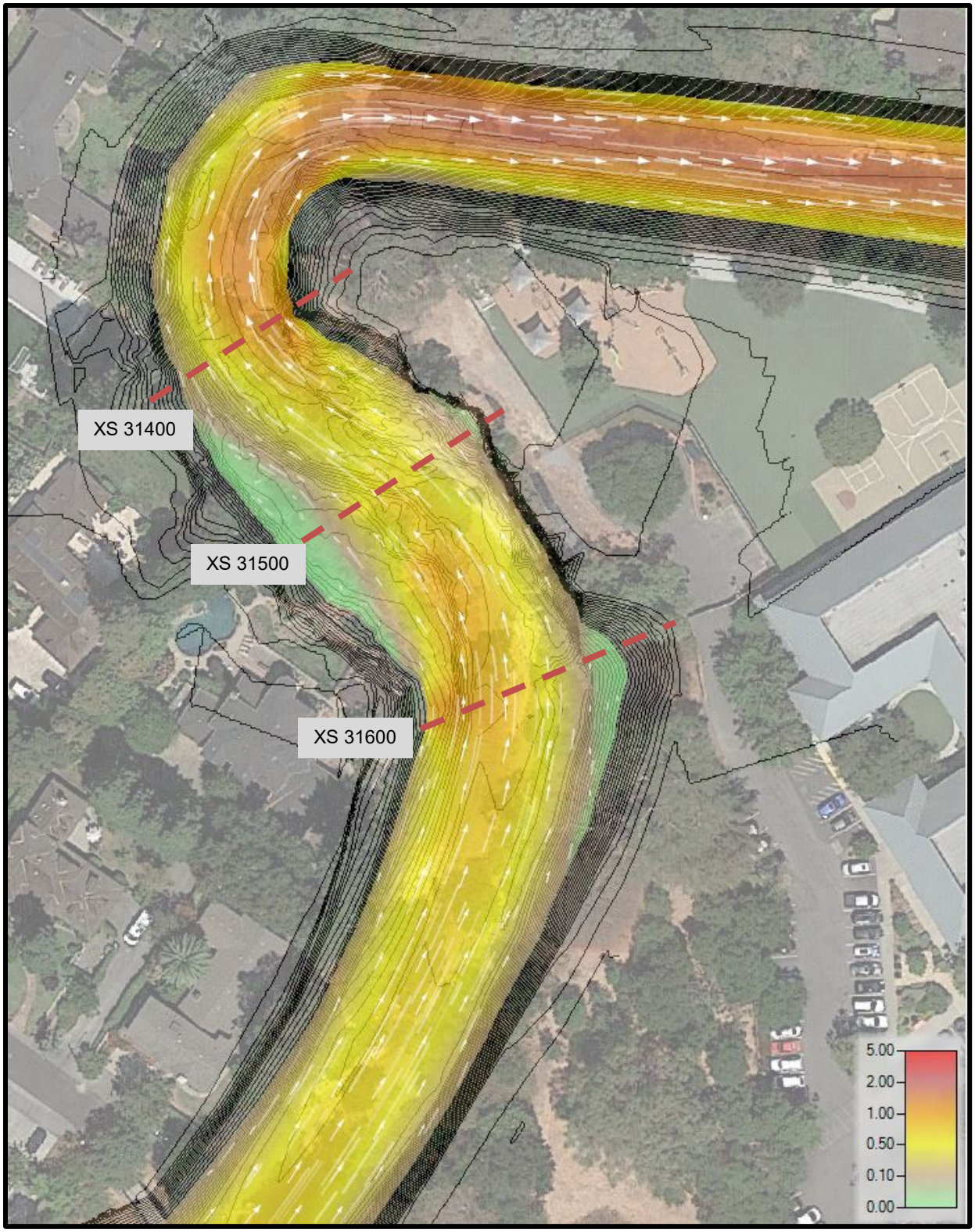

Figure 6 . Existing Conditions model of shear (lb/sf) for 10-year event

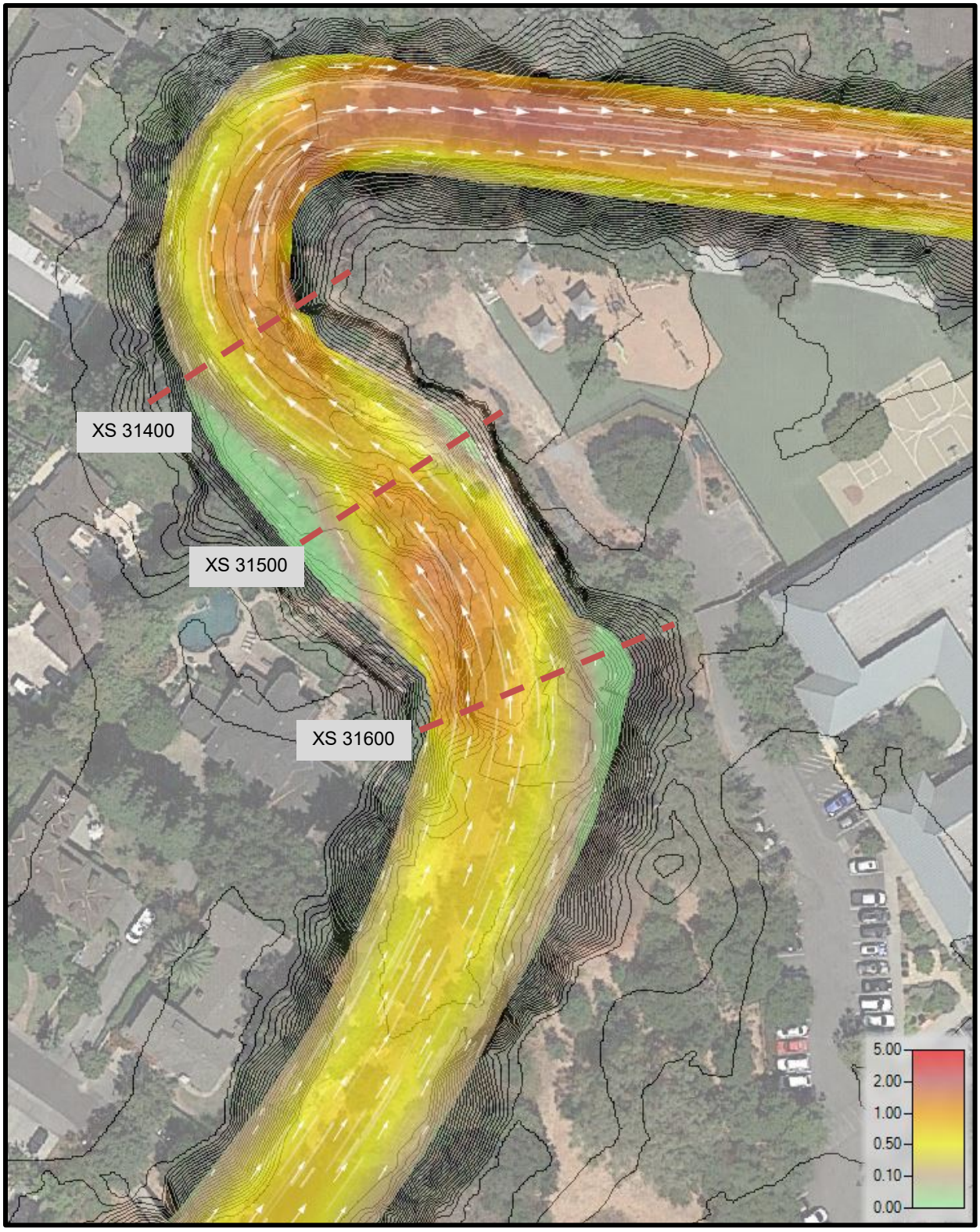

Figure 7 . Proposed Conditions model of shear (lb/sf) for 10-year event

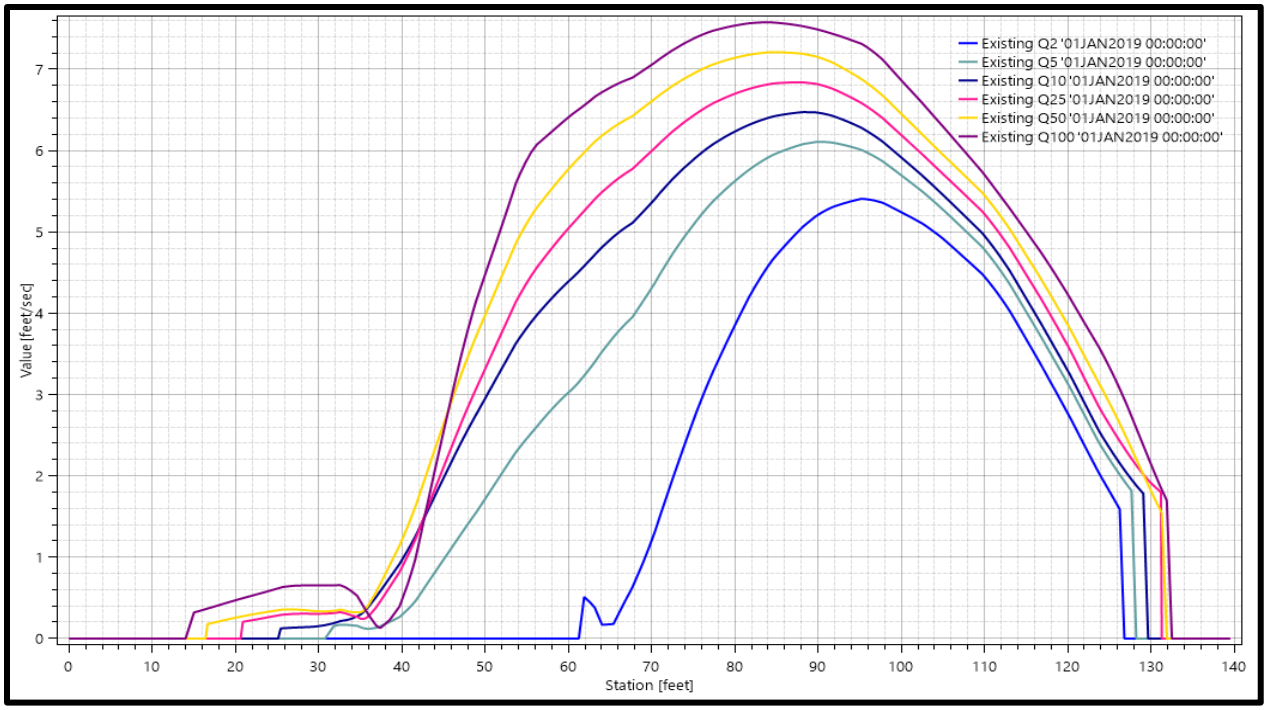

Figure 8. Existing Conditions model output showing velocity (ft/s) for 2-year to 100-year events at a sample cross section within the Project Area

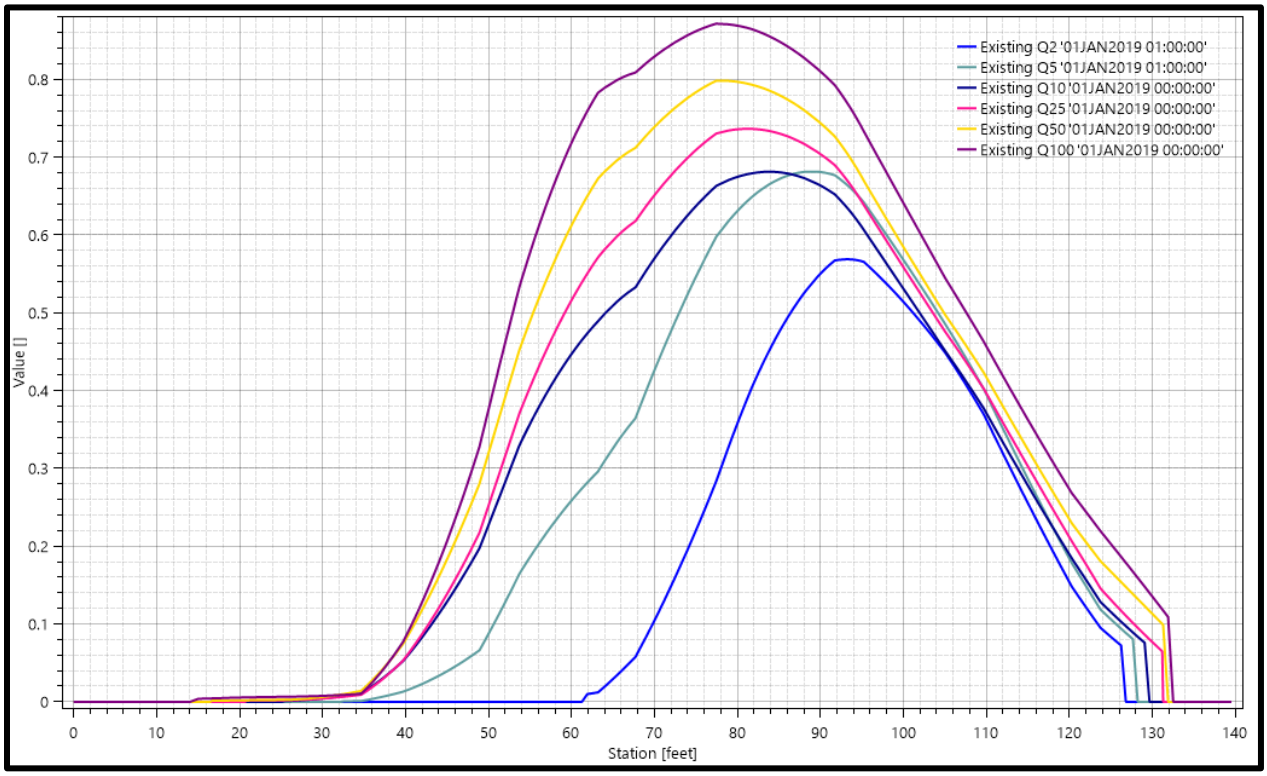

Figure 9. Existing Conditions model output showing shear stress (lb/sf) for 2-year to 100-year events at a sample cross section within Project Area

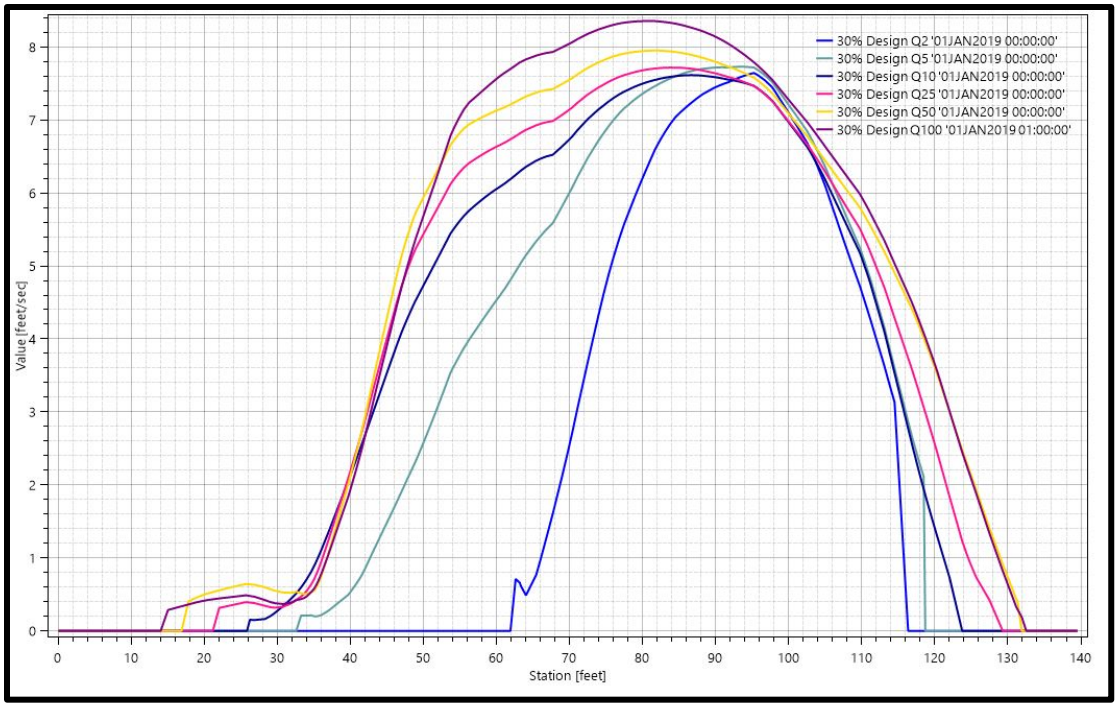

Figure 10. Proposed Conditions model output showing velocity (ft/s) for 2-year to 100-year events at a sample cross section within the Project Area

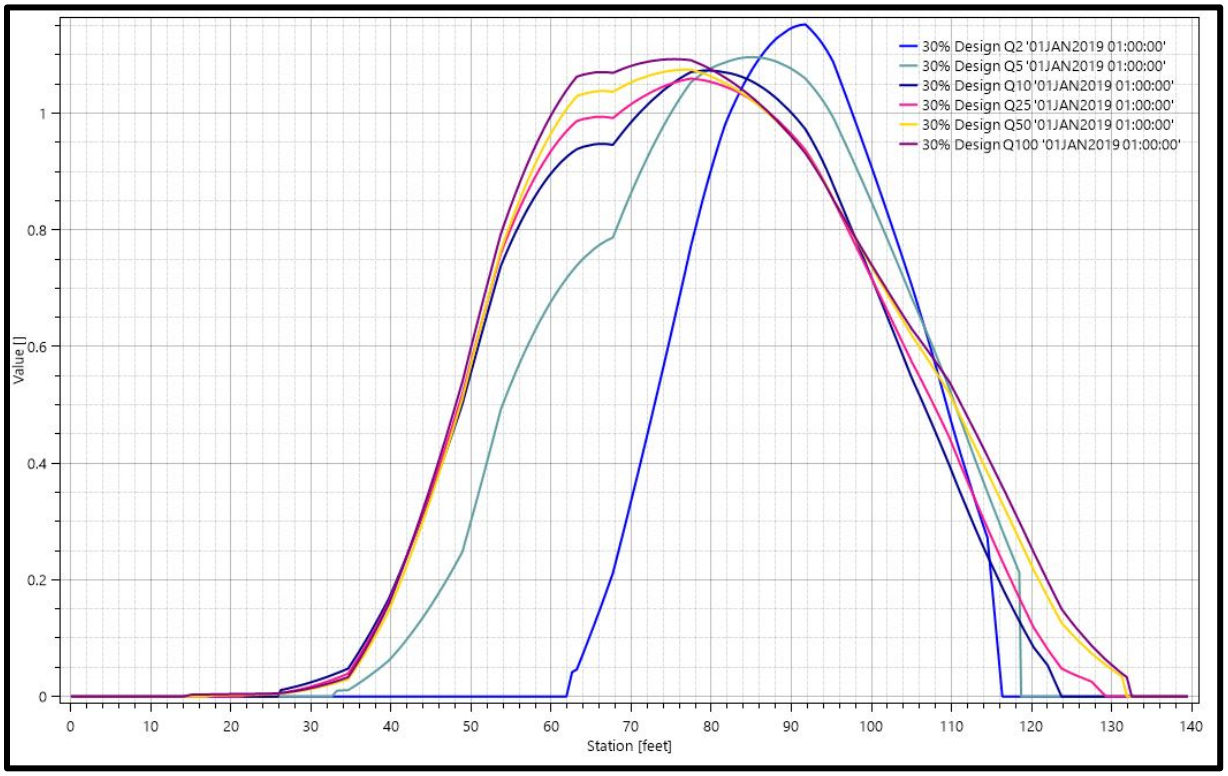

Figure 11. Proposed Conditions model output showing shear stress (lb/sf) for 2-year to 100-year events at a sample cross section within Project Area

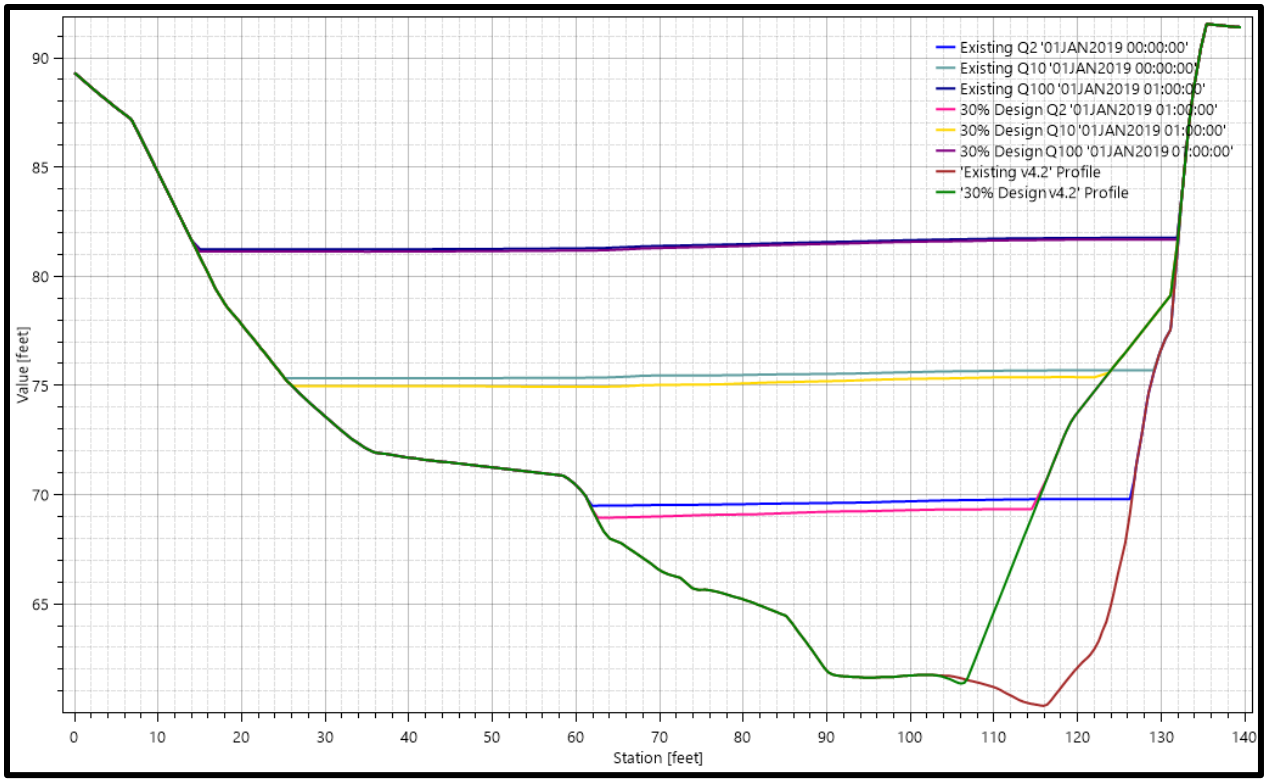

Figure 12. Comparison of Existing and Proposed terrain and Water surface elevations (feet) at sample cross section

References

CSA. (2017). Cotton Shires and Associates, Inc. *Children's Health Center Surveying and Engineering*. California, USA.

FEMA. (2014). *Flood Insurance Study, Santa Clara County and Incorporated Areas.* FEMA.

JPA. (2000, September). *San Francisquito Creek Bank Stabilization and Revegetation Master Plan.* Retrieved 2019, from City of Menlo Park: https://www.menlopark.org/207/Master-Plan-Report

Noble Consultants, Inc. (2010). *San Francisquito Creek Hydraulic Modeling and Floodplain Mapping.* San Francisco: US Army Corps of Engineers.

Philip Williams and Associates. (1998). *San Francisquito Creek Stabilization and Revegetation Master Plan.* Menlo Parl, Palo Alto, East Palo Alto: Cities of Menlo Park, Palo Alto, East Palo Alto; Counties of San Mateo and Santa Clara.

USGS. (2019, 7 2). *StreamStats Data-Collection Station Report #11164500*. Retrieved from usgs.gov: https://streamstatsags.cr.usgs.gov/gagepages/html/11164500.htm

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Part 14. Dewatering Plan

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Memorandum

To: Terry Boyle
Children's Health Council
650 Clark Way
Palo Alto, CA 94304

From: Andrew Smith, Ben Snyder, and Bianca Clarke

Date: December 18, 2019

Subject: Dewatering Plan, San Francisquito Creek Bank Stabilization Project, Palo Alto, California

The primary responsibilities of the dewatering plan are to (1) Provide a safe working area for construction crews and equipment; (2) minimize impacts to the environment such as turbidity for aquatic species and noise for local community; (3) Restore the creek to its original condition prior to de-watering.

WRA, Inc. is proposing a temporary creek bypass/dewatering plan for construction access for the bank stabilization efforts for the Children's Health Center. Prior to the construction of any dewatering structures, fish screens would be installed above the proposed upstream dam location as well as below the downstream dam location. WRA, Inc. would coordinate with the qualified fisheries biologist during the fish relocation activities to avoid conflicts as well as to ensure all fish have been relocated.

A gravity system is proposed to divert the water in the creek by using sandbags, plastic sheeting, and re-usable pipes. A sandbag dam would be placed at the upstream end of the project site approximately around station 316+50. A similar sandbag dam would be placed at the lower end of the Creek, approximately around station 312+00 to prevent any water from re-entering the work area. Plastic sheeting would be used to prevent seepage through the sandbags. The re-usable pipes would be used to drain water from the upstream sandbag dam to the downstream sandbag dam. The pipe size would be appropriate to capture the creek flow rate. We intend to use twelve (12) inch diameter pipes but could potentially reduce that size if the flows decrease at the time of construction. The conceptual layout of the dewatering plan is shown in Figure 1.

Any nuisance water within the site, between the upper dam and lower dam, would be pumped with a submersible pump and hoses into a filtration bag to clean the water. The nuisance water would be pumped up into the brush area so it can dissipate into the ground. Please refer to the attached diagrams for locations of sandbag dams and pipes. All water would be clean and filtered prior to being released back into the creek system. The contractor would dewater the site prior to the start of any construction within the creek.

All pumps would be placed in a containment tray and be fueled away from the creek channel. The pumps would be tied to a tree or stake to avoid movement caused by the vibration.

All dewatering measures and dams shall be removed at the end of the project and the creek shall be restored to its original conditions at the dam locations. The dams would be removed slowly to avoid any erosion or turbidity.

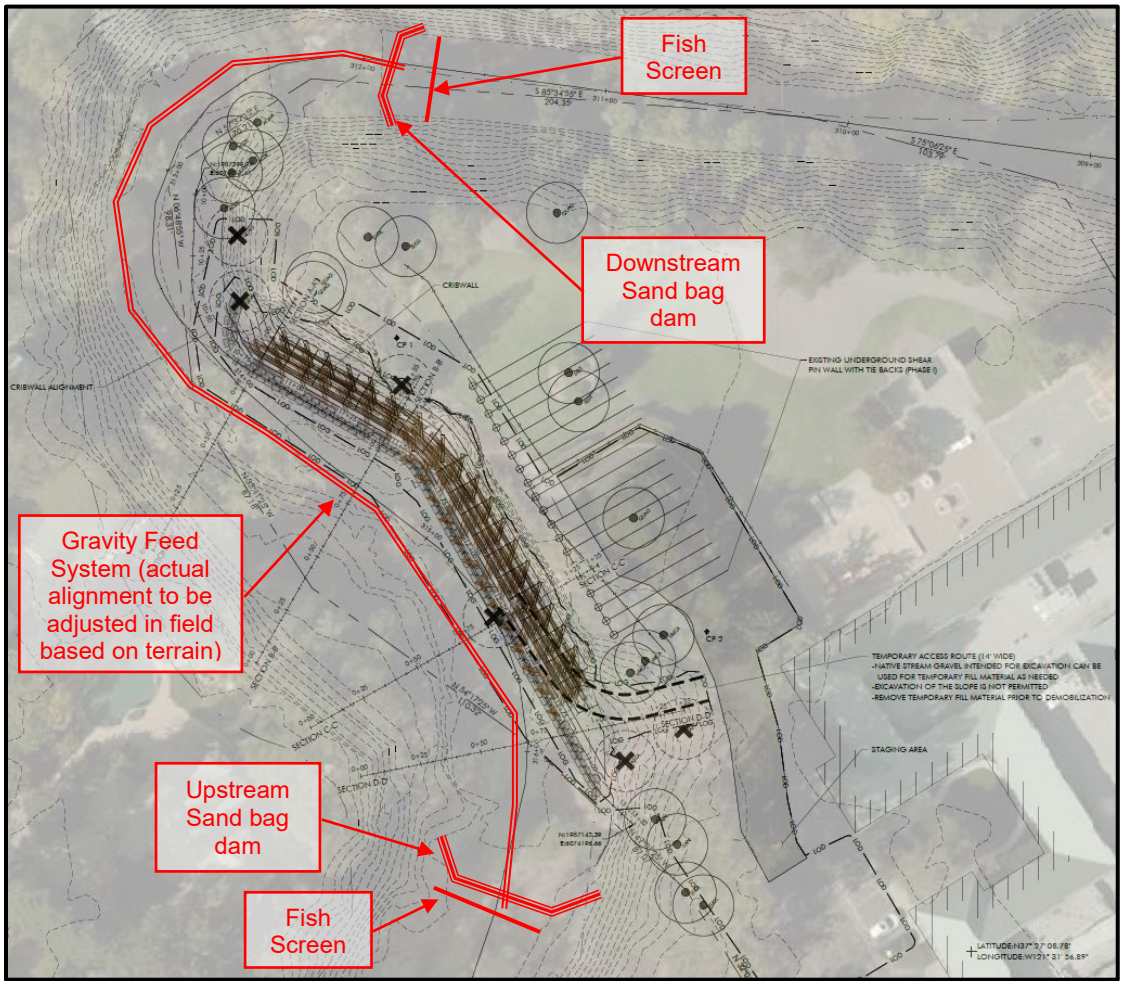

Figure 1: Dewatering Plan

Part 15. Fish Relocation Plan

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Fish Rescue and Relocation Plan

The purpose of this letter is to outline the procedures and equipment that will be used in the event that fish rescue and relocation operations are required during the dewatering of San Francisquito Creek as part of the CHC Project (Project). The Project will occur on an approximately 275 linear foot section of San Francisquito Creek, located on the border of San Mateo and Santa Clara Counties, California (Project Area). Fish capture and relocation is anticipated to be authorized for federal listed species including steelhead (*Oncorhynchus mykiss*), by the National Marine Fisheries Service (NMFS) Biological Opinion (BO) for the Project. The resumes for Nick Brinton and Stewart DesMeules, the fisheries biologists responsible for leading the capture and relocation effort, are attached with this document (Attachment A). Additional qualified biologists may assist with the capture and relocation effort.

Additional details provided by the contractor on the approach for dewatering have been reviewed prior to drafting this document. Based on the draft dewatering plan, the primary responsibilities of WRA during fish rescue and relocation are to (1) ensure that the Project Area is sufficiently isolated to prevent fish from entering the Project Area before dewatering is initiated (install exclusion nets); (2) complete with the capture and relocation of fish within the Project Area prior to pumping of remnant water; and (3) report the results of the rescue and relocation.

Minimization and Avoidance Measures

Any measures specified in the NMFS BO will be adhered to, the measures below are those from the NMFS Programmatic Biological Opinion for Restoration Projects (WCR-2015-3755) and will be used to guide the methods stated in this plan.

1) The work area boundaries, including access routes, shall be the clearly marked in the field before any work begins and shall be the minimum size required to complete the project.

2) All work will occur between May 1 and October 15 to avoid impacts to migrating salmonids. The seventy-two hour weather forecasts from the National Weather Service shall be consulted prior to starting any phase of the project that may result in sediment run-off to the stream. All associated erosion control measures must be kept on-site and be in place prior to the onset of precipitation.

3) Any work using equipment located within the stream channel shall be performed in isolation from the flowing stream. Cofferdams used to divert water shall be constructed with clean materials that will not themselves cause turbidity. If a work site is to be temporarily dewatered by pumping, intakes shall be completely screened with wire mesh not larger than ¼ inch to prevent fish and amphibians from entering the pump system. Note that this size mesh is specified in the NMFS 1997 criteria for screening when waters do not contain fry life stages.

4) Fish relocation shall be performed by a qualified fisheries biologist. Rescued fish shall be moved to the nearest appropriate site outside of the Project Area with favorable habitat conditions. A record shall be maintained of all fish rescued and moved. The record shall include the date of capture and relocation, the method of capture, the location of the relocation site in relation to the project site, and the number and species of fish captured and relocated.

5) No debris, soil, silt, sand, cement, concrete, or washings thereof, or other construction related materials or wastes, oil or petroleum products or other organic or earthen material shall be allowed to enter into or be placed where it may be washed by rainfall or runoff into waters of the State. When operations are completed, any excess material shall be removed from the work area where such material may be washed into waters of the State.

6) Appropriate BMPs shall be incorporated into the project to minimize the re-suspension and discharge of sediments and other pollutants downstream and to prevent channel or streambank erosion or destabilization once the project has been completed.

Methodology

The following section outlines the methodology that will be employed by the Project during fish rescue and relocation activities. The methodology incorporates the anticipated dewatering approach, WRA's previous experience conducting fish rescue and relocation activities, and input from Project Permits. Any fish rescue shall occur in advance of dewatering in case multiple days are required for the relocation effort.

Relocation Sites

Prior to the start of dewatering and fish salvage operations; the qualified biologist will identify a suitable downstream relocation site within the same stream as the Project Area to release collected fish. The relocation site will have suitable flow, depth, and cover to allow fish relocated to the area to recover and freely move away as desired. The relocation site will be far enough away from the Project Area to limit the potential for additional disturbance to the individuals associated with restoration activities. More than one relocation site may be used if a large number of fish are collected within the Project Area, in order to reduce disturbance and crowding of fish currently occupying the selected habitat. The site selection and distance from the Project Area will be based on professional judgment of the fisheries biologists, site conditions and access at the time of the relocation.

If a relocation site is not available immediately downstream of the Project Area either due to dry conditions or private property restrictions, steelhead will be relocated to the perennial pool just below the Searsville Dam. The Searsville Dam and property immediately downstream is owned by Stanford (who also owns the property where the Project is located) and would provide a suitable relocation site for steelhead if none are available downstream.

Fish Exclusion

Once a suitable relocation site has been determined, the process of installing the block nets or screens will commence. Block nets or screens with 1/8 to 1/4 inch mesh will be deployed across the creek as the upstream and downstream fish exclusion barriers. Any nets or screens shall

span both the width of the wetted channel as well as the entire depth of the water column. Additionally, nets or screens will stand at least 1 foot above the water, and will be secured at the bottom (e.g. cobble may be added to the lower edge to prevent passage beneath). This will prevent fish from being able to jump over, or pass beneath the exclusion barriers. Nets or screens will most likely be supported by t-posts driven by hand into the bed of the creek. Any exclusion materials will be removed at the end of the Project.

General Equipment and Procedure for Capture

Following the placement of the block nets, fish capture and relocation shall begin. Due to the variety of habitat features within the Project Area it is anticipated that electrofishing will be the main method of collection. Electrofishing parameters will follow the NOAA Guidelines for Electrofishing Waters Containing Salmonids Listed under the Endangered Species Act. At least one netter or fish transfer personnel will accompany the biologist running the elctrofisher to capture fish and transfer/monitor captured fish recovery. Equipment used by the crew would likely include one electrofisher, long handled dip nets with soft nylon mesh, as well as aquarium nets. If seining is used at any time, seine nets will be made of similar 1/8 to 1/4 inch soft knotless nylon mesh and will range in size from 4 feet to 20 feet in length, by 4 feet tall.

Collected fish will be temporarily held in buckets before being placed in specially designed relocation coolers. This will allow any excess sediment to be washed off the fish before placing them in the coolers and it will allow biologists to monitor recovery of each fish before being placed in the cooler. Relocation coolers are designed to hold and transport special-status species that require maintained cool and well-oxygenated water; and have been used to safely hold various salmonids including steelhead as well as other native species such as Sacramento splittail (*Pogonichthys macrolepidotus*), and tidewater goby (*Eucyclogobius newberryi*). Water temperature within the coolers will be monitored, and two aerators capable of aerating 10-15 gallons of water each will be used per cooler (each cooler has a capacity of approximately 10 gallons).

If water temperature within coolers exceeds a 2 °C change over the ambient stream temperature, all fish will be released and relocation activities will halt for the day. Because work is scheduled to occur during the summer and fall, relocation activities will be scheduled to occur in the early morning when temperatures are most favorable and stress on fish is minimized.

Dewatering

Once all fish have been collected or when collection efforts are no longer effective, the biologist may declare the Project Area sufficiently cleared to begin the dewatering process. Dewatering will follow the contractor provided dewatering plan, but is generally anticipated to begin with installation of the upstream cofferdam, and bypass pipe(s), followed by the downstream cofferdam. Once the upstream cofferdam is in place, it is anticipated that the site will almost entirely dewater naturally, as pools in the Project Area are limited. However, it is likely that some small pools of water may remain within the Project Area and would require further dewatering. During this process, the biologist will monitor the dewatering and will collect any fish which may have been hidden under cover but are now exposed. If any remaining pools need to be dewatered with the aid of pumps, small portable pumps may be used (size estimate for pumps would be ¾ - 1 ½ inches diameter). Any pumps used in-channel for this phase of dewatering will be sufficiently screened to prevent entrainment of fish. When the biologist is confident that no special-status fish remain within the Project Area, the remaining water will be allowed to be pumped from the

site and the rescue will be considered complete.

Processing

Holding time will be minimized, and releases will be conducted as necessary to limit unnecessary stress from overcrowding or temperature fluctuations in the coolers. Any steelhead encountered will be placed in separate coolers, and segregated by size to minimize opportunities for predation. Water temperature, dissolved oxygen, and salinity will be taken at the predetermined release locations, and compared to conditions within the coolers. Fish will be suitably acclimated during the release procedure to limit shock. Data on species encountered, relative size will be estimated by age class, total number, and release times will be collected.

Decontamination

Prior to any work on the Project, and following completion, all equipment used within the Project Area will be sufficiently cleaned and decontaminated to prevent the spread of invasive species. WRA uses HDQ Neutral, a generic formulation of Quat-256 for decontamination to minimize the potential for spread of disease or invasive species. After decontamination, all equipment will be allowed to air dry prior to use elsewhere.

Mortality Procedures

In the event that a dead or fatally wounded steelhead is encountered, it will be collected in a zip-lock bag, and will be frozen as soon as possible. Alternatively, the carcass may be preserved in 200 proof ethanol. Any carcasses will be retained by the biologist and made available to NMFS upon completion of the relocation.

Reporting

After completing the fish rescue and relocation, a brief summary report will be prepared and submitted to NMFS. The report will, at minimum contain the following information:

- dates when the relocation occurred,
- personnel conducting the relocation,
- methods used including electrofisher settings,
- location of the relocation site(s),
- ambient conditions at the time in the Project Area, at the relocation sites, and in coolers during holding,
- number of each species collected as well as approximate age class, and
- an estimate of survival and mortality.
- Photographs of the work area and operations will also be included.

ENVIRONMENTAL CONSULTANTS

Attachment A: Fisheries Biologist Resumes

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Nicholas Brinton
Associate &
Fisheries Biologist
brinton@wra-ca.com
o: 415.524.7248
c: 909.275.2358
Years of Experience: 7

Education
BS Wildlife, Fish and Conservation Biology, UC Davis, 2012

Technical Training:
Cal-Nevada AFS Fish Passage and Screening Criteria Workshop Sacramento, California, 2015.

BCM Bat Survey Techniques. Portal Arizona. 2016

Smith-Root Electrofishing Principals and Safety Certification 2019

Mine Safety and Health Administration Part 46 Certified Surface Miner

Professional Affiliations/ Certifications

Member: American Fisheries Society

Nick earned his undergraduate degree in Wildlife, Fish and Conservation Biology from the University of California, Davis. Prior to coming to work with WRA, Nick worked in a variety of locations from the Sierra Nevada Mountains and the Central Valley of California gaining an array of experience with various California fish and amphibian species.

With WRA, Nick performs a variety of specialized permitting tasks leading Section 7 and Section 10 consultation with federal agencies, as well as Section 2081 and 1602 permitting with the state. He also performs protocol level surveys, fish passage assessments, as well as habitat and water quality assessments. He has specialized in fisheries related issues and has performed fish rescues on numerous state and federal listed species including steelhead and Coho salmon. He is certified to operate electrofishing equipment, and leads electrofishing efforts for WRAs fisheries projects. In addition, Nick has gained a wide array of experience with California tiger salamander and California red-legged frog. He acts as a project manager for numerous projects with special-status amphibians and has lead relocation efforts as well as trained staff to perform species specific procedures for surveys and relocation.

Representative Projects

Fisheries

Mare Island Ship Yard Dry Dock Fish Salvage, Vallejo, California, 2014-Present
Both government and private ships needing repair are brought to the dry docks at the former Mare Island Naval Shipyard. In accordance with permit requirements by the USFWS, NMFS, and CDFW, biologists are required to be present during final stages of dewatering to salvage (rescue) stranded fish from the dry dock. Captured fish are placed in aerated holding coolers, identified to species, enumerated and measured before being returned to the Mare Island Channel of the Napa River. Nick is the lead fisheries biologist for this operation. His primary responsibility for this project is in leading and overseeing field crews that conduct the salvage operations. He also coordinates with resource agency personnel ensuring permit compliance, and writes technical reports following each salvage event. He is authorized to handle and relocate longfin smelt, Delta smelt, steelhead, winter and spring-run Chinook salmon as well as green sturgeon at this site. To date he has performed more than 125 salvages at this site. This project is ongoing.

East Russian Gulch Fish Passage Restoration Project, Sonoma County, California, 2019
WRA worked with The Wildlands Conservancy to help implement a fish rescue and relocation prior to the start of restoration work to remove two fish passage barriers on East Russian Gulch Creek, which prevented the upstream migration of returning adult steelhead. In a remote setting, WRA lead the two-day operation to rescue steelhead from approximately 300 feet of stream before the start of restoration work. During the two-day effort, WRA biologists relocated nearly 50 steelhead and more than 30 California giant salamanders. Nick acted as both the project manager, and lead biologist for

a team of biologists to conduct the work. Due to the extreme habitat complexity, methods primarily relied on electrofishing. The project was completed on time, and within all stated parameters of the biological opinion.

National Park Service Electrofishing Surveys, Muir Woods, Mill Valley California, 2019
As part of the monitoring efforts within the National Park system, NPS fisheries crews annually sample Redwood Creek within Muir Woods in order to monitor the population of Central California Coast steelhead and Central California Coast Coho salmon which occur in the creek. Nick assisted with the electrofishing survey in 2019 which resulted in the capture and handling of both Coho and steelhead.

Olema-Bolinas Road Flood Control Project, Marin County, California, 2017 - 2019
WRA works with Marin County to help implement various projects when projects are likely to encounter protected species and special approval is needed to help relocate or capture those species. At mile marker 0.18 a box culvert funnels Lewis Gulch beneath Olema-Bolinas Road and out to Bolinas Lagoon. In 2017, and 2019 storms caused severe flooding of the area and plugged the culvert with sediment. Prior to the rainy season in 2018 and 2020, the County sought to perform maintenance to remedy flooding issues. Nick was approved by NMFS to perform the fish relocation activities, and by the USFWS to perform California red-legged frog preconstruction surveys and relocations as outlined in the project Biological Opinions. Using seine and dip nets, Nick, with the assistance of Kallie Kull from Marin County, captured and successfully relocated nearly 30 steelhead between these two efforts, as well as numerous California red-legged frogs. All of the captured fish and amphibians were successfully relocated. No mortality was observed and the project finished on schedule.

Lower Miller Creek Channel Maintenance, San Rafael, California, 2016-2019
The Las Gallinas Valley Sanitary district regularly removes accumulated sediments from the channel within Lower Miller Creek. As part of the project mitigation efforts, a fish salvage is required in order to salvage and relocate any native fish in the proposed work area which stretches approximately ½ mile in length. Nick was approved as the lead fisheries biologist for the project and has organized, executed and reported all of the associated salvage work on Lower Miller Creek for the last three years. All work was conducted in accordance with project permits and the project is now completed.

San Geronimo Creek Flood Control and Habitat Restoration Project, Marin County, California, 2019
WRA worked with The Marin resource Conservation District (MRCD) to help implement a fish rescue and relocation prior to the start of restoration work. The goal of the Project was to enhance fish cover through a reach of San Geronimo Creek with the addition of large woody debris. WRA lead the three-day operation to rescue steelhead and Coho salmon from approximately 400 feet of stream before the start of restoration work. During the effort, WRA biologists relocated approximately 350 steelhead and 50 Coho salmon, primarily through electrofishing. Nick acted as both the project manager, and oversaw the project while biologist Stewart DesMeules was charged with conducting the rescue work. The project was completed on time, and within all stated parameters of the biological opinion.

Napa County Resource Conservation District, Rotary Screw Trap, Napa County, California, 2018-2019
The Napa County Resource Conservation District (NRCD) is an organization that promotes watershed-based stewardship of natural resources throughout the greater Napa County area. NRCD monitors Central California Coast Distinct Population Segment steelhead and fall-run Chinook salmon populations by collecting data on the number of fish migrating to the ocean each year through the operation of a rotary screw trap on the Napa River. The trap is typically operated February through May, and WRA involvement with the trap involves identifying the species and numerating the captured fish. For target species, such as lamprey and salmonids, additional biological information is collected which involves measuring the species length, weigh, and collecting genetic samples through fin clips. In addition, steelhead are pit-tagged to track the potential return of adult animals. Nick was approved by

NMFS and CDFW to act as a lead biologist on the project. Over the course of this project Nick handled several dozen steelhead, hundreds of Chinook salmon, and several thousand lamprey.

Novato Creek Maintenance and Sediment Removal, San Rafael, California, 2014 - Present
The Marin County Flood Control District conducts regular maintenance within the lower portions of Novato Creek as well as within Warner and Arroyo Avichi Creeks. Before work can begin a fisheries biologist must clear each reach to assure that steelhead are not present. Nick lead a team of volunteers who systematically cleared and relocated any native or special-status fish encountered in the creeks. During the salvage work, multiple *Oncorhynchus mykiss* were encountered and successfully relocated without injury.

Lucas Valley Bridge Emergency Repair, San Rafael, California, 2018
Following winter storms in November 2017, erosion at the Lucas Valley Road Bridge required emergency repairs in order to maintain functionality of the bridge. WRA was contracted to salvage and relocate steelhead from Miller Creek before emergency repair operations could begin. Nick led the team of fisheries biologists and county volunteers for this project, successfully relocating 47 steelhead. No mortality was documented among steelhead and the project was completed on time. Methodology used for this project relied primarily on electrofishing.

Westside Basin, Santa Clara, California, 2017
The City of Santa Clara sought to dredge a stormwater retention basin within city limits to bring it back to full operational capacity. A streambed alteration agreement was required for the project and as part of the measures stipulated in the SAA, a fish rescue plan and field effort was required. Nick wrote the fish rescue plan, as well as the invasive species removal plan for the project, both of which were approved by CDFW. During the field effort Nick led the weeklong effort and designed a special fyke trap to catch fish within the basin when traditional means were not feasible. Nearly 1,000 fish composed of common carp, bluegill, largemouth bass and goldfish were encountered. No native fish were encountered during the fish salvage and all non-native fish were euthanized and disposed of in accordance with CDFW's permit requirements. This project has been completed.

San Geronimo Creek Fish Passage and Habitat Improvement Project, San Rafael, California, 2016
As part of a fisheries restoration grant, this project sought to eliminate a major fish passage barrier and enhance fish habitat by using large woody debris. As part of the restoration effort, a fish rescue and relocation was required in order to capture and relocate Coho salmon and steelhead within or immediately downstream of the work area. Under the supervision of a CDFW biologist, Nick assisted with the fish rescue effort which successfully relocated over 400 Coho salmon and steelhead. Methods for rescue and relocation primarily relied upon electroshocking.

Napa Dry Bypass, Napa, California, 2014
The Napa Dry Bypass is part of a series of flood control projects headed by the Army corps of Engineers designed to divert 100 year flows around the oxbow reach of the Napa River to avoid flooding the Soscol Gateway area in downtown Napa. Nick was approved as a lead fisheries biologist on this project and conducted multiple fish salvage operations for longfin smelt, and steelhead. Nick also assisted in otter trawl surveys and fish exclusion work which were required during pile driving operations. He has also been involved with this project by monitoring compliance and construction activities including monitoring during the use of an impact hammer for pile driving. In addition, he assisted in the design and implementation of the environmental awareness training program to comply with various permit conditions.

Healdsburg Veterans Memorial Dam Spillway Repair, Healdsburg, California, 2014
The Healdsburg Veterans Memorial Dam is a flashboard dam located within the city of Healdsburg on the Russian River. The dam is installed seasonally to create a temporary recreational lake. For this project, Nick was approved as the lead fisheries biologist, and biological monitor. He conducted pre-construction surveys for breeding birds as well as Pacific pond turtle. Turtles were identified near to the project area. As the lead fisheries biologist he lead

a team of biologists who performed multiple fish salvages within the project area following de-watering events. All steelhead encountered during the salvages were successfully relocated. He conducted pre-construction checks, environmental trainings, and water quality monitoring throughout the course of the project. The project was completed in compliance with permits conditions.

US Forest Service, Tahoe National Forest, 2013
The Tahoe National Forest covers over one million acres and is home to 23 species of fish. Nick worked as a fisheries technician performing more than 200 hours of electrofishing and seine surveys throughout the forest for both population trend analysis, and range expansion surveys. He has handled several thousand fish during this project including: Lahontan cutthroat trout, rainbow trout, and brown trout. As part of this project he performed surveys on two watersheds to using the US Forest Service Basinwide Survey protocol to map, classify and measure current habitat conditions. He also performed habitat assessment surveys in those same watersheds for Sierra mountain yellow-legged frog and successfully identified adults, sub-adults and larval forms of the species.

Slinkard Creek, Walker, California, 2012
Slinkard Creek is a tributary of the West Walker River and is located within the state wildlife refuge of Slinkard Valley. It contains one of the few remaining populations of federally threatened Lahontan cutthroat trout (LCT) as well as a large population of non-native brook trout. In cooperation with CDFW, Nick was contracted by California Trout to facilitate the removal of brook trout from Slinkard Creek to enhance conditions for LCT. Nick designed a series of portable Alaskan weirs to divide Slinkard Creek into reaches which were then systematically cleared of all fish using a backpack electrofisher. LCT were retained in the creek, and allowed to repopulate reaches once all brook trout were removed. Nick logged approximately 80 hours of time using a backpack electrofisher on this project while electroshocking, and capturing over 300 LCT. Mortality among LCT was exceptionally low (<1 percent) and approximately 1 kilometer of creek was restored during the season which he worked on this project.

UC Davis, Fangue Laboratory, Davis California, 2011-2012
Research in the Fangue lab focused on understanding the physiological specializations that allow animals to survive in complex environments. As part of his work with the laboratory, Nick conducted experiments to assess the physiological responses to conditions such as critical thermal, stimuli aversion and entrainment of native fishes. The fish used in such experiments were cared for in a hatchery that he helped to maintain and construct additions to. Species cared for included: northern DPS green sturgeon, fall-run Chinook salmon, hardhead and Sacramento splittail.

Fisheries (Observation/Monitoring)

Bon Air Bridge Rehabilitation, Larkspur, California
Bon Air Bridge spans Corte Madera Creek, providing an important link between Magnolia Avenue, Larkspur's main street, and the northeast side of the city. The bridge will be replaced by a new bridge, correcting structural deficiencies to provide a stable and safe structure. Nick was approved by NMFS to act as the lead biologist for fish exclusion operations. Additionally he has lead the fisheries observation compliance monitoring during pile driving operations. As part of his duties he has trained and overseen numerous observers on marine mammal and fisheries observing practices. This project is ongoing.

Frenchman's Creek Water District, San Mateo County
Frenchman's Creek Water District (FCWD) is a small water service provider located north of Half Moon Bay along coastal San Mateo County. A CDFW 1602 permit allows for the temporary installation of a flashboard dam and water withdrawal from the system for agricultural purposes. Nick serves as a fisheries biologist for this project, which involves monitoring flow, water quality sampling, as well as habitat connectivity and condition for steelhead

during the diversion period. He also assists with permit compliance, and annual reporting. This project is currently ongoing.

Red Rocks Warehouse Creosote Removal and Pacific Herring Habitat Restoration Project, Richmond, California

WRA helped to prepare plans for monitoring light availability and turbidity to protect local eelgrass beds during the removal of creosote pilings and other anthropomorphic materials from the dilapidated Red Rocks Warehouse facility. Nick assisted in conducting a light and turbidity monitoring studies following National Marine Fisheries Service (NMFS) protocols. The project used a WRA vessel to deploy light monitoring loggers and collect turbidity samples during work to assure that pile removal operations were not impacting nearby eelgrass beds. Nick was also and approved to monitor for Pacific herring, and performed surveys in compliance with construction permits.

Port of Oakland Maintenance Dredging, Oakland, California

Maintenance dredging of the Port of Oakland Inner and Outer Harbor Channels was necessary to maintain passageways for the active port. Pacific herring is a protected commercial fishery, and dredging operations within the Pacific herring spawning season were unavoidable and required observers to assure operations did not occur during spawning events. Nick was a CDFW approved observer for the Project. No spawn events or Pacific herring activity was noted during dredge activities. All Project activities were completed in compliance with the Project's Pacific Herring Work Window Waiver.

Port of Richmond Inner Harbor Maintenance Dredging, Richmond, California

Maintenance dredging for the Port of Richmond was conducted in the winter of 2014 to maintain passageways for heavy ships entering and exiting the port. Pacific herring is a protected fishery, and dredging operations within the harbor overlapped with the Pacific herring spawning season. Nick acted as an approved CDFW observer for the Project. During operations, two spawning events occurred within or adjacent to the Project Area. Nick observed the spawning events aided crews with required procedures to maintain compliance and avoid impacts to the spawn. All Project activities were completed in compliance with the Project's Pacific Herring Work Window Waiver.

STEWART DESMEULES
Fisheries Biologist
desmeules@wra-ca.com
o: 415.454.8868 x2040
c: 207.380.6138

Years of Experience: 7

Education
B.A. Biology, Wheaton College, 2010

Professional Affiliations/ Certifications
Commercial Unmanned Aerial Vehicle (UAV) Pilot with Part 107 License

American Fisheries Society

NMFS Certified Commercial Fisheries/ Marine Mammal Observer

Specialized Training
Cal-Neva AFS / TWS: Tidewater Goby Management & Ecology Workshop

TWS Environmental DNA: A Practical Workshop

TWS Drone Regulation and Technology: A Workshop for Biologists

NMFS Northeast Fisheries Observer Program Trained

Special Recognitions/ Publications
Poster Presentation: Fisheries Observer Retention Strategies presented at the International Fisheries Observing and Monitoring Conference 2016

Co-author: American Eel potting presentation: American Fisheries Society Conference 2014

Stewart DesMeules holds a B.A. in Biology from Wheaton College in Massachusetts. Prior to joining WRA, Stewart worked with the National Oceanic and Atmospheric Administration (NOAA) Fisheries Observer Program on the East Coast. During his time with WRA, Stewart has managed and worked on a diversity of fisheries and wildlife related projects including permitting, endangered species consultation, protected species surveys, mitigation and conservation banking, habitat evaluation, assessments, and species sampling.

Stewart has experience with environmental permitting including Endangered Species Act Section 7 and Essential Fish Habitat consultation, California Department of Fish and Wildlife (CDFW) Streambed Alteration Agreements, CDFW Incidental Take Permits (2081), and biological resource assessments prepared for the California Environmental Quality Act (CEQA). Stewart performs a variety of specialized tasks, including biological monitoring, amphibian surveys, fish relocation, electrofishing, fish passage evaluation, construction monitoring, and redd and carcass spawner surveys. He holds a FAA Remote Pilot License, and has logged over 70 hours in flights. In addition, he has experience monitoring for Pacific herring spawning activity, and marine mammal observing.

Representative Projects

Napa County Resource Conservation District, Rotary Screw Trap, Napa County, California

The Napa County Resource Conservation District (NRCD) is an organization that promotes watershed-based stewardship of natural resources throughout the greater Napa County area. NRCD monitors Central California Coast Distinct Population Segment steelhead and fall-run Chinook salmon populations by collecting data on the number of fish migrating to the ocean each year through the operation of a rotary screw trap on the Napa River. The trap is typically operated February through May, and WRA involvement with the trap involves identifying the species and numerating the captured fish. For target species, such as lamprey and salmonids, additional biological information is collected which involves measuring the species length, weigh, and collecting genetic samples through fin clips. In addition, steelhead are pit-tagged to track the potential return of adult animals. Stewart was approved by NMFS and CDFW to act as a lead biologist on the project. Over the course of this project Stewart handled dozens of steelhead, hundreds of Chinook salmon, and several thousand lamprey in addition to many other native and non-native species.

Redd and Carcass Spawning Survey Work, Pt. Reyes Station, California

Stewart worked with the National Park Service staff to complete redd and carcass spawning surveys for Coho salmon in Pt. Reyes National Seashore. Work involved traversing sections of creek monitoring for Coho salmon and other salmonids. Encountered reds were measured and marked with GPS after being evaluated for condition. Encountered Coho salmon carcasses were sampled for otoliths and DNA. Live fish had their locations marked with GPS and were visually measured. In addition, water quality measurements and depths were taken incrementally over the survey area. Survey work is ongoing.

Mare Island Ship Yard Dry Dock Fish Salvage, Vallejo, California
Government, commercial, and private ships needing repair are brought to the dry docks at the former Mare Island Naval Shipyard. In accordance with permit requirements of USFWS, National Marine Fisheries Service (NMFS), and CDFW, biologists are required to be present during final stages of dewatering to rescue stranded fish from the dry dock. Captured fish are placed in aerated holding coolers, identified to species, counted, and measured before being returned to the Mare Island Channel of the Napa River. Stewart leads this operation, compiles data from fish salvages and writes technical reports following each salvage event. He is authorized to handle and relocate longfin smelt, Delta smelt, steelhead, fall, late-fall, winter and spring-run Chinook salmon as well as green sturgeon at this site. He is also assisting with preparation of renewal of NMFS and USFWS permits for the project. This project is ongoing.

Butte Sink Mitigation Bank, Colusa County, California, 2019
The Butte Sink Mitigation Bank is an approximately 350-acre mix of agriculture and riparian habitat in Colusa County, California. The site is located along the western bank of Butte Creek and at the terminus of the Colusa Bypass, which diverts high flows from the Sacramento River into the site. The project is designed to create, restore, and preserve a mix of riparian, wetland, and off channel floodplain habitat. Target species for the bank include a mix of protected salmonid species that occur in Sacramento River and Butte Creek, including protected spring and winter-run Chinook salmon, and steelhead. WRA is leading the effort to develop the conservation bank, which includes concept design, baseline biological surveys, habitat evaluation, prospectus development, and permitting. Stewart has assisted in biological surveys on the site, installation of hydrological data loggers, as well as providing technical fisheries support for various aspects of the permitting and habitat evaluation process. He has also conducted drone flights of the property to aid in hydrological analysis.

Santa Clara River Habitat Restoration, Los Angeles County, California
Stewart assisted with a fisheries restoration project including a feasibility study and conceptual design development for the restoration of fish habitat at a confidential location along the Santa Clara River. Habitat for Santa Ana sucker, unarmored threespine stickleback, and Arroyo chub were assessed as part of this project, and Stewart worked with hydrologists to recommend habitat restoration measures. His work included a habitat assessment, and report preparation. This project is ongoing.

Refinery Marine Terminal Ridgway's Rail Surveys, Martinez, California
Stewart has performed biological monitoring for a well installation project at a refinery marine terminal on Suisun Bay. The primary special-status species of concern for the project are the federal endangered California Ridgway's Rail and Salt-marsh Harvest Mouse. Stewart conducted protocol level surveys for California clapper rails as part of ongoing remediation at this project under the supervision of federal recovery permit holder Jason Yakich (TE-58760A-0). This project is ongoing.

Union City Sanitary District Outfall Improvements California Ridgway's Rail Survey
Stewart conducted passive surveys for California clapper rails as part of an emergency outfall improvements project under the supervision of federal recovery permit holder Jason Yakich (TE-58760A-0). The survey effort was undertaken to determine the presence of breeding rails in the vicinity of the proposed project. Stewart has positively identified multiple CRR during this project.

Burrow Exclusion and Burrowing Owl Surveys, Newark, California
The project is at a remediation property in Alameda County, California, where burrowing owl is known to occur in the vicinity of the Project Area, and take avoidance surveys are required year-round by project permits and

California Department of Fish and Wildlife (CDFW). Stewart surveyed the area and collapsed burrows that weren't being used by burrowing owl to prevent colonization on the site. Stewart assisted in the installation of one-way exclusion doors on site. He positively identified two burrowing owls as part of the project.

Small Mammal Trapping Study, Mare Island, Vallejo, California
A study was conducted to investigate the presence of salt marsh harvest mice at a remediated Marine Corps firing range on Mare Island in Solano County, California, and to collect genetic samples of any captured harvest mice for ongoing population genetics research. Stewart assisted Wildlife Biologist Katie Smith with the checking, setting and baiting of over 150 Sherman live traps. Species encountered included house mice, California voles, western harvest mice, and salt marsh harvest mice.

Treasure Island/Yerba Buena Island Redevelopment, San Francisco, California
The Treasure Island and Yerba Buena Island Redevelopment Project involves the conversion of 460 acres of the former Naval Base Treasure Island to mixed-use development, parks, and open space sponsored by the City of San Francisco and a consortium of private developers. It is one of the largest and most visible projects in the San Francisco Bay Area in the last 30 years. The project requires shoreline improvements and construction of a new ferry terminal located within an existing Anchorage Zone designated by the U.S. Coast Guard. In accordance with project permits, Stewart conducted over 60 hours of nesting bird surveys on both Treasure Island and Yerba Buena Island, successfully identifying numerous active nests. In addition to nesting bird surveys, Stewart has conducted pre-demolition bat inspections of buildings on the site. He also assists with post survey reporting. This project is ongoing.

McClellan Ranch West Parking Area Project. Cupertino, California
As part of a project for the City of Cupertino, Stewart conducted pre-construction surveys for California red-legged frog, western pond turtle, San Francisco dusky-footed woodrat, Santa Cruz black salamander, California Giant Salamander, pallid bat, long-eared owl, and Nicklin's Peninsula Snail. Work for this project was authorized through a California Department of Fish and Wildlife 1600 Stream Bed Alteration Agreement (SAA), and Stewart worked as a CDFW approved biological monitor and assisted with compliance of the SAA. As part of pre-construction activities, Stewart guided and monitored the installation of an amphibian exclusion fence along the riparian edge of the project site, and performed construction monitoring. He also completed post monitoring reports. This project is ongoing.

Bon Air Bridge Replacement Dewatering and Fish Salvage, Larkspur, California
Bon Air Bridge spans Corte Madera Creek, providing an important link between Magnolia Avenue, Larkspur's main street, and the northeast side of the city. The bridge is scheduled to be replaced by a new bridge, correcting structural deficiencies to provide a stable and safe structure. Stewart was an approved biologist to monitor dewatering of coffer dams on Corte Madera creek during the beginning phases of the Bon Air Bridge Replacement Project. He was present during the final stages of dewatering and removed stranded fish from the coffer dam with an elongated dip net, identified them, and released them back into the creek. Additionally, Stewart has performed exclusion fence monitoring and pre-work inspections of salt marsh vegetation within the project area for Salt Marsh Harvest Mouse presence.

Cargill Salt, Newark, Redwood City, California
One of two sea salt works left in the United States, Cargill contains approximately 8,000 acres of evaporation ponds devoted to salt production in South San Francisco Bay, California. Stewart is a USFWS approved biologist, assisting Cargill with compliance monitoring, including Western Snowy Plover, Salt-marsh Harvest

Mouse, California Clapper Rail, and Least Tern surveys, as well as intermittent vegetation monitoring. As part of compliance monitoring, Stewart has positively identified over 15 Western Snowy Plovers, including two chicks. Additionally, Stewart is assisting Cargill with permitting efforts as they relate to protected fish species, including Longfin Smelt, Green Sturgeon, Steelhead and other wildlife. This project is ongoing.

Marin County Flood Control and Water Conservation District, Marshall-Petaluma Bridge Repair, Point Reyes Station, California
In summer of 2018, WRA was contracted to capture and relocate native fish species from Nicasio Creek. This work took place prior to dewatering a portion of the creek for maintenance. During the two day effort, over 1,500 native fish were encountered and relocated out of the work area. Stewart's primary role in this project was to conduct the fish rescue, utilizing primarily electrofishing and block nets to capture fish. Prior to release, fish were held in aerated coolers and monitored for water quality. All electrofishing was conducted following National Marine Fisheries Service guidelines for e-fishing.

Eelgrass Surveys in Tomales Bay, California
Stewart has conducted numerous eelgrass surveys in Tomales Bay, California in support of commercial development projects in the area. Stewart has assisted with the preparation of documentation to fulfill the requirements of CEQA review for potential impacts to eelgrass and other Essential Fish Habitat (EFH). He continues to perform monitoring services to meet mitigation requirements.

Pier 70 Redevelopment, South San Francisco, California
The Pier 70 redevelopment project lies on the San Francisco waterfront. A 28-acre portion of the Pier 70 Project is planned for demolition and surveys are required in the spring and summer of 2018, prior to build-out of the Project. Currently, the site is developed with numerous buildings which are scheduled for demolition so that reconstruction of the site can occur. Stewart served as Biologist, conducting surveys for both nesting birds and bat roosts throughout the site. Overall surveys covered approximately 12 buildings of various construction, and stages of decay, as well as adjacent undeveloped habitats. This project is ongoing.

Facebook Campus Expansion, Menlo Park, California
As Facebook continues to expand, the corporation's need for new office space adjacent to its Menlo Park headquarters is insatiable. WRA continues to provide biological services, including planning, nesting bird surveys and pre-demolition surveys to support the expanding campus. Stewart conducted pre-construction nesting bird surveys in 2018

Foothill Yellow-legged Frog Surveys, Multiple Counties, California
In spring of 2018 and 2019, Stewart assisted WRA Biologist Brian Freiermuth in conducting egg mass surveys for foothill yellow-legged frog (FYLF) in Sonoma, Mendocino and Lake Counties, CA. Dozens of FYLF in all life stages were detected during the surveys. Habitat assessments and impact analyses for FYLF were also conducted as part of this work. Total duration of these surveys exceeded 100 hours. In addition to spring surveys, Stewart has conducted daytime presence/absence surveys for metamorphosed FYLF in the late summer under an approved CDFW protocol (5 hours).

City of Burlingame Stormwater Drain Maintenance, Burlingame, California
As part of the Burlingame Stormwater Maintenance Project, rehabilitation of concrete lined stormwater channels and installation of flap gates on stormwater outfalls was completed in 2018. Dewatering of the channels was conducted under a CDFW Streambed Alteration Agreement and a Regional Water Quality Control Board permit.

Stewart worked to monitor the channel during the dewatering process for aquatic species, including California red-legged frog, San-Francisco garter snake, and Ridgway's rail. He also performed visual checks on turbidity levels and monitored BMP's.

Ridge Top Ranch Wildlife Conservation Bank, Solano County, California
Ridge Top Ranch, LLC (RTR) is an approved conservation bank on over 280 acres of high quality California red-legged frog and callippe silverspot butterfly mitigation habitat located within Solano County, California. WRA, in consultation with the USFWs and under 10(a)(1)(A) Recovery Permit TE-212445-0, successfully translocated California red-legged frogs to created habitat within the RTR Wildlife Conservation Bank. WRA has been involved throughout the process, from selecting donor sites and planning habitat creation, to translocation of egg masses and monitoring the frogs to ensure that establishment at the receiving site was successful. In the summer of 2018, Stewart assisted WRA Biologist and recovery permit holder Rob Schell in the capture, handling, measurement and pit-tagging of more than 25 adult CRLF. Survey time for the site visit was approximately 5 hours. Stewart also assisted WRA Biologist Brian Freiermuth in counting California red-legged frog egg masses and performed site checks on mesh enclosures containing egg masses. In addition to egg masses, over 20 adult California red-legged frogs were identified over the course of multiple nighttime surveys, with over 15 hours of nighttime surveys logged. Stewart has also performed vegetation control within the site. This project is ongoing.

Marin County Flood Control and Water Conservation District, Lucas Valley Bridge Emergency Repair, San Rafael, California
Following winter storms in November 2017, erosion at the Lucas Valley Road Bridge required emergency repairs in order to maintain functionality of the bridge. WRA was contracted to capture and relocate steelhead from Miller Creek before emergency repair operations could begin. Stewart assisted the team of fisheries biologists and county volunteers for this project, successfully relocating 47 steelhead. No mortality was observed among steelhead and the project was completed on time. Methodology used for this project relied primarily on electrofishing.

Port of Oakland Maintenance Dredging, Oakland, California
Maintenance dredging of the Port of Oakland Inner and Outer Harbor Channels was necessary to maintain passageways for the active port. Pacific herring is a protected commercial fishery, and dredging operations within the Pacific herring spawning season were unavoidable and required observers to assure operations did not occur during spawning events. Stewart was a CDFW approved observer for the Project. This project is ongoing.

Niebaum-Coppola Estate Winery, L.P., Bear Canyon Creek Fish Passage Maintenance Project and Biological Construction Monitoring, Rutherford, California
WRA assisted the Napa Resource Conservation District with biological monitoring during sediment removal activities for a reservoir on Bear Creek, in Napa County. Work for this project was authorized through a California Department of Fish and Wildlife 1600 Stream Bed Alteration Agreement (SAA), and Stewart worked as a biological monitor and assisted with compliance of the SAA. Protected species known for the area included foothill yellow-legged frog, pallid bat, Pacific pond turtle, and steelhead. No protected species were injured during the monitoring. Sediment control measures were monitored to minimize sediment flowing offsite.

Avian Surveys for Confidential Client, Lake County, California
A confidential client contracted WRA to conduct a biological resources assessment of a recently purchased property in Lake County in order to determine the full extent of wildlife that occupied the property. Stewart was part of the wildlife team that was tasked with surveying for and identifying special-status species throughout the

property including golden and bald eagle and special-status amphibians. In total, five eagle nests were located over two months of surveys. Additionally, Stewart assisted in visual encounter amphibian surveys. Other special-status species including foothill yellow-legged frog, western pond turtle, tricolored blackbird, white-tailed kite and yellow-headed blackbird were identified on site.

Young Ranch Bay Checkerspot Butterfly Surveys, Santa Clara County, California
Young Ranch is an approximately 2,100 acre ranch in the Coyote Hills just southeast of San Jose, California. WRA is managing a biological resources assessment of the property, including a butterfly-specific habitat suitability analysis for the federally endangered Bay checkerspot butterfly (BCB), as well as annual surveys for both BCB and burrowing owl. Stewart's chief involvement in this project is to conduct adult BCB surveys in an effort to document on-site habitat use and provide information for the development of a land use plan. During surveys, he has identified many individual BCB, observed behavior and plants if nectaring or resting, and provided GPS locations which are being used in a GIS corridor analysis.

Drone Work

Santa Clara River Habitat Restoration, Los Angeles County, California
Stewart flew UAV missions at this location in support of fisheries restoration efforts that included a feasibility study and conceptual design development for the restoration of fish habitat at a confidential location along the Santa Clara River. Habitat for Santa Ana sucker, unarmored threespine stickleback, and Arroyo chub were assessed as part of this project, and Stewart worked with hydrologists to provide high quality imagery and elevation mapping to support restoration designs. This project is ongoing.

Butte Sink Mitigation Bank UAV Survey, Colusa County, California, 2019
The Butte Sink Mitigation Bank is an approximately 350-acre mix of agriculture and riparian habitat in Colusa County, California. The site is located along the western bank of Butte Creek and at the terminus of the Colusa Bypass, which diverts high flows from the Sacramento River into the site. The project is designed to create, restore, and preserve a mix of riparian, wetland, and off channel floodplain habitat. Target species for the bank include a mix of protected salmonid species that occur in Sacramento River and Butte Creek, including protected spring and winter-run Chinook salmon, and steelhead. WRA is leading the effort to develop the conservation bank, which includes concept design, baseline biological surveys, habitat evaluation, prospectus development, and permitting. Stewart has flown the site using a UAV on multiple occasions, particularly in response to flooding events to document the extent of inundation and provide footage to inform models.

Elsie Gridley Mitigation Bank UAV Survey, Dixon, California 2018
The Elsie Gridley Mitigation Bank is the largest mitigation bank in California at more than 1,800 acres, and is a central component of the largest contiguous vernal pool preserve in the United States. The bank is approved by five different agencies and covers two different Army Corps Districts. In addition, the bank sells both numerous species credits such as California tiger salamander, vernal pool crustaceans, Swainson's hawk, and burrowing owl, as well as wetland credits to offset impacts under the Clean Water Act. Utilizing a UAV (unmanned aerial vehicle) Stewart flies the site on a routine basis in order to acquire aerial imagery which could be used to assess restoration progress.

Confidential Client UAV Survey, Sacramento County, California

A WRA client in Sacramento County required surveys to determine the extent of wetland establishment adjacent to a piece of developed property. Utilizing a UAV (unmanned aerial vehicle) Stewart flew the site in order to acquire aerial imagery which could be used to assess wetland growth.

Antonio Mountain Ranch Mitigation/Conservation Bank UAV Survey, Placer County, California
The Antonio Mountain Ranch Mitigation/Conservation Bank is a proposed approximately 800-acre wetland and protected species mitigation bank in Placer County. The bank serves as offsite mitigation for impacts to wetlands and non-wetland waters, including vernal pool and swale complexes, seasonal and perennial wetlands, and streams, and as a conservation bank, pursuant to federal and California Endangered Species Acts (for special-status vernal pool branchiopods in Placer County and surrounding counties). Swainson's hawk and tricolored blackbird habitat credits are also provided for covered activities under the Placer County Conservation Plan. Utilizing a UAV (unmanned aerial vehicle) Stewart has flown the site multiple times in order to acquire aerial imagery which could be used to assess restoration progress.

Petersen Ranch Mitigation Bank, Leona Valley, California
The Petersen Ranch Mitigation Bank is the largest mitigation bank in California and was approved in May 2016. The bank is approximately 4,000 acres in size and approved by the Los Angeles District of the U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, California Department of Fish and Wildlife, and Lahontan Regional Water Quality Control Board. The bank consists of two different sites located in the Santa Clara River and Antelope Valley watersheds. Stewart has conducted UAV flights on the property for annual monitoring efforts.

Experience Prior to WRA

Massachusetts Division of Marine Fisheries, Lake Sabattia American Eel Mark Recapture Study, Taunton, Massachusetts
For the Massachusetts Division of Marine Fisheries, Stewart coordinated and conducted field work to assess American eel populations in water body prior to a downstream dam removal project. American eels were collected with modified gee traps using herring as bait. Trapping locations were chosen based on a previously completed habitat assessment. Traps were retrieved daily, using a 15 foot trailer launched boat. Water quality measurements were taken at each trapping locations. Once eels were caught, they were sedated, measured, injected with pit tags, and released.

Massachusetts Division of Marine Fisheries, Southeastern Massachusetts River Herring Count, Southeastern Massachusetts
For the Massachusetts Division of Marine Fisheries, Stewart conducted a river herring count during the spring runs, using primarily Smith Root electronic counters and video counters. He made bi-weekly visits to 8 counting stations to offload count data, take water quality measurements, and to maintain the fish counting platforms. Stewart conducted weekly sampling of individual river herring runs, taking 100 fish at a time for processing. Processing involved measuring, sexing, and extracting otoliths. Count data supplemented the Atlantic States Marine Fisheries Commission (ASMFC) river herring population assessment.

Massachusetts Division of Marine Fisheries, American Eel Monitoring, Southeastern Massachusetts

As part of the Massachusetts Division of Marine Fisheries young of year assessments for American eel, Stewart conducted standardized monitoring of glass eels under the coordination of ASMFC. The monitoring of the glass eels contributed to a coast-wide index of eel population relative abundance. Stewart installed eel ramps to aid in upstream migration, and monitored 9 sites, counting and taking length data on the American eels as they passed through. Over a half million eels have passed through the counting stations since they were installed in 2007.

City of New Bedford, Massachusetts, Marine Mammal Observing, New Bedford, Massachusetts
Underwater blasting occurred in New Bedford harbor before dredge work could be done to increase depth outside heavily trafficked fish processing plants. Fathom Resources LLC. was contracted to provide marine mammal observing services under the Marine Mammal Protection Act (MMPA). As a certified marine mammal observer, Stewart surveyed the area in and around the blasting site for any signs of marine mammals, and alerted the barge crew of their presence. Blasting schedules were delayed whenever a marine mammal was observed within the work area. No marine mammals were harmed during the blasting period.

Wells National Estuarine Research Reserve, Piping Plover Monitoring, Wells, Maine
Stewart assisted in Piping Plover nest monitoring along Laudholm Beach. He, along with other monitors identified numerous Piping Plover nests, chicks, and adults, and set up predator exclusion fencing. In total, Stewart identified over 20 Piping Plover nests, and over 100 adults and chicks. In addition, Stewart assisted with the installation and maintenance of symbolic fencing erected to prevent human and vehicle activity from disturbing nesting Piping Plovers.

Wells National Estuarine Research Reserve, Wading Bird Survey, Wells, Maine
Stewart coordinated and conducted a wading bird survey of restored estuary habitat over the course of a summer in Wells, Maine. Survey points were visited bi-weekly along restored sections of salt marsh, and at least one hour was spent as each location per visit. Bird species and numbers were tracked, and used to assess the success of restoration activities. Stewart was trained by Reserve staff on wading bird field identification and logged over 15 hours of surveys. Species encountered included herons, egrets, ibis, and non-wading bird species such as osprey, eagles, and shorebirds.

Wells National Estuarine Research Reserve, Larval Fish Survey, Wells, Maine
Stewart assisted with the implementation of a larval fish monitoring program that was established in 2008. The monitoring program seeks to track abundance and diversity of fish larvae, as well as investigating the seasonal and spatial patterns or larval fish assemblages. Stewart assisted reserve staff with plankton net tows on incoming ties within the Webhannet estuary, as well as processing those samples. Stewart used a microscope to identify and measure larval fish, as well as invertebrates present in the sample.

Lloyd Davis Anadromous Fish Trust, Annual Medomak River Herring Count, Waldoboro, Maine
Stewart managed over 30 volunteers to conduct an annual count of river herring on the Medomak River. He trained volunteers in fish counting procedures, and coordinated their counting schedule. All fish swimming upstream were channeled through a 3 foot wide white ramp using a set of nets. Volunteers then counted fish as they passed from above. Stewart was the point person for the count, and maintained the nets as needed, clearing debris from them daily, and ensuring they were properly anchored to only allow fish to swim through the ramp. He took weekly samples of river herring to collect scale samples from to provide to state fisheries biologists. Upon conclusion of the count, he compiled the count data for submission to the state of Maine.

Presentations

Poster Presentation: Fisheries Observer Retention Strategies presented at the International Fisheries Observing and Monitoring Conference 2016

Part 16. Habitat Mitigation and Monitoring Plan

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Habitat Mitigation Monitoring Plan

SAN FRANCISQUITO CREEK
BANK STABILIZATION PROJECT: PHASE II
PALO ALTO, SANTA CLARA COUNTY, CALIFORNIA

Prepared on Behalf of:
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Date: April 2020

WRA Project No. 27109

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1.0 INTRODUCTION

The Children's Health Council (CHC; Applicant) submits this Habitat Mitigation Monitoring Plan (HMMP) in support of an application for the United States Army Corps of Engineers (Corps) Section 404 Permit (Nationwide Permit 13), Regional Water Quality Control Board (RWQCB) Section 401 Water Quality Certification, and a California of Department Fish and Wildlife (CDFW) Code Section 1602 Notification of Streambed Alteration Agreement (SAA) for the San Francisquito Creek Bank Stabilization, Phase II Project (Project) in the City of Palo Alto, Santa Clara County, California (Project Area).

The Project Area is located along San Francisquito Creek at 650 Clark Way (APN 142-02-020) within the Coyote Creek watershed, HUC 18050003 (Appendix A - Figures). San Francisquito Creek and its riparian corridor is the dominant drainage within the Project Area, with all waters eventually flowing into this drainage. San Francisquito Creek is a named perennial stream on the Palo Alto USGS 7.5-minute quadrangle (USGS 2018), which contains intermittent drainages that flow during the rainy season throughout mid to late summer. The banks of San Francisquito Creek at the margins of the CHC parcel are at high risk for erosion and mass wasting of material, including property loss into the creek. In channel creek bank stabilization will be accomplished via the construction of a crib wall constructed of a series of set logs and backfilled with soil. The crib wall will be planted with native vegetation, and root wads will be added to the lower tier of the crib wall to enhance in channel and riparian habitat along the creek bank. The result of the project will be a net increase habitat function along the project reach compared to existing conditions, which currently consist primarily of an unvegetated and weedy eroding bank.

This HMMP describes the proposed restoration goals and activities, restoration implementation and planting plans, and maintenance and monitoring of the restored habitats associated with the planned crib wall within the project area. Because restoration activities will result in a greater quality of potentially jurisdictional habitat than what is currently present, and will not result in a reduced quantity of habitat, no additional off-site mitigation is proposed. The project has been designed with the following objectives:

- To stabilize the banks of San Francisquito Creek within the Project Area;
- Improve quality of aquatic habitat and restore the character of the creek;
- Provide beneficial salmonid habitat;
- Enhance riparian corridor disturbed by the Project.

The Project has been designed to meet the above objectives and avoid disturbance to sensitive resources to the maximum extent feasible.

1.1 Responsible Parties

The Applicant is solely responsible for developing, implementing, maintaining and monitoring the proposed restoration activities associated with the Project. This includes property management; compliance with local, state, and federal laws and regulations; construction of capital improvements; police, and fire services; and self-governance, including public elections and taxation.

The applicant: Children's Health Council
650 Clark Way
Palo Alto, California 94304
Contact: Terry Boyle, CFO & COO
Phone: (650) 688-3602

This HMMP was prepared by WRA, Inc. (WRA). WRA has also prepared accompanying permit applications.

The preparer of this plan:

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1.2 Project Description

The Applicant proposes to rebuild and stabilize approximately 275 linear feet of eroding stream bank, and enhance stream and riparian habitat, along San Francisquito Creek. The proposed Project includes a bioengineered crib wall positioned at the forefront of ongoing erosion of the creek bank, with a variety of native riparian vegetation plantings planned within and above the crib wall to improve habitat for fish, birds, and other species. The Project will construct a live log crib wall supported by a geoengineered foundation on the east bank of the creek. The crib wall foundation consists of large boulders, cobble alluvium, and rootwads secured together and embedded within the bank. The crib wall structure consists of wooden logs and will be anchored to the foundation and existing bank with support anchors and rooted vegetation. Slopes on and above the crib wall will be graded and planted with native trees, shrubs, and grasses. Additionally, a temporary access route, including vegetation removal will be required to access the Project Area. Project work is scheduled to commence May 1, 2021 and be completed by October 15, 2021, during the dry season, thus minimizing disturbance to aquatic species, habitat, and water quality. Specific Project elements include the following:

- Excavate 1,370 cubic yards consisting mostly of native sediment with some amounts of eroded brick and artificial fill, all below the TOB;
- Remove trees and shrubs within the 0.04 acre temporary access route;
- Placement of 2,500 cubic yards of clean boulder, cobble, and engineered fill;
- Construct 275 linear feet of bioengineered crib wall (0.37 acre);
- Riparian planting of approximately 0.15 acres;

The Project has been designed to avoid or minimize disturbance to sensitive habitats and species to the maximum extent possible. The project is self-mitigating and will include on-site mitigation, including the following:

- Stabilize 275 linear-feet of San Francisquito Creek;
- Replace any removed trees at a minimum 3:1 replacement ratio
- Restore any areas de-vegetated to allow project activities to occur

2.0 EXISTING CONDITIONS

The Project Area is located along the east bank of San Francisquito Creek within Palo Alto along the northwest border of Santa Clara County (Appendix A – Figures). The approximately 4.50-acre CHC property is surrounded by suburban residential properties to the west and south and CHC outdoor learning areas to the north and east. The dominant feature in the Project Area is San Francisquito Creek and associated riparian corridor. The riparian corridor within the Project Area is in a semi-natural state and is dominated by a mixture of native coast live oak (*Quercus agrifolia*), California bay (*Umbellularia californica*), and California buckeye (*Aesculus californica*) trees, interspersed with non-native trees including blue gum (*Eucalyptus globulus*), tree of heaven (*Ailanthus altissima*), tobacco tree (*Nicotiana glauca*), and silver wattle (*Acacia dealbata*). The canopy is open and lacking trees in the area of active erosion. The tree canopy is typically underlain by common native and non-native shrub and vine species including poison oak (*Toxicodendron diversilobum*), coyote brush (*Baccharis pilularis* ssp. *consanguinea*), ripgut brome (*Bromus diandrus*), Bermuda buttercup (*Oxalis pes-caprae*), and periwinkle (*Vinca major*). Scattered woody species along the banks below OHWM include coast live oak, red willow (*Salix laevigata*), tobacco tree, and French broom (*Genista monspessulana*) are present within the wetted portion of the channel, below OHWM.

San Francisquito Creek is a United States Geological Survey (USGS) named perennial stream that flows through the Project Area in a northerly direction. The creek is the Project Area's most prominent natural feature, with all adjacent drainage flowing to it. The creek is positioned within an approximately 30-foot deep by 60-foot wide fluvial terrace. The current condition of the east bank of San Francisquito Creek consists of an incised channel and an approximately 20 to 30-foot high bank. Above the TOB buried below the surface is the constructed shear pin wall (Phase I). Below the reinforced shear pin wall, the creek bank is comprised of a mixture of native soil, exposed brick, artificial fill, and unconsolidated sand-gravel alluvium. Evidence of mass wasting of bank material is evident at the bank toe of slope. In areas of erosion, the creek banks are sparsely vegetated. Toe scour is evident along much of the Project Area, indicating that current flows are continually eroding the creek bank. The combination of height and steepness of the bank, sparse vegetation, evidence of recent incision and toe erosion, and unconsolidated nature of bank material strongly suggests that the bank will continue to retreat laterally unless it is adequately reinforced. The channel bed is partially armored with large cobbles, particularly upstream of the Project Area. The bed along the Project Area appeared less armored, with several areas of exposed sand and gravel.

3.0 PROPOSED PROJECT ACTIVITIES

The Applicant proposes to rebuild and stabilize approximately 275 linear feet of eroding stream bank, and enhance stream and riparian habitat, along San Francisquito Creek. The Project will construct a live log crib wall supported by a geoengineered foundation on the east bank of the creek. The crib wall foundation consists of large boulders, cobble alluvium, and rootwads secured together and embedded within the bank. The crib wall structure consists of wooden logs and will be anchored to the foundation and existing bank with support anchors and rooted vegetation. Slopes on and above the crib wall will be graded and planted with native trees, shrubs, and grasses. Anticipated project outcomes include a stabilized stream bank using bioengineered techniques; enhanced stream and riparian habitat to provide flow refugia, stream shading and other benefits for fish and aquatic life and riparian canopy for birds; and reduced input of fine sediment to San Francisquito Creek.

Following completion of crib wall construction, riparian areas within the limit of grading will be seeded and replanted with native woody and herbaceous vegetation to replace removed riparian vegetation and improve in-channel habitat conditions. Replanting includes three distinct native riparian planting areas and schedules (Appendix B – Sheet C-4.0). The lowest portion of the crib wall (Riparian Area 1) will be planted with arroyo willow (*Salix lasiolepis*) and sandbar willow (*Salix exigua*) poles placed within the lower crib wall cavities. The remaining slopes above will be planted with native riparian shrub and tree species and hydroseeded with a native riparian seed mix (Riparian Areas 2 and 3). These replanting activities are described in more detail below.

Riparian vegetation removal will entail the removal of six trees; three coast live oak (Tree #742, #996, and #997), two California buckeyes (Tree # 746 and #991), and one red willow (*Salix laevigata*; Tree #987). All trees to be removed are located on the east bank. In addition, understory poison oak patches and herbaceous cover will be cleared and grubbed. Details of all trees inventoried is included in Appendix C – Tree Inventory. Tree species proposed for removal are depicted in Appendix B – Sheet C-4.0.

4.0 RIPARIAN RESTORATION WORKPLAN

Riparian restoration is scheduled to occur following completion of crib wall installation activities. Planting of the riparian restoration area will occur in the late fall to take advantage of winter rains and increase opportunities for plant establishment. Due to the steep slopes and variability in available groundwater, irrigation will be installed to increase probability of proper establishment. Design oversight of the contractor will occur throughout construction to ensure specifications in the final detailed construction drawings are met. Plans depicting the riparian restoration can be Appendix B.

The riparian planting palette will consist of three distinct planting areas; Riparian Planting Area 1, 2, and 3. Riparian Planting Area 1 is located on top of the bioengineered crib wall near the OHWM. Riparian Planting Area 2 is located upslope of Riparian Planting Area 1 on the second tier of the crib wall. Riparian Planting Area 3 is located at the top of the crib wall and within the temporary site access route. The total planting area proposed is 0.15 acre (6,273 square feet; 275 linear feet) which will replace the value of removed riparian vegetation and increase the habitat value of the Project Area compared to existing conditions. A breakdown of the different riparian planting areas and their acreages is shown below on Table 1 and depicted in Appendix B.

Table 1. List of Riparian Planting Areas

Specific Planting Area	Acres	Riparian Trees Planted	Riparian Shrubs Planted
Riparian Planting Area 1	0.02	190	0
Riparian Planting Area 2	0.06	198	16
Riparian Planting Area 3	0.07	9	31
Total	**0.15**	**397**	**47**

4.1 Planting Plan

The overarching goal of planting is to stabilize the bank, establish cover of native vegetation, and for riparian canopy to establish in a similar manner found in similar habitats in the region. A planting plan is provided in Appendix B – Sheet C-4.0. Plant materials includes willow poles, container plants of native trees and shrubs, and a seed mix of native grasses and forbs. This will help control any potential erosion of the newly stabilized bioengineered crib wall, soils disturbed above the OHWM, and reduce the invasion of non-native vegetation.

A plant palette was developed for the riparian revegetation based on species which have been shown to be successful in riparian restoration and within San Francisquito Creek. Additionally, these species, including red willow, California buckeye, coast live oak, and blue elderberry (*Sambucus nigra* ssp. *caerulea*) occur naturally in riparian habitat within, or surrounding, the Project Area. Willow (*Salix* sp.), white alder (*Alnus rhombifolia*) and shrub species tolerant of saturated soils will be planted in the lower- and mid-riparian zones (Riparian Planting Area 1 and 2). Proposed willow plantings include pole cuttings of Arroyo willow, sandbar willow, and red willow spaced approximately three feet on center and placed in a somewhat linear fashion along the cavities of the crib wall and within the slope. Willow cuttings will be sourced either upstream and downstream of the Project Area or propagated from a nearby nursery.

Tree, shrub, and herbaceous species will be planted in the mid- and upper-riparian zones (Riparian Planting Area 2 and 3). Proposed tree species include California buckeye and coast live oak spaced ten to twelve feet on center. Proposed shrub species include blue elderberry, California wild rose (*Rosa californica*), California blackberry (*Rubus ursinus*), and common snowberry (*Symphoricarpos albus*) spaced four to six feet on center. In addition, the slopes of the mid- and upper-riparian zones will be hydroseeded with native herbaceous species typical to the area. This includes species such as yarrow (*Achillea millefolium*), California brome (*Bromus carinatus*), blue wildrye (*Elymus glaucus*), California fescue (*Festuca californica*), meadow barley (*Hordeum brachyantherum*), creeping wild rye (*Elymus* [*Leymus*] *triticoides*), and native pine bluegrass (*Poa secunda*).

The riparian restoration areas will be irrigated to aid recruitment of planted species. Restoration plantings will be irrigated until they become established and are self-sufficient. Irrigation will be provided by an automated irrigation system, use of DRiWater®, or by hand as needed through a 5-year establishment period. Riparian plantings will be planted at elevations adequate to provide groundwater infiltration; however, some plantings may require irrigation for the first few years following installation.

Riparian planting palettes are provided below in Table 2, Table 3, Table 4, and provide planting specifics including species, size, installation spacing, and quantity. The proposed hydroseed mix specifications are discussed in Table 5. Planting palettes are subject to change based on availability of container plants and seed.

Table 2. Riparian Planting Area 1 Proposed Plant Palette

Scientific Name	Common Name	Size	On-Center Spacing (feet)	Quantity
Salix lasiolepis	Arroyo willow	Pole cuttings	3	95
Salix exigua	Sandbar willow	Pole cuttings	3	95
			Total	**190**

Riparian Planting Area 1 is the lowest portion of the three planting areas and is located at the lowest level of the crib wall, near the OHWM. Pole cuttings of arroyo and sandbar willow will be placed throughout the crib wall cavities approximately three feet on center. The pole cuttings provide an effective means to establish a high concentration of roots, further stabilizing the bioengineered wall.

Table 3. Riparian Planting Area 2 Proposed Plant Palette

Scientific Name	Common Name	Size	On-Center Spacing (feet)	Quantity
Alnus rhombifolia	White alder	5 gal	10	8
Salix laevigata	Red willow	Pole cuttings	3	95
Salix lasiolepis	Arroyo willow	Pole cuttings	3	95
Sambucus nigra ssp. *caerulea*	Blue elderberry	16” deepot	6	16
			Total	**214**

Riparian Planting Area 2 is located upslope of Riparian Planting Area 1 in the middle elevations of the crib wall. This area will be planted with a mix of native shrubs and willows, as well as hydroseeded with a native seed mix. Shrub plantings consist of facultative riparian species including arroyo and red willow, white alder, and blue elderberry.

Table 4. Riparian Planting Area 3 Proposed Plant Palette

Scientific Name	Common Name	Size	On-Center Spacing (feet)	Quantity
Aesculus californica	California buckeye	15 gal	12	5
Quercus agrifolia	Coast live oak	15 gal	12	4
Rosa californica	California wild rose	1 gal	6	9
Rubus ursinus	California blackberry	1 gal	6	11
Symphoricarpos albus	Common snowberry	1 gal	4	11
			Total	**40**

Riparian Planting Area 3 is located upslope of Riparian Planting Area 2 at the top tier of the crib wall and within the temporary site access route. This area will be planted with native tree and shrubs and hydroseeded with a native seed mix. Tree plantings consist of California buckeye and coast live oak. Shrub plantings include California wild rose, California blackberry, and common snowberry.

Table 5. Proposed Hydroseed Mix for Riparian Area 2 and 3.

Scientific Name	Common Name
Achillea millefolium	yarrow
Bromus carinatus	California brome
Elymus glaucus	blue wildrye
Festuca californica	California fescue
Hordeum brachyantherum	meadow barley
Elymus [*Leymus*] *triticoides*	creeping wild rye
Poa secunda	native pine bluegrass

4.2 Maintenance during the Monitoring Period

Maintenance activities in the riparian restoration areas during the five-year monitoring period following planting may include the following tasks as needed: (1) erosion control and repair should an extreme storm event occur; (2) inspection for signs of vandalism or other disturbance of the creation and restoration area by people; (3) inspections for colonization of problematic non-native plants and action to control their spread; and (4) replanting of riparian species if survival goals are not achieved. Removal of non-native species in the riparian restoration area will be conducted as needed and recommended in the annual Monitoring Report (see Section 5.1 below). Removal of non-native species may be conducted by a qualified biologist or by Applicant maintenance personnel as directed by a qualified biologist. Some planted species initially planted may not establish and/or may be outcompeted by other planted native species. Replacement plant materials, if needed, would include those species that have been most successful in establishment.

4.3 As-Built Conditions

A brief letter report outlining the as-built conditions of the riparian restoration area will be prepared and submitted to the RWQCB, Corps, CDFW, and other interested agencies within 45 days of creation and restoration planting plan implementation. The report shall document construction activities, report final impact acreages, provide final drawings of construction for the restored areas, and include before and after photographs.

5.0 SUCCESS CRITERIA AND MONITORING

5.1 Success Criteria

Monitoring of the riparian areas will occur annually for five years beginning one full rainy season following implementation of the HMMP. Data will be collected to assess the successful establishment of appropriate native vegetation.

Success criteria in the table below are developed in consideration of the density of plantings proposed, the fact that the majority of the area to be planted currently lacks vegetation or is dominated by non-native herbaceous species, and the fact that only six trees will be removed as a result of construction. The majority of the criteria in the table below are therefore focused on ensuring the long-term function of the crib wall through the growth of adequate riparian vegetation.

Table 6. Summary of Riparian Monitoring and Success Criteria

Success Criteria	Methods[1]	Year 1	Year 2	Year 3	Year 4	Year 5
Baseline Mitigation Criteria for Removed Vegetation						
Riparian Tree and Shrub Survivability	Visual assessment of health and survival	≥ 36 surviving plantings	≥ 30 surviving plantings	≥ 24 surviving plantings	≥ 18 surviving plantings	≥ 18 surviving plantings
Total vegetative cover	Photo-monitoring and cover estimation	≥ 50% vegetative cover	≥ 60% vegetative cover	≥ 70% vegetative cover	≥ 70% vegetative cover	≥ 70% vegetative cover
Vegetation – Dominance of Invasives	Photo-monitoring and population mapping	Invasive plants on the California Invasive Plant Council (Cal-IPC) High list will not exceed 10% cover within the riparian restoration area				
Erosion and Geomorphic Monitoring	Visual assessment and photo-monitoring 100 feet up and downstream of project site;	No significant erosion and/or sedimentation that threatens habitat quality, crib wall, or project functionality				
Criteria Used to Evaluate Crib Wall Sustainability						
Riparian Tree and Shrub Container Plantings	Visual assessment of health and survival in each planting area	≥ 85% survival of planted trees	≥ 75% survival of planted trees	≥ 75% survival of planted trees	≥ 60% survival of planted trees	≥ 60% survival of planted trees
Willow Poles in Riparian Planting Area 1 and 2	Visual assessment of health and survival	≥ 15% vegetative cover	≥ 30% vegetative cover	≥ 40% vegetative cover	≥ 50% vegetative cover	≥ 60% vegetative cover

1. Due to the steepness of the slope, it may not be possible or advisable to directly access each level of the crib wall to count trees or measure herbaceous vegetation. Therefore, these parameters will be counted on the ground as much as feasible, and areas that are not safely accessed will be estimated.

Monitoring will be performed by a qualified biologist with experience in riparian restoration monitoring. If the project results in an improved functional condition at the end of the monitoring period, then it will be concluded that the project was effective. Baseline mitigation success criteria will be used to evaluate whether or not the impacts to riparian areas have been mitigated for purposes of permit compliance. Additional criteria in the table above are also included to ensure that the crib wall will support adequate vegetation to withstand future high flow events and achieve the project goals of stabilizing the base on the eroded bank. Monitoring results from the Crib Wall Sustainability Criteria will be used in conjunction with erosion and crib wall stability assessments to determine if any follow up actions are necessary to address any deficiencies.

Monitoring will consist of annual site visits during each monitoring year to inspect conditions and take annual photographs for reporting purposes to ensure that the riparian restoration areas are on trajectory to meet the performance criteria established. A short memorandum will summarize whether these habitats are on trajectory during these years and if necessary, will provide appropriate recommendations for adaptive management practices.

5.2 Monitoring

5.2.1 Methods

Vegetation

Vegetation monitoring will occur once annually and involves two components: (1) making an estimate of overall plant establishment, density, and cover and (2) surveying for the presence of invasive exotic herbaceous weeds.

Overall plant establishment will be assessed visually near the end of the growing season. The number of living trees and shrubs, including recruits, will be tallied, and compared to the number of original plantings. Due to the steepness of the slope, it may not be possible or advisable to directly access each level of the crib wall to count trees or measure herbaceous vegetation. Therefore, these parameters will be counted on the ground as much as feasible, and areas that are not safely accessed will be estimated. The biologist conducting the monitoring will determine whether to recommend replacing trees and shrubs that die based on the site's progress in meeting performance criteria for riparian revegetation survivability.

These data will be analyzed to assess whether vegetation coverage is meeting the performance criteria goals outlined in Section 5.1. Photographs will be taken at selected permanent photo-points during the vegetation monitoring visit each monitoring year for year-to-year comparison. Monitoring will be conducted at the end of the growing season for riparian plant species, typically late spring (June) or summer (July-August).

Riparian habitats within the Project Area currently support predominantly non-native grasses and forbs with occasional native forbs and shrubs. These non-native annual grasses have become ubiquitous throughout California such that they are considered to be part of the naturalized landscape. Therefore, plants considered by the California Invasive Plant Council (Cal-IPC) Inventory List (2019) as "Moderate," such as non-native annual grasses, are expected to be present following restoration plant installation due to their prolific nature in adjacent lands and would be impractical to eradicate. Surveying for the presence of invasive exotic plant species within the riparian areas will occur annually during the vegetation monitoring visit. Terrestrial weeds identified on the Cal-IPC list as "High", exclusive of non-native grasses, will be controlled if observed in excess of 10 percent cover.

Soil Erosion

Photo-monitoring will be used to document signs of erosion within the Project Area and 100-feet upstream and downstream of the Project site. Photographic points will be established prior to construction and will be used to document changes to the riparian planting area over the monitoring period, including signs of sedimentation or erosion. Erosion in the Project Area will be documented, and corrective measures will be recommended if problems occur.

6.0 MAINTENANCE DURING MONITORING PERIOD

6.1 Maintenance Activities

Maintenance of the riparian restoration areas is generally anticipated to occur during the spring (for invasive species management) and fall (for any riparian plantings required). Maintenance activities help ensure yearly success criterion are achieved.

6.1.1 Contingency Measures

If annual or final success criteria are not met, the Applicant will prepare an analysis of the cause(s) of failure and, if determined necessary by the agencies and the Applicant, propose remedial action for approval. Permit requirements will be determined to be satisfied if the Baseline Mitigation Criteria success criteria are met. Crib Wall Sustainability success criteria will be used to assess if any follow up actions are necessary to ensure adequate vegetation of the crib wall for stability and long term sustainability to resist high flow events. Each of these success criteria will be evaluated separately, and maintenance recommendations made as appropriate for conditions observed during the monitoring site visits.

6.1.2 Pest Species Control

After construction, weed maintenance will focus on invasive species with a Cal-IPC rating of High. Weed removal activity will be conducted using methods specifically identified as effective for those target species.

Surveying for the presence of invasive exotic plant species will occur during the spring or summer monitoring visit. Removal by hand will occur if possible wherever these species are observed on the restoration site. Invasive non-native plant species monitoring will occur once per year concurrent with vegetation monitoring.

7.0 MONITORING REPORTS

7.1 As-Builts

A letter report outlining the as-built conditions of the post-construction Project Area will be prepared and submitted to the Corps and other interested agencies within 45 days of completion of creation and restoration planting plan implementation.

7.2 Annual Reports

Annual reports will be prepared that discuss monitoring methodology and results. Full annual reports will be provided for each monitoring year, which will be submitted to the agencies and other interested agencies by December 31st of each monitoring year. If restored riparian habitats

within the Project Area demonstrate that they are successfully meet established performance criteria early into the monitoring period, the Applicant may request early signoff from the agencies. A qualified biologist with experience in biological monitoring will supervise the report preparation. These reports will assess progress in meeting success criteria and identify any problems with flooding, sedimentation, vandalism, and/or other general causes of poor survival or degradation. If necessary, recommendations or improvements based on adaptive management will be made to ensure the success criteria will be met during the monitoring period.

7.3 Notification of Completion

Upon completion of five years of monitoring, a final report will be sent to the RWQCB, Corps, CDFW, and other interested agencies detailing the results of the final year of monitoring. If the restored riparian area has met the success criteria outlined in Section 5.0 by the end of the monitoring period, then the proposed action in the final report will be for no further action. If the restored area has not met the success criteria outlined in Section 5.0 by the end of the monitoring period, then the final report may recommend additional corrective measures and/or extending the monitoring period.

8.0 REFERENCES

[Cal-IPC] California Invasive Plant Council. 2019. California Invasive Plant Inventory Database. Online at: https://www.cal-ipc.org/plants/inventory/

U.S. Geological Survey (USGS). 2018. Palo Alto, California. 7.5-minute quadrangle topographic map

APPENDIX A – FIGURES

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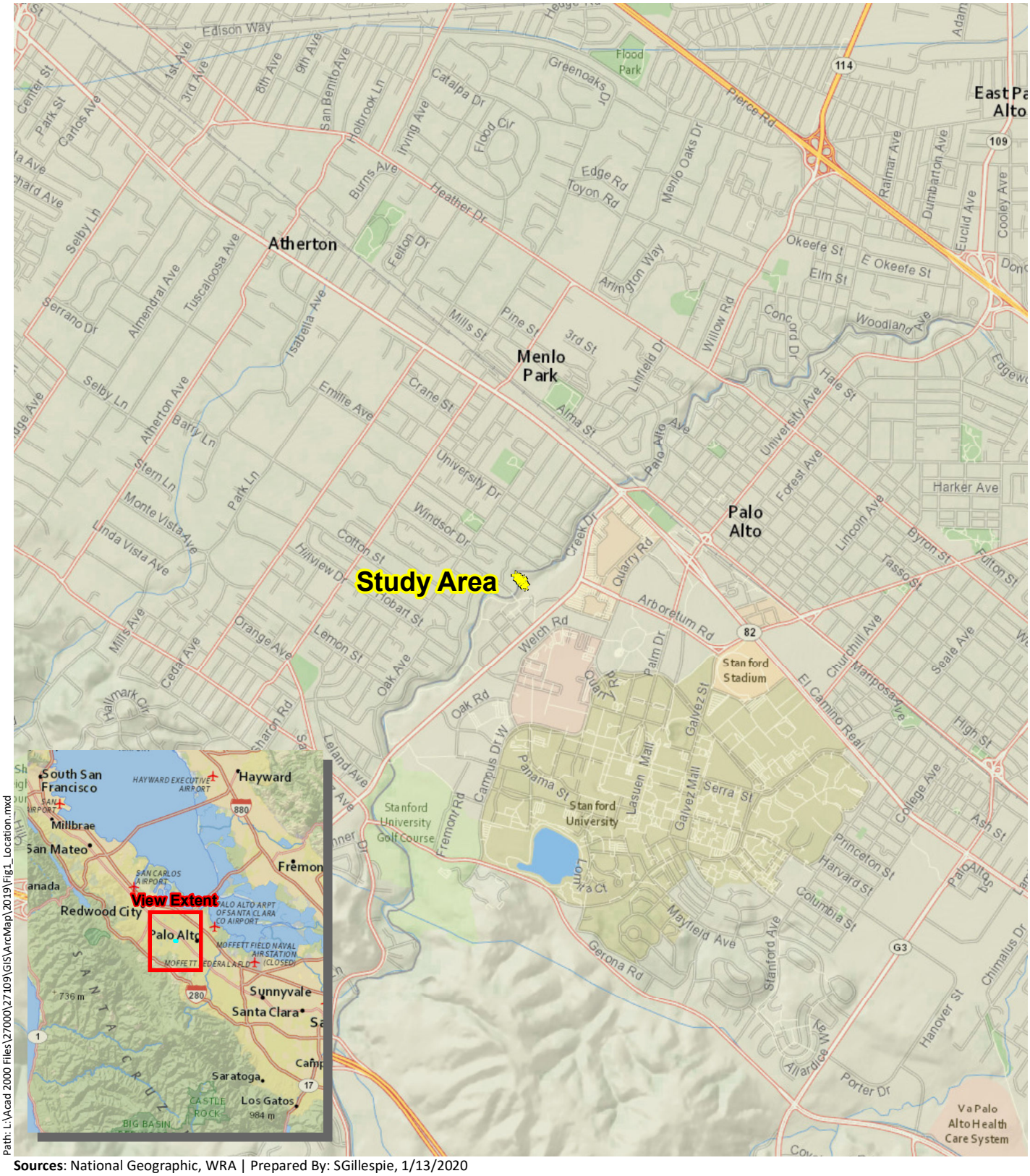

Sources: National Geographic, WRA | Prepared By: SGillespie, 1/13/2020

Figure 1. Project Area Regional Location Map

Children's Health Council
Creek Bank Restoration
Palo Alto, California

0 0.5 1 Miles

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wra
ENVIRONMENTAL CONSULTANTS

Sources: Esri Streaming - NAIP 2016 | Prepared By: SGillespie, 3/9/2020

Figure 2. Biological Communities within the Project Area

Children's Health Council
Creek Bank Restoration
Palo Alto, California

0 50 100 Feet

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ENVIRONMENTAL CONSULTANTS

APPENDIX B – PLANTING PLAN (SHEET C-4.0 OF PROJECT PLANS)

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PLANTING LEGEND

SYMBOL	DESCRIPTION
	PROPERTY LINE
(100)	(E) CONTOUR (2 FT)
100	PROPOSED CONTOUR (2 FT)
LOG	LIMIT OF GRADING
	CHANNEL ALIGNMENT
	TREE PROTECTION FENCING
TREE TAG NUMBER / TREE IDENTIFIER	EXISTING TREE
	EXISTING TREE TO BE REMOVED
	PROPOSED RIPARIAN PLANTING AREA 1 (CRIB WALL WITH LIVE WILLOW CUTTINGS)
	PROPOSED RIPARIAN PLANTING AREA 2 (UP TO Q10) — HYDROSEED
	PROPOSED RIPARIAN PLANTING AREA 3 (Q10 TO Q100) — HYDROSEED

TREE IDENTIFIER	BOTANICAL NAME	COMMON NAME
ACDE	ACACIA DEALBATA	SILVER WATTLE
ACMA	ACER MACROPHYLLUM	BIGLEAF MAPLE
AECA	AESCULUS CALIFORNICA	CALIFORNIA BUCKEYE
AIAL	AILANTHUS ALTISSIMA	TREE OF HEAVEN
EUGL	EUCALYPTUS GLOBULUS	BLUE GUM EUCALYPTUS
QUAG	QUERCUS AGRIFOLIA	COAST LIVE OAK
SALA	SALIX LAEVIGATA	RED WILLOW
SANI	SAMBUCUS NIGRA SSP. CAERULEA	BLUE ELDERBERRY
SESE	SEQUOIA SEMPERVIRENS	COAST REDWOOD
UMCA	UMBELLULARIA CALIFORNICA	CALIFORNIA BAY

PLANTING LIST

RIPARIAN AREA 1 (0.02 ACRES)

BOTANICAL NAME	COMMON NAME	SIZE	SPACING (OC FEET)	QUANTITY
SALIX LASIOLEPIS	ARROYO WILLOW	4' POLE CUTTINGS	3	95
SALIX EXIGUA	SANDBAR WILLOW	4' POLE CUTTINGS	3	95

RIPARIAN AREA 2 (0.056 ACRES)

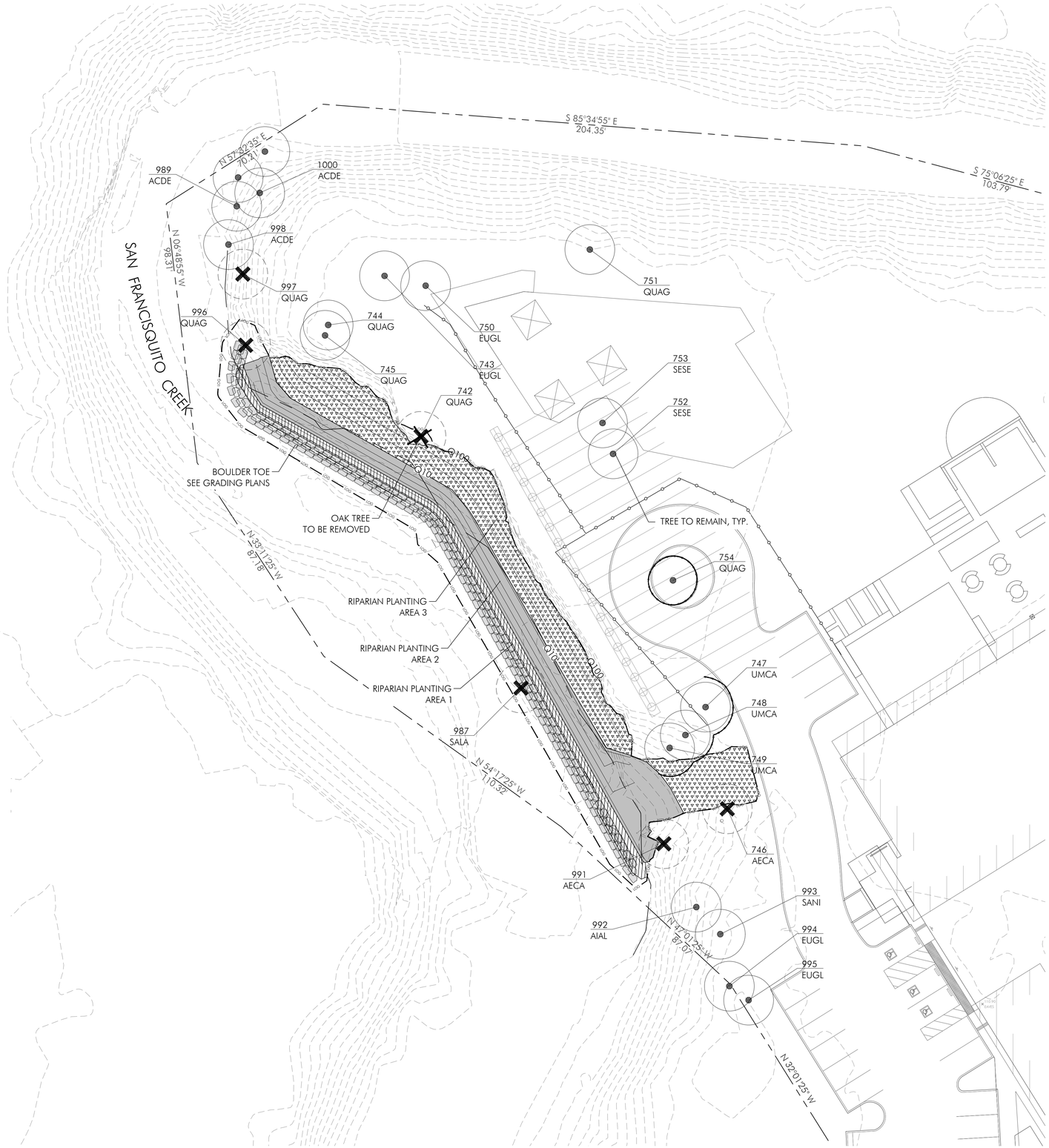
BOTANICAL NAME	COMMON NAME	SIZE	SPACING (OC FEET)	QUANTITY
ALNUS RHOMBIFOLIA	WHITE ALDER	5 GAL	10	8
SALIX LAEVIGATA	RED WILLOW	4' POLE CUTTINGS	3	95
SALIX LASIOLEPIS	ARROY WILLOW	4' POLE CUTTINGS	3	95
SAMBUCUS NIGRA SPP. CAERULIA	BLUE ELDERBERRY	16" DEEPOT	6	16

RIPARIAN AREA 3 (0.07 ACRES)

BOTANICAL NAME	COMMON NAME	SIZE	SPACING (OC FEET)	QUANTITY
AESCULUS CALIFORNICA	CALIFORNIA BUCKEYE	15 GAL	12	5
QUERCUS AGRIFOLIA	COAST LIVE OAK	15 GAL	12	4
ROSA CALIFORNICA	CALIFORNIA WILD ROSE	1 GAL	6	9
RUBUS URSINUS	CALIFORNIA BLACKBERRY	1 GAL	6	11
SYMPHORICARPUS ALBUS	COMMON SNOWBERRY	1 GAL	4	11

HYDROSEED MIX

BOTANICAL NAME	COMMON NAME
ACHELLIA MILLEFOLIUM	YARROW
BROMUS CARINATUS	CALIFORNIA BROME
ELYMUS GLAUCUS	BLUE WILDRYE
FESTUCA CALIFORNICA	CALIFORNIA FESCUE
HORDEUM BRACHYANTHERUM	MEADOW BARLEY
LEYMUS TRITICOIDES	CREEPING WILD RYE
POA SECUNDA	NATIVE PINE BLUEGRASS



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CREEK BANK STABILIZATION PROJECT - PHASE II

CHILDREN'S HEALTH COUNCIL
PALO ALTO, CALIFORNIA

NOT FOR CONSTRUCTION

Date	Issues And Revisions	No.
03/27/19	CONCEPT	
08/19/19	30% DESIGN	

PROJECT #27109
DRAWN BY:RFP, ACS
CHECKED BY: BSS, RBB
ORIGINAL DRAWING SIZE: 24 X 36

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SCALE: 1 " = 20 '

PLANTING PLAN

Sheet

C-4.0

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APPENDIX C – TREE INVENTORY

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Attachment A. Children's Health Council San Francisquito Creek Bank Restoration Project Tree Survey. February 2018 & November 2019.

Tag_ID	Species	Common Name	Multistem	Ordinance Protected Tree	Tree Impact	DBH_1	DBH_2	DBH_3	DBH_4	DBH_5	Total DBH (inches)	Dripline Area (feet)	Estimated Height (feet)	Condition	Health	Structure
742	*Quercus agrifolia*	Coast live oak	No	Yes	Remove	14.1	0.0	0.0	0.0	0.0	14.1	11.8	30	Fair	Good	Poor
743	*Eucalyptus globulus*	Blue gum	No	No	Preserve	50.0	0.0	0.0	0.0	0.0	50	41.7	60	Fair	Fair	Fair
744	*Quercus agrifolia*	Coast live oak	No	No	Preserve	4.0	0.0	0.0	0.0	0.0	4	3.3	8	Good	Good	Fair
745	*Quercus agrifolia*	Coast live oak	Yes	No	Preserve	6.2	1.5	0.0	0.0	0.0	7.7	6.4	1	Good	Good	Fair
746	*Aesculus californica*	California buckeye	Yes	No	Remove	8.9	10.3	10.5	4.8	5.1	39.6	33.0	25	Good	Good	Fair
747	*Umbellularia californica*	California bay	Yes	No	Preserve	33.2	34.0	32.0	19.0	0.0	118.2	98.5	34	Fair	Fair	Poor
748	*Umbellularia californica*	California bay	Yes	No	Preserve	23.1	35.0	0.0	0.0	0.0	58.1	48.4	45	Fair	Fair	Poor
749	*Umbellularia californica*	California bay	Yes	No	Preserve	28.0	14.0	14.5	10.0	12.0	78.5	65.4	45	Fair	Fair	Poor
750	*Eucalyptus globulus*	Blue gum	No	No	Preserve	19.3	0.0	0.0	0.0	0.0	19.3	16.1	35	Fair	Fair	Fair
751	*Quercus agrifolia*	Coast live oak	Yes	Yes	Preserve	20.0	10.1	12.0	0.0	0.0	42.1	35.1	40	Good	Good	Fair
752	*Sequoia sempervirens*	Coast redwood	No	No	Preserve	16.1	0.0	0.0	0.0	0.0	16.1	13.4	35	Good	Good	Good
753	*Sequoia sempervirens*	Coast redwood	No	No	Preserve	14.8	0.0	0.0	0.0	0.0	14.8	12.3	35	Good	Good	Good
754	*Quercus agrifolia*	Coast live oak	No	Yes	Preserve	22.1	0.0	0.0	0.0	0.0	22.1	18.4	30	Good	Good	Good
987	*Salix laevigata*	Red willow	Yes	No	Remove	4.0	1.0	1.0	0.0	0.0	6	5.0	8	Fair	Fair	Poor
988	*Acacia dealbata*	Silver wattle	No	No	Preserve	5.5	0.0	0.0	0.0	0.0	5.5	4.6	11	Poor	Fair	Poor
989	*Acacia dealbata*	Silver wattle	Yes	No	Preserve	4.5	4.0	0.0	0.0	0.0	8.5	7.1	12	Poor	Fair	Poor
990	*Acer macrophyllum*	Bigleaf maple	Yes	No	Preserve	8.0	7.0	7.0	6.1	0.0	28.1	23.4	35	Poor	Fair	Poor
991	*Aesculus californica*	California buckeye	Yes	No	Remove	11.9	11.3	0.0	0.0	0.0	23.2	19.3	28	Fair	Fair	Fair
992	*Ailanthus altissima*	Tree of Heaven	No	No	Preserve	6.1	0.0	0.0	0.0	0.0	6.1	5.1	30	Fair	Fair	Fair
993	*Sambucus nigra* ssp. *caerulea*	Blue elderberry	Yes	No	Preserve	5.5	2.6	1.0	1.0	1.0	11.1	9.3	12	Fair	Fair	Poor
994	*Eucalyptus globulus*	Blue gum	Yes	No	Preserve	65.0	0.0	0.0	0.0	0.0	65	54.2	70	Fair	Fair	Good
995	*Eucalyptus globulus*	Blue gum	No	No	Preserve	51.5	0.0	0.0	0.0	0.0	51.5	42.9	70	Fair	Fair	Fair
996	*Quercus agrifolia*	Coast live oak	No	Yes	Remove	12.6	0.0	0.0	0.0	0.0	12.6	10.5	33	Fair	Good	Poor
997	*Quercus agrifolia*	Coast live oak	No	No	Remove	4.0	0.0	0.0	0.0	0.0	4	3.3	12	Fair	Fair	Fair
998	*Acacia dealbata*	Silver wattle	No	No	Preserve	6.1	0.0	0.0	0.0	0.0	6.1	5.1	45	Fair	Fair	Fair
1000	*Acacia dealbata*	Silver wattle	No	No	Preserve	9.7	0.0	0.0	0.0	0.0	9.7	8.1	40	Fair	Fair	Fair

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REDACTED

The Cultural Resources Summary Letter and Report (Part 17 of the Regulatory Permit Application Package) has been confidentially withheld to protect the location of cultural resources and is on file at the City of Palo Alto Planning & Development Services Department.