DOCKETED	
Docket Number:	24-OPT-04
Project Title:	Potentia-Viridi Battery Energy Storage System
TN #:	258051
Document Title:	Hydrology and Water Quality Technical Report
Description:	This report (documents the methods and results of a hydrology and water quality study for the project
Filer:	Jennifer Dorgan
Organization:	Allen Matkins Leck Gamble Mallory & Nats
Submitter Role:	Applicant Representative
Submission Date:	7/26/2024 11:34:39 AM
Docketed Date:	7/26/2002

Appendix 3.15A

Hydrology and Water Quality Technical Study

Hydrology and Water Quality Technical Study

Potentia-Viridi BESS Project Alameda County, California

JULY 2024

Prepared for:

LEVY ALAMEDA, LLC
Project Applicant
155 Wellington Street W, Suite 2930
Toronto, Ontario M5V 3H1, Canada

CALIFORNIA ENERGY COMMISSION
Lead Agency
715 P Street
Sacramento, California 95814

Prepared by:

DUDEK

605 Third Street
Encinitas, California 92024

Table of Contents

SECTION **PAGE NO.**

FIGURES

TABLES

APPENDICES

Acronyms and Abbreviations

Acronym/Abbreviation	Definition
amsl	above mean sea level
APN	Assessor's Parcel Number
BESS	Battery Energy Storage System
FEMA	Federal Emergency Management Agency
gen-tie	generator tie
HSG	Hydrologic Soil Group
HUC	Hydrologic Unit Code
NHD	National Hydrography Dataset
NOAA	National Oceanic and Atmospheric Administration
PG&E	Pacific Gas and Electric
RWQCB	Regional Water Quality Control Board
TMDL	Total Maximum Daily Load

INTENTIONALLY LEFT BLANK

1 Introduction

1.1 Overview

The California Energy Commission will act as the Lead Agency to identify and evaluate potential environmental impacts associated with the Potentia-Viridi Battery Energy Storage System Facility Project (Project) proposed in Alameda County.

This report (Report) documents the methods and results of a hydrology and water quality study for the proposed Project. The characterization of the Project runoff as it relates to water quality is summarized in the context of the Water Quality Control Plan (Basin Plan) for the California Regional Water Quality Control Board Central Valley Region and the 2020-2022 Integrated Report (Clean Water Act Section 303(d) List/305(b) Report) approved by the California Environmental Protection Agency and adopted by the State Water Resources Control Board. A stormwater compliance plan was prepared by Coffman Engineers. This plan, along with impervious area quantities and preliminary hydrology calculations, can be found in Appendix A.

The analyses in this Report are preliminary in nature. Recommendations found within this Report are not approved and are not for construction purposes; contractors shall refer to the final approved construction documents for construction details.

1.2 Project Location

The Project would be located in Alameda County, California within a portion of Assessor Parcel Number (APN) 99B-7890-002-04 located at 17257 Patterson Pass Road, southwest of Interstate 580 and Interstate 205 (Figure 1, Project Location). Development of the BESS facility would occur on about 70 acres of APN 99B-7890-002-04, which currently consists of fallowed annual grasslands suitable for grazing. The gen-tie line would extend southeast from the Project substation, crossing Patterson Pass Rd, and then proceed east to the Point of Interconnection (POI) at the Tesla Substation. The Project's gen-tie line would be sited on APNs 99B-7890-2-4, 99B-7890-2-6, and 99B-7885-12. Land uses in the immediate vicinity of the Project include undeveloped rural agricultural lands, multiple high-voltage transmission lines and electrical substations, rural roads, and railroad lines. The nearest municipality to the Project site is the City of Tracy approximately 2.5 miles to the northeast. There are a few single-family residences near the Tesla Substation's southern and eastern boundaries. The nearest residence is about 1,500 feet southeast of the Project site and 560 feet south of the proposed gen-tie line; it is owned by the same landowner leasing the lands for the Project.

The Project location was selected due to it being large enough to support development of the Project, its close proximity to existing electrical infrastructure and the Tesla Substation, thereby minimizing length of the proposed gen-tie line to the POI, and because it is located immediately adjacent to existing roadways for construction and O&M access.

1.3 Project Description

The proposed Project would include the construction, operation and maintenance, and decommissioning of a 400 megawatt (MW) BESS facility. The primary Project components include an up to 3,200 megawatt-hour (MWh) battery energy storage system (BESS) facility, an operations and maintenance (O&M) building, a project substation, a 500 kilovolt (kV) overhead intertie transmission (gen-tie) line, and interconnection facilities within the Pacific Gas and Electric (PG&E) owned and operated Tesla Substation.

The Project would draw electricity from the power grid to charge and store electrical energy and discharge back to the power grid when the stored energy is needed. The Project would provide several benefits to the power grid, including reducing the need to operate natural gas power plants to balance intermittent renewable generation and serving as an additional capacity resource that would enhance grid reliability.

The Project would be remotely operated and monitored year-round and be available to receive or deliver energy 24 hours a day and 365 days a year. During the operational life of the Project, qualified technicians would routinely inspect the Project facilities and conduct necessary maintenance to ensure reliable and safe operational readiness.

2 Environmental Setting

APN 99B-7890-002-04 currently consists of vacant, agricultural farmland with natural topography. The topography is hilly and generally slopes from the higher elevations in the south down toward the lower elevations in the north. The highest elevation on the APN 99B-7890-002-04 is approximately 540 feet above mean sea level (amsl) along the southern border and the lowest elevation is approximately 400 feet amsl in the northeast corner. The southern edge of APN 99B-7890-002-04 is bordered by a railroad, which sits atop an elevated berm. The railroad berm is assumed to serve as a hydrologic barrier to any flow that would otherwise enter the site from the south. APN 99B-7890-002-04 is surrounded by vacant, open space and rural roads.

The Project's gen-tie line would be sited on APNs 99B-7890-2-6 and 99B-7885-12 and would extend from the Project site across Patterson Pass Rd, and over additional agricultural lands surrounding the PG&E Tesla Substation which is located directly to the east. In addition to the PG&E Tesla Substation, the Project site and gen-tie route are surrounded by vacant rural agricultural land, multiple high-voltage transmission lines, rural roads, and a railroad line.

2.1 Surface Water Hydrology

The Project site is within the jurisdictional boundary of the Central Valley Region (Region 5) of the Regional Water Quality Control Board (RWQCB). Specifically, the Project falls within the North Diablo Range Hydrologic Unit (Hydrologic Unit Number 543.00) of the San Joaquin Hydrologic Basin Planning Area (Figure 2, RWQCB Hydrologic Setting and Surface Water Features). These watersheds are used to identify beneficial uses and water quality objectives in the San Joaquin River Basin. The San Joaquin River Basin covers 15,580 square miles and includes the entire area drained by the San Joaquin River.

The U.S. Geological Service Watershed Boundary Dataset indicates the Project site is located in the southwestern portion of the San Joaquin Delta watershed (Figure 3, USGS Hydrologic Setting). The watershed is identified by a Hydrologic Unit Code (HUC) 8 designation, which signifies the scale of the watershed. The San Joaquin Delta watershed begins in the elevated topography west of the site and flows in an easterly direction toward the San Joaquin River, which drains the watershed. On a smaller scale, the Project site is within the Old River (HUC-10) and Lower Old River (HUC-12) watersheds, which are drained by the Old River, a tributary to the San Joaquin River.

The National Hydrography Dataset (NHD) is maintained by the U.S. Geological Service (USGS 2023) for the purpose of portraying surface waters on a national scale. The NHD is maintained at a broad nationwide level to represent features, such as rivers, streams, canals, lakes, ponds, coastlines, dams, and stream gages. Due to its scale, the NHD provides only an estimate of the waterbodies, is not comprehensive, and may not be accurate. The NHD displays one unnamed, intermittent "stream/river" feature flowing south to north through APN 99B-7890-002-04 (Figure 2). Immediately east of the Project site is an intermittent "stream/river" named Patterson Run that flows from south to north through the proposed overhead gen-tie alignment. Immediately north of the Project site is an unnamed, intermittent "stream/river" that flows from west to east and collects flow from the tributary through APN 99B-7890-002-04 before flowing into Patterson Run (Figure 3).

2.2 Flood Zones

Federal Emergency Management Agency (FEMA) Flood insurance Rate Maps identify flood zones and areas that are susceptible to 100-year and 500-year floods. Figure 4, FEMA Flood Zones, shows that the Project site is outside of any mapped FEMA flood zone, meaning the area is of minimal flood hazard (FEMA 2023).

2.3 Climate and Rainfall

The Project site is 2.5 miles west of Tracy, the second most populous city in San Joaquin County, California. Tracy has a Mediterranean semi-arid climate with cool, moist winters and hot and dry summers. December and January are the coolest months, averaging around 47° Fahrenheit, and July is the warmest month, averaging 76.4° Fahrenheit (NOAA 2023a).

Rainfall depths for various storm durations and recurrence intervals at the Project site were obtained using National Oceanic and Atmospheric Administration (NOAA) Atlas 14 precipitation estimates. These depths are provided in Table 1 and shown in Appendix B (NOAA 2023b).

Table 1. Rainfall Depths

Duration	Precipitation (inches)			
	Average Recurrence Interval (years)			
	5	10	25	100
1-hour	0.44	0.53	0.65	0.87
3-hour	0.77	0.90	1.10	1.44
6-hour	1.04	1.22	1.48	1.93
24-hour	1.87	2.23	2.74	3.57

Source: NOAA 2023b.

According to the PRISM Climate Group annual precipitation dataset, which uses average monthly and annual conditions over the most recent three full decades (1991–2020), the Project site gets an average of 10 inches of precipitation annually (PRISM 2023), most of which falls between the months of November through March.

According to the Alameda County Flood Control and Water Conservation District isohyetal map the mean annual precipitation at the Project site was approximately 12.5 inches in 2011 (ACFCWCD 2018).

2.4 Soils

The Soil Conservation Service of the U.S. Department of Agriculture has investigated the hydrologic characteristics of soils as related to runoff potential and has developed a system to classify soils into four hydrologic soil groups (HSGs). The four HSGs are A, B, C and D. Group A generally has the smallest runoff potential and Group D the greatest. The HSGs are defined as follows:

- **Group A.** Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well-drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.
- **Group B.** Soils having a moderate infiltration rate when thoroughly wet. These consist primarily of moderately deep or deep, moderately well-drained or well-drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.
- **Group C.** Soils having a slow infiltration rate when thoroughly wet. These consist mostly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.
- **Group D.** Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist largely of clays that have a high shrink–swell potential, soils that have a high-water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

As shown in Figure 5, Soil Map, the three Project basins are composed entirely of HSG C soils.

2.5 Land Cover

As shown in Figure 6, Land Cover Map, the Project site comprises “herbaceous” and “emergent herbaceous” land types, which are both pervious surfaces. Patterson Pass Road, which makes up 1.5 acres of area within the disturbed area southeast of APN 99B-7890-002-04, consists of “Developed” land cover types. These areas were equated to “Rural Coverage” in Table 6 of the Hydrology Manual. Because the impervious area is not directly connected to a storm drain system, the “Rural Coverage” category from Table 6 of the Hydrology Manual can be applied to the impervious area.

2.6 Characterization of Project Runoff

This section provides a characterization of the Project runoff as it relates to water quality. Potential pollutants associated with the operation of the Project facilities are summarized, as well as the applicable receiving water body beneficial uses, water quality impairments, and Total Maximum Daily Loads (TMDLs).

2.6.1 Beneficial Uses for Surface and Groundwater

California Water Code Section 13050(f) describes the beneficial uses of surface and ground waters that may be designated by the State Water Resources Control Board or RWQCB for protection as follows:

> Beneficial uses of the waters of the state that may be protected against quality degradation include, but are not necessarily limited to, domestic, municipal, agricultural and industrial supply; power generation; recreation; aesthetic enjoyment; navigation; and preservation and enhancement of fish, wildlife, and other aquatic resources or preserves.

To comply with the California Water Code and the federal Clean Water Act, surface waters within the same Hydrologic Unit Number of the Project site have been assigned beneficial uses in the Water Quality Control Plan for the Central Valley Region, as shown in Table 2.

Table 2. Surface Water Bodies and Beneficial Uses

Surface Water Bodies	Beneficial Use										
		Agriculture		Industry		Recreation		Freshwater Habitat		Spawning	
	MUN	AGR		PROC	POW	REC-1	REC-2	WARM	COLD	SPWN	WILD
	Municipal and Domestic Supply	Irrigation	Stock Watering	Process	Power	Contact	Other Noncontact	Warm	Cold	Cold*	Wildlife Habitat*
Other Lakes and Reservoirs in Hydro Units 531, 532, 533, 543, 544	●	●	●	●	●	●	●	●	●	●	●

Source: SWRCB 2019.
Notes:
● = Existing beneficial uses.
* = Salmon and steelhead.

Definitions of the beneficial uses mentioned in Table 2 are as follows:

Municipal and Domestic Supply (MUN)—Uses of water for community, military, or individual water supply systems including, but not limited to, drinking water supply.

Agriculture Supply (AGR)—Uses of water for farming, horticulture, or ranching including, but not limited to, irrigation (including leaching of salts), stock watering, or support of vegetation for range grazing.

Industrial Process Supply (PROC)—Uses of water for industrial activities that depend primarily on water quality.

Hydropower Generation (POW)—Uses of water for hydropower generation.

Water Contact Recreation (REC-1)—Uses of water for recreational activities involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, water-skiing, skin and scuba diving, surfing, white water activities, fishing, or use of natural hot springs.

Non-contact Water Recreation (REC-2)—Uses of water for recreational activities involving proximity to water, but where there is generally no body contact with water, nor any likelihood of ingestion of water. These uses include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, tidepool and marine life study, hunting, sightseeing, or aesthetic enjoyment in conjunction with the above activities.

Warm Freshwater Habitat (WARM)—Uses of water that support warm water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.

Cold Freshwater Habitat (COLD)—Uses of water that support cold water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.

Spawning, Reproduction, and/or Early Development (SPWN)—Uses of water that support high-quality aquatic habitats suitable for reproduction and early development of fish.

Wildlife Habitat (WILD)—Uses of water that support terrestrial or wetland ecosystems including, but not limited to, preservation and enhancement of terrestrial habitats, or wetlands, vegetation, wildlife (e.g., mammals, birds, reptiles, amphibians, invertebrates), or wildlife water and food sources.

2.6.1 Potential Pollutants

During operations and maintenance of the Project facilities, small quantities of hazardous materials may be periodically and routinely transported, used, and disposed. These materials would consist of minor amounts of small quantities of gasoline, diesel fuel, oils, lubricants, solvents, detergents, degreasers, paints, ethylene glycol, dust palliatives, herbicides, and welding materials/supplies. Small quantities of additional common hazardous materials may also be used on site, including waste paint, spent construction solvents, waste cleaners, waste oil, oily rags, waste batteries, and spent welding materials.

2.6.2 Water Quality Objectives

The Porter-Cologne Water Quality Control Act defines water quality objectives as "…the limits or levels of water quality constituents or characteristics which are established for the reasonable protection of beneficial uses of water or the prevention of nuisance within a specific area." Section 3.1 of the Water Quality Control Plan for the Central Valley Region established water quality objectives that apply to all surface waters in the San Joaquin River Basin. These objectives apply to categories shown in Table 3.

Table 3. San Joaquin River Basin Water Quality Objective Categories

Bacteria	Pesticides
Biostimulatory substances	Radioactivity
Chemical constituents	Salinity
Cryptosporidium and giardia	Sediment
Color	Settleable material
Dissolved oxygen	Suspended material
Floating material	Tastes and odors
Mercury	Temperature
Methylmercury	Toxicity
Oil and grease	Turbidity
pH	

Source: SWRCB 2019.

2.6.3 Receiving Water Impairments, TMDLs, and Beneficial Uses

Run-on and runoff from the proposed Project may discharge to the Old River, as described in Section 2.1, Surface Water Hydrology. The Old River is listed as the impaired water body according to the 2020-2022 Integrated Report (Clean Water Act Section 303(d) List/305(b) Report) published by the California Environmental Protection Agency, State Water Resources Control Board.

To comply with the Clean Water Act, water quality objectives must be met to maintain listed 303(d) primary pollutants at target levels. Figure 7, Impaired Waterbodies, and Table 4 present the listed 303(d) pollutants for the Old River and downstream receiving waters.

Table 4. 2020-2022 303(d) List of Water Quality Segments

Receiving Water Bodies	Listed 303(d) Pollutants	TMDL(s)
1. Mountain House Creek (from Altamont Pass to Old River, Alameda and San Joaquin Counties; partly in Delta Waterways, southern portion) 2. Old River (San Joaquin River to Delta Mendota Canal; in	▪ Arsenic ▪ Chlordane ▪ Chloride ▪ Chlorpyrifos ▪ DDT (Dichlorodiphenyltrichloroethane) ▪ Diazinon	▪ Arsenic ▪ Chloride ▪ Chlordane ▪ DDT (Dichlorodiphenyltrichloroethane) ▪ Dieldrin ▪ Electrical Conductivity

Table 4. 2020-2022 303(d) List of Water Quality Segments

Receiving Water Bodies	Listed 303(d) Pollutants	TMDL(s)
Delta Waterways, southern portion) 3. Delta Waterways (southern portion) 4. Delta Waterways (central portion) 5. Delta Waterways (western portion) 6. Sacramento San Joaquin Delta 7. Suisun Bay 8. Carquinez Strait 9. San Pablo Bay 10. San Francisco Bay, Central	▪ Dieldrin ▪ Dioxin compounds (including 2,3,7,8-TCDD) ▪ Electrical Conductivity ▪ Furan Compounds ▪ Group A Pesticides ▪ Indicator Bacteria ▪ Invasive Species ▪ Low Dissolved Oxygen ▪ Manganese ▪ Mercury ▪ Oxygen, Dissolved ▪ PAHs (Polycyclic Aromatic Hydrocarbons ▪ PCBs (Polychlorinated biphenyls) ▪ PCBs (Polychlorinated biphenyls) (dioxin-like) ▪ Salinity ▪ Selenium ▪ Specific Conductivity ▪ Total DDT (sum of 4,4'- and 2,4'-isomers of DDT, DDE, and DDD) ▪ Total Dissolved Solids ▪ Toxicity ▪ Trash	▪ Group A Pesticides ▪ Indicator Bacteria ▪ Oxygen, Dissolved ▪ Manganese ▪ PAHs (Polycyclic Aromatic Hydrocarbons ▪ PCBs (Polychlorinated biphenyls) ▪ Specific Conductivity ▪ Total DDT (sum of 4,4'- and 2,4'-isomers of DDT, DDE, and DDD) ▪ Total Dissolved Solids

Source: SWRCB 2022.
Notes: TMDL = Total Maximum Daily Load

Downstream receiving waters include waterbodies in the San Joaquin River Basin. The receiving water body beneficial uses, water quality impairments, and TMDLs were identified by using the San Joaquin and Sacramento Basin Plans, and the U.S. Environmental Protection Agency Water Quality Assessment and TMDL Reports (SWRCB 2018, 2019).

While the Project operations are not expected to generate pollutants of concern, runoff generated from the site currently has the potential to contribute unknown pollutants to downstream water bodies.

INTENTIONALLY LEFT BLANK

3 References

ACFCWCD (Alameda County Flood Control & Water Conservation District). 2018. *Alameda County Hydrology & Hydraulics Manual*. Accessed December 2023. https://www.acpwa.org/acpwa-assets/docs/document-library/Engineering-Documents/ACFCD-Hydrology-Manual-Rev-081420.pdf.

FEMA (Federal Emergency Management Agency). 2023. FEMA Flood Map Service Center. https://msc.fema.gov/portal/search. Accessed October 2023.

NCLD (National Land Cover Database). 2021. MRLC NLCD Viewer, 2021 CONUS Land Cover. Accessed December 2023. https://www.mrlc.gov/viewer/.

NOAA (National Oceanic and Atmospheric Administration). 2023a. NOAA Online Weather Data. Accessed December 2023. https://www.weather.gov/wrh/climate?wfo=sto.

NOAA. 2023b. NOAA Atlas 14 Point Precipitation Frequency Estimates: CA. Accessed December 2023. https://hdsc.nws.noaa.gov/pfds/.

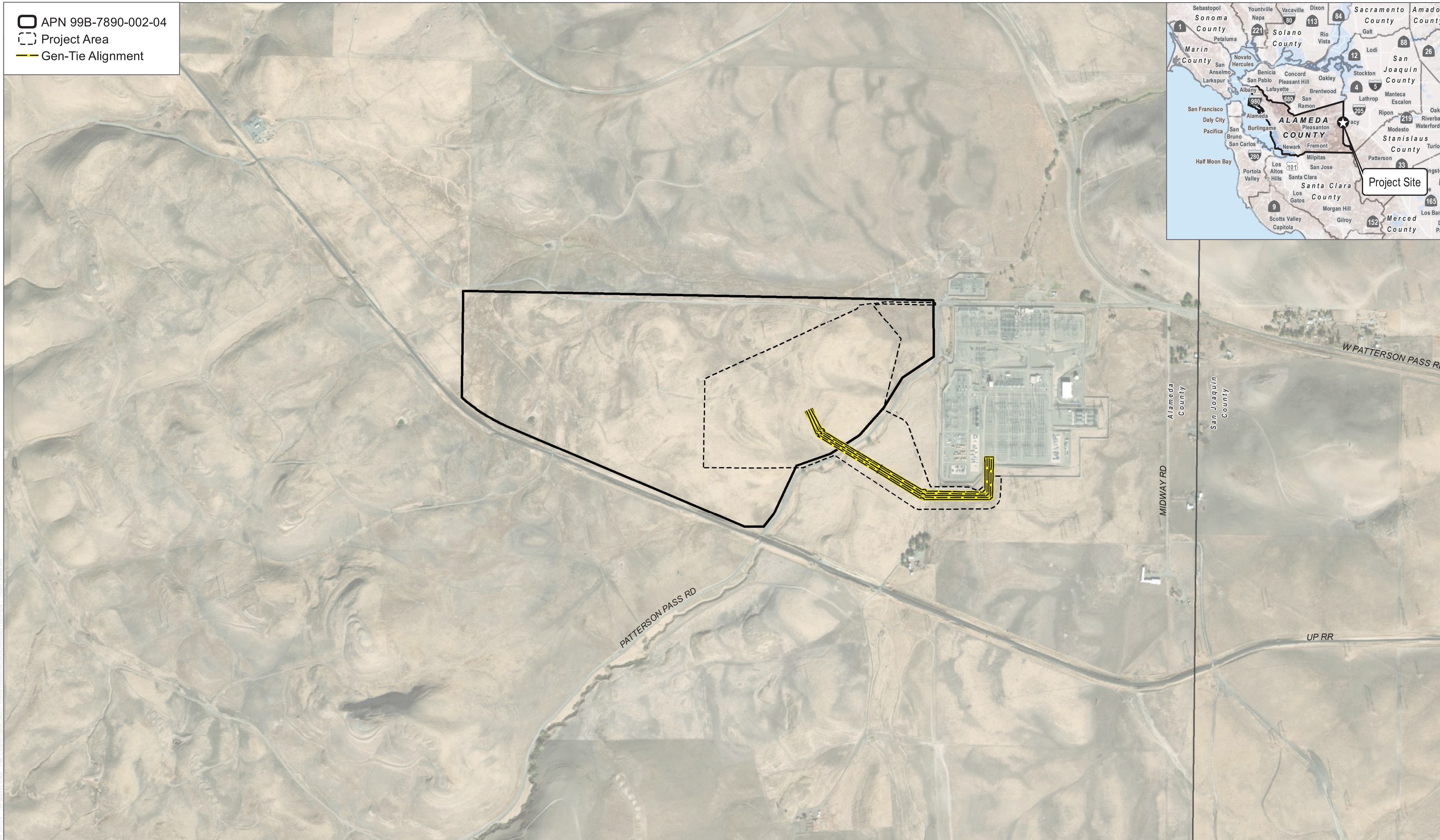
PRISM (PRISM Climate Group, Oregon State University) 2023. PRISM Climate Data. Data created February 4, 2014. Accessed December 2023. https://prism.oregonstate.edu.

SWRCB (State Water Resources Control Board). 202022. 2020-2022 California Integrated Report (Clean Water Act Section 303(d) List and 305(b) Report). Accessed February 2024. https://www.waterboards.ca.gov/water_issues/programs/water_quality_assessment/2020_2022_integrated_report.html

SWRCB. 2019. Water Quality Control Plan for the Central Valley Region. Revised February 2019.

USGS (U.S. Geological Service). 2023. National Hydrography Dataset. Accessed December 2023. https://www.usgs.gov/national-hydrography/national-hydrography-dataset.

INTENTIONALLY LEFT BLANK



SOURCE: USGS National Map; Esri

DUDEK

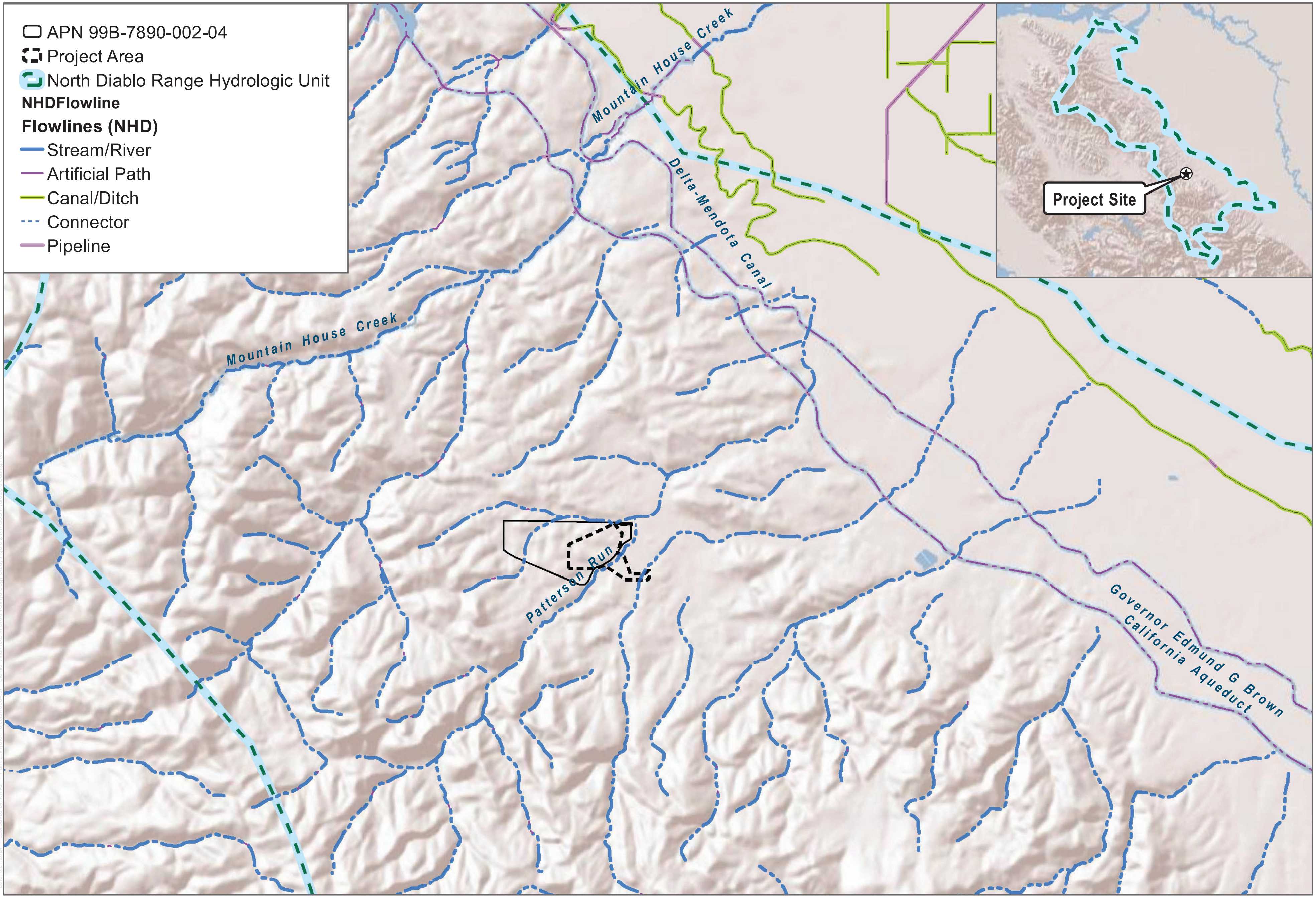
0 1,000 2,000 Feet

FIGURE 1

Project Location

Potentia-Viridi BESS Project

INTENTIONALLY LEFT BLANK



SOURCE: Esri World Imagery Basemap; SWRQCB

DUDEK

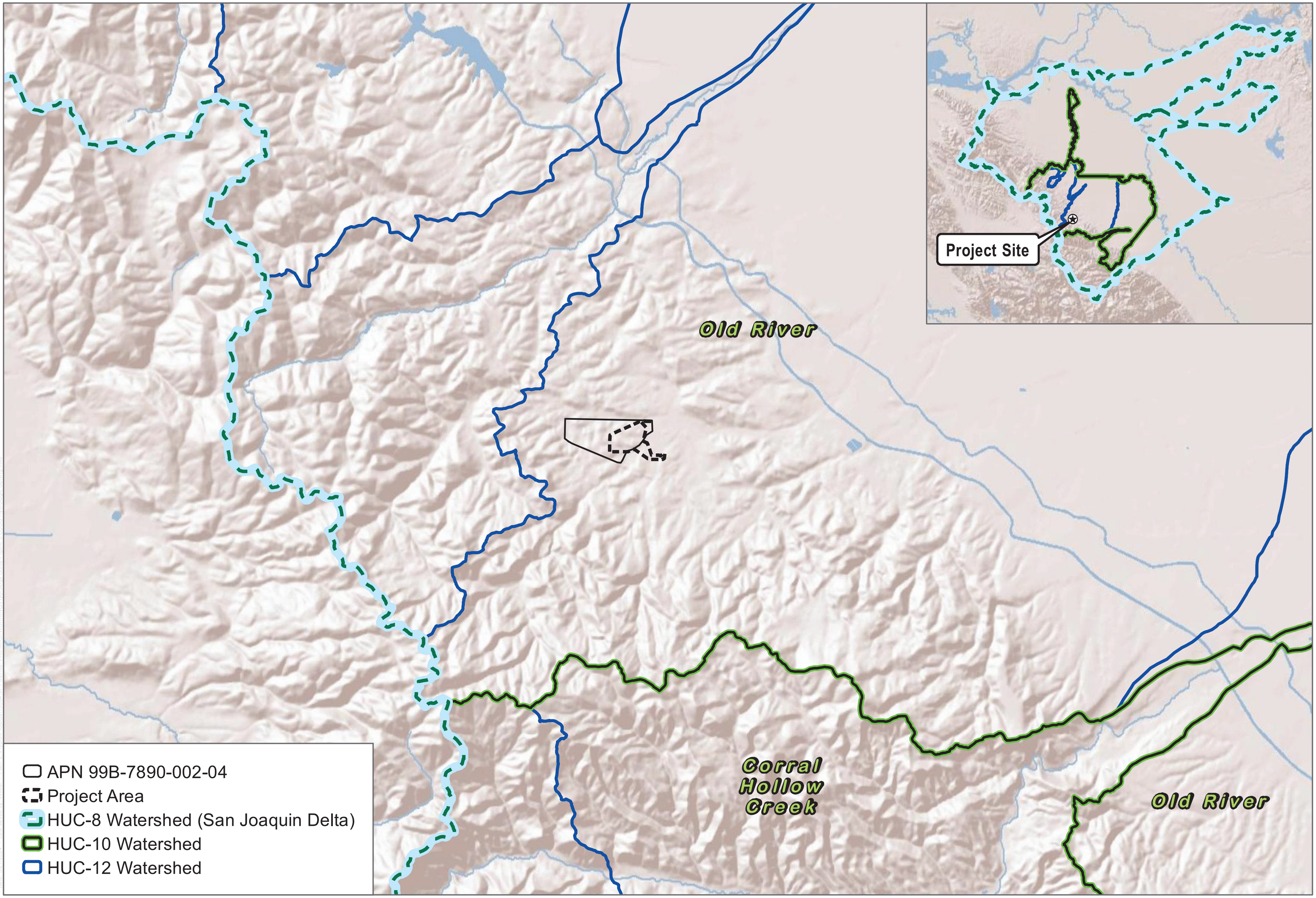
0 0.5 1 Miles

FIGURE 2

RWQCB Hydrologic Setting and Surface Water Features

Potentia-Viridi BESS Project

INTENTIONALLY LEFT BLANK



SOURCE: Esri World Imagery Basemap; SWRQCB

DUDEK

0 0.5 1 Miles

FIGURE 3

USGS Hydrologic Setting

Potentia-Viridi BESS Project

INTENTIONALLY LEFT BLANK

APN 99B-7890-002-04

Project Area

FEMA Flood Hazard Areas

100-Year Flood Hazard Area - Special Flood Hazard Areas Subject to Inundation by the 1% Annual Chance Flood.

ZONE A: No Base Flood Elevations determined.

ZONE AE: Base Flood Elevations determined.

SOURCE: ESRI; DWR; FEMA

DUDEK

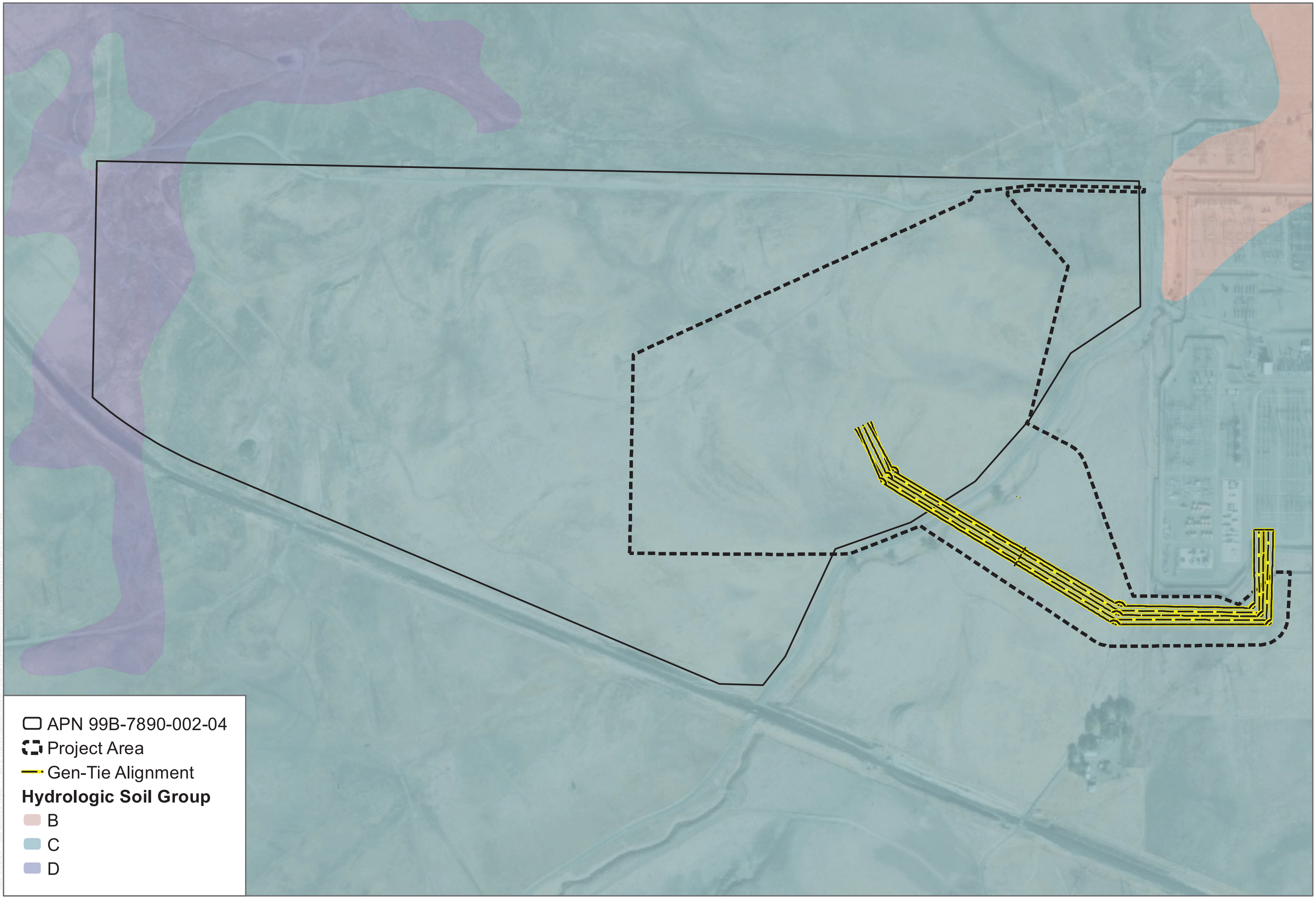
0 2,000 4,000 Feet

FIGURE 4

FEMA Flood Zones

Potentia-Viridi BESS Project

INTENTIONALLY LEFT BLANK



SOURCE: Esri World Imagery Basemap; USDA

DUDEK

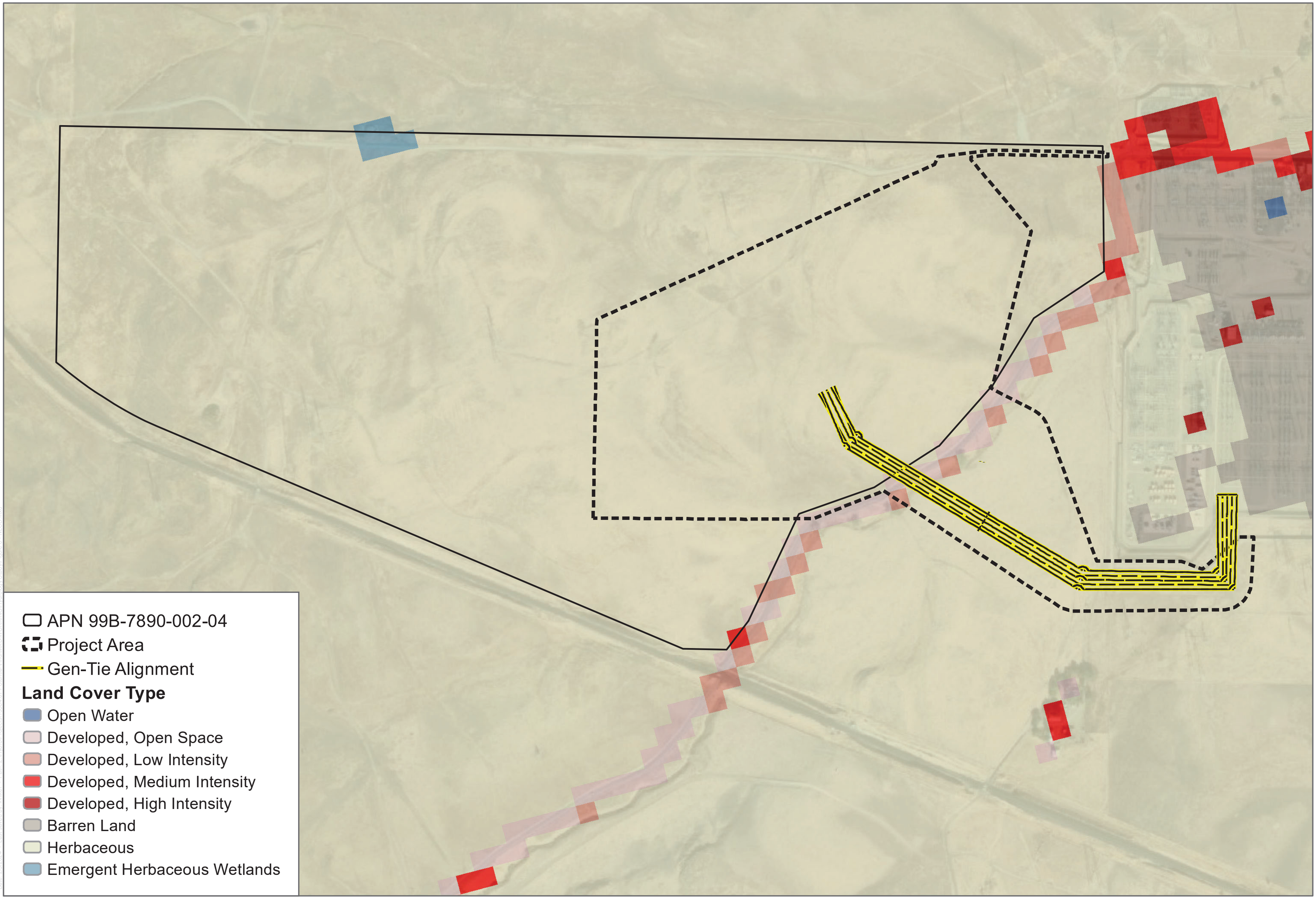
0 550 1,100 Feet

FIGURE 5

Soil Map

Potentia-Viridi BESS Project

INTENTIONALLY LEFT BLANK



SOURCE: NLCD

DUDEK

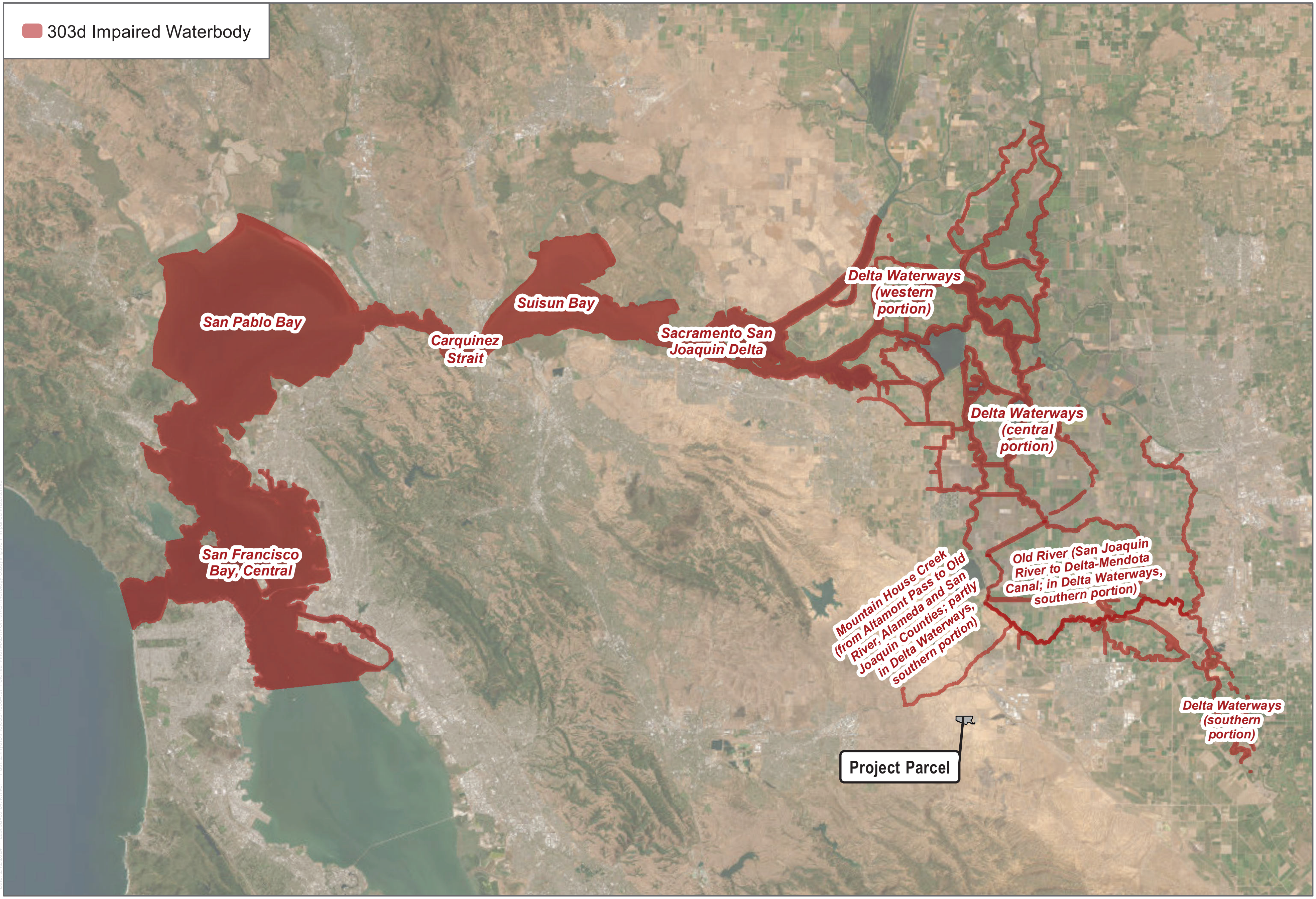
0 550 1,100 Feet

FIGURE 6

Land Cover Map

Potentia-Viridi BESS Project

INTENTIONALLY LEFT BLANK



SOURCE: Esri World Imagery Basemap; SWRQCB

DUDEK

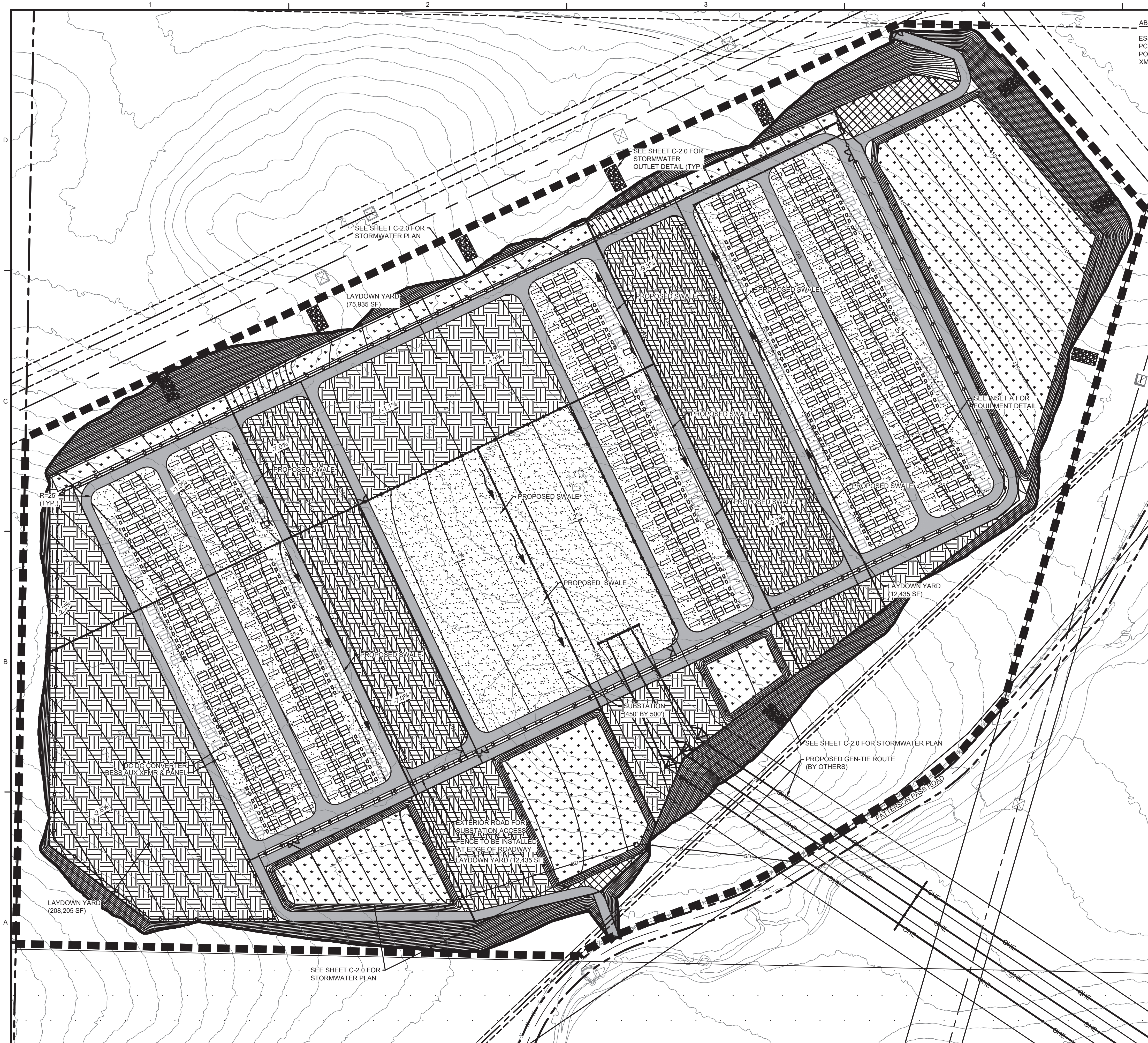
FIGURE 7

Downstream Impaired Waterbodies

Potentia-Viridi BESS Project

INTENTIONALLY LEFT BLANK

Appendix A
Civil Site Plans



ABBREVIATIONS

ESS	ENERGY STORAGE SYSTEM
PCS	POWER CONVERSION SYSTEM
POI	POINT OF INTERCONNECTION
XMFR	TRANSFORMER

LEGEND

- GRAVEL ACCESS ROAD
- GRAVEL
- STORMWATER/ LID AREA
- LAYDOWN AREA
- OTHER

EARTHWORK QUANTITIES
CUT = 588,018 CUBIC YARDS
FILL = 344,900 CUBIC YARDS
NET = 243,118 CUBIC YARDS (EXPORT)

TOTAL = 932,918 CUBIC YARDS

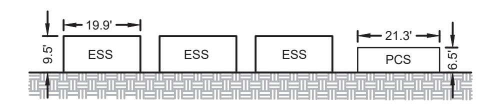
NOTE:
1. EARTHWORK QUANTITIES ARE ESTIMATES ONLY AND ARE NOT ADJUSTED FOR SHRINKAGE, CONSOLIDATION, AND CLEARING LOSS FACTORS. THESE QUANTITIES ARE TO BE USED FOR BONDING AND PERMIT PURPOSES ONLY.
2. CUT/FILL SLOPES ARE SHOWN NO STEEPER THAN 3:1.
3. PRELIMINARY EARTHWORK QUANTITIES ASSUME ONSITE MATERIAL IS ADEQUATE FILL. ASSUMPTIONS ARE TO BE CONFIRMED BASED ON GEOTECH RECOMMENDATIONS.
4. EARTHWORK QUANTITIES DO NOT INCLUDE GEN-TIE LINE.

SYSTEM SUMMARY	
ESS TYPE	SOLBANK
ESS QUANTITY	1000
PCS UNITS	140
BATTERY CAPACITY	400 MW/3200 MWH
BESS YARD	13.3 ACRES
PROJECT SUBSTATION	5.5 ACRES
ACCESS ROADS	6.6 ACRES
LAYDOWN YARD (INCLUDING O&M BUILDING)	15.2 ACRES
STORMWATER AREAS*	9.3 ACRES
STORMWATER OUTFALL	0.6 ACRES
OTHER**	7.2 ACRES
TOTAL DISTURBED AREA***	57.7 ACRES

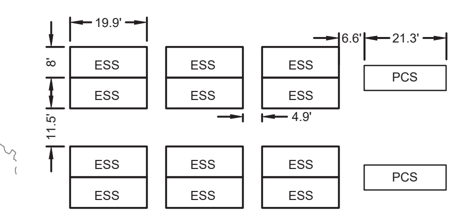
NOTE:
* PRELIMINARY STORMWATER TREAMENT AND STORAGE SIZING BASED ON ALAMEDA COUNTY STANDARDS
** INCLUDES SLOPED AREAS
*** TO GRADING DAYLIGHT

GENERAL NOTES:
FUTURE STEEL FRAME O&M BUILDING (100'X50') WILL BE LOCATED WITHIN PROPOSED LAYDOWN YARD. EXACT BUILDING SIZE AND LOCATION TBD.

FIRE NOTES:
1) FIRE APPARATUS ACCESS ROADS SHALL HAVE AN UNOBSTRUCTED WIDTH OF NOT LESS THAN 20 FEET.
2) INTERNAL RADII = 25' MINIMUM.



INSET A - ELEVATION



INSET A - PLAN

UTILITY STATEMENT
LOCATION OF EXISTING UNDERGROUND UTILITIES HAVE BEEN TAKEN FROM DRAWINGS AND FIELD LOCATES SUPPLIED BY THE APPROPRIATE UTILITY COMPANIES. UTILITY LOCATIONS SHOWN ON THIS DRAWING ARE APPROXIMATE ONLY. PRIOR TO BEGINNING ANY CONSTRUCTION, THE CONTRACTOR SHALL VERIFY THE EXACT LOCATION OF EACH UTILITY.

100 50 0 100 200
SCALE: 1 INCH = 100 FEET

COFFMAN ENGINEERS
www.coffman.com

PROJECT INFORMATION

CLIENT INFORMATION

REV	DATE	DESCRIPTION

PROJ. NO. ######
DRAWN LB
CHECKED RB
DATE 07/06/20

SHEET TITLE:

CIVIL SITE PLAN

SHEET NO:

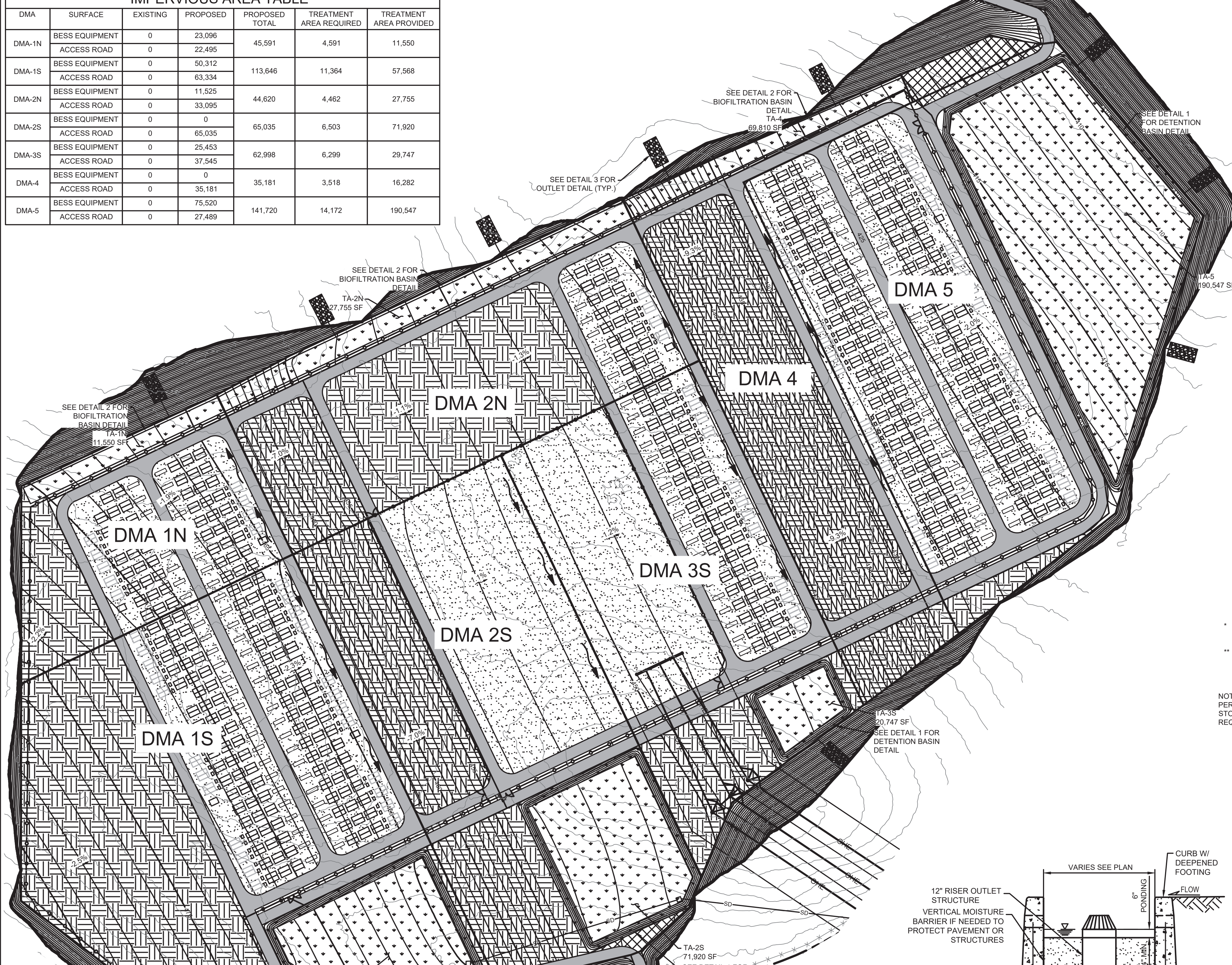
C-1.0

SHEET OF XXX

P:\BAY\23\OBS\232059 CAPSTONE POTENTIA-VIRIDI BESS OE\0.0 DWGS\C\PLAN PRODUCTION\PERMIT PLAN\232059 PERMIT PLAN-OUTFALL.DWG GRADING PLAN (2) : BEEBE, ALEXANDREA : LAST SAVED : July 22, 2024 : PLOT DATE: 7/22/24

IMPERVIOUS AREA TABLE*

DMA	SURFACE	EXISTING	PROPOSED	PROPOSED TOTAL	TREATMENT AREA REQUIRED	TREATMENT AREA PROVIDED
DMA-1N	BESS EQUIPMENT	0	23,096	45,591	4,591	11,550
	ACCESS ROAD	0	22,495			
DMA-1S	BESS EQUIPMENT	0	50,312	113,646	11,364	57,568
	ACCESS ROAD	0	63,334			
DMA-2N	BESS EQUIPMENT	0	11,525	44,620	4,462	27,755
	ACCESS ROAD	0	33,095			
DMA-2S	BESS EQUIPMENT	0	0	65,035	6,503	71,920
	ACCESS ROAD	0	65,035			
DMA-3S	BESS EQUIPMENT	0	25,453	62,998	6,299	29,747
	ACCESS ROAD	0	37,545			
DMA-4	BESS EQUIPMENT	0	0	35,181	3,518	16,282
	ACCESS ROAD	0	35,181			
DMA-5	BESS EQUIPMENT	0	75,520	141,720	14,172	190,547
	ACCESS ROAD	0	27,489			



PRELIMINARY HYDROLOGY CALCS**

DMA	STORM EVENT	INTENSITY (IN/HR)	Q-PRE (CFS)	Q-POST (CFS)	DELTA-Q (CFS)
DMA-1N	5-YEAR	1.15	0.8	2.7	1.9
	15-YEAR	1.50	1.0	3.5	2.4
	25-YEAR	1.66	1.1	3.8	2.7
	100-YEAR	2.05	1.4	4.7	3.3
DMA-1S	5-YEAR	1.06	1.9	6.5	4.6
	15-YEAR	1.38	2.5	8.4	6.0
	25-YEAR	1.52	2.7	9.3	6.6
	100-YEAR	1.88	3.4	11.5	8.1
DMA-2N	5-YEAR	1.15	1.4	4.7	3.3
	15-YEAR	1.50	1.8	6.1	4.3
	25-YEAR	1.66	2.0	6.8	4.8
	100-YEAR	2.05	2.5	8.3	5.9
DMA-2S	5-YEAR	1.21	2.0	6.9	4.9
	15-YEAR	1.58	2.7	9.0	6.4
	25-YEAR	1.74	2.9	10.0	7.0
	100-YEAR	2.16	3.6	12.4	8.7
DMA-3S	5-YEAR	1.02	1.4	4.6	3.3
	15-YEAR	1.32	1.8	6.0	4.2
	25-YEAR	1.46	1.9	6.6	4.7
	100-YEAR	1.81	2.4	8.2	5.8
DMA 4	5-YEAR	0.73	0.8	2.6	1.8
	15-YEAR	0.95	1.0	3.3	2.4
	25-YEAR	1.05	1.1	3.7	2.6
	100-YEAR	1.30	1.3	4.6	3.2
DMA 5	5-YEAR	1.45	3.4	11.4	8.1
	15-YEAR	1.89	4.4	14.9	10.5
	25-YEAR	2.08	4.8	16.4	11.6
	100-YEAR	2.59	6.0	20.4	14.4

VOLUME SIZING

DMA	REQUIRED STORAGE VOLUME (CF)	TREATMENT AREA PROVIDED	DEPTH REQUIRED
DMA-1N	72,284	11,550	6.3
DMA-1S	175,245	57,568	3.0
DMA-2N	127,235	27,755	4.6
DMA-2S	188,346	71,920	2.6
DMA-3S	124,989	29,747	6.0
DMA-4	69,810	16,282	4.3
DMA-5	31,758	190,547	1.6

* PRELIMINARY LID CALCULATIONS ARE CONSERVATIVELY BASED ON 10% OF TOTAL IMPERVIOUS AREA.

** HYDROLOGY CALCULATIONS ARE PER ALAMEDA CO. HYDROLOGY & HYDRAULICS MANUAL 2016. RAINFALL INTENSITY IS BASED ON A CALCULATED TIME OF CONCENTRATION (T_C) AND MEAN ANNUAL PRECIPITATION OF 12 INCHES PER ALAMEDA CO. HYDROLOGY & HYDRAULICS MANUAL.

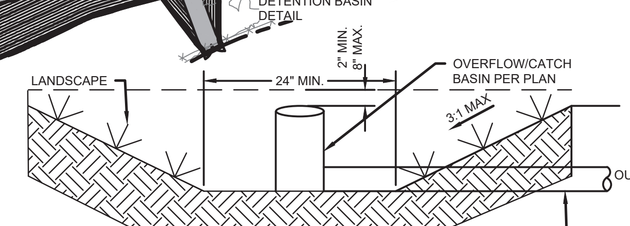
NOTE:
PER CALCULATIONS ABOVE, THE POST-CONSTRUCTION RUNOFF RATES FOR THE 100-YEAR STORM EXCEED 5 CFS SO A PRELIMINARY ON-SITE STORM RUNOFF DETENTION PLAN WILL BE REQUIRED PER ALAMEDA COUNTY GUIDELINES.

LEGEND
- GRAVEL ACCESS ROAD
- GRAVEL
- STORMWATER/LID AREA
- LAYDOWN AREA
- OTHER
- SWALE

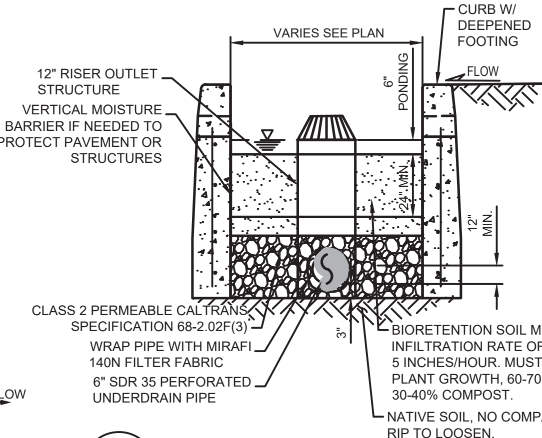
ABBREVIATIONS:
- DMA — DRAINAGE MANAGEMENT AREA
- TA — TREATMENT AREA

UTILITY STATEMENT
LOCATION OF EXISTING UNDERGROUND UTILITIES HAVE BEEN TAKEN FROM DRAWINGS AND FIELD LOCATES SUPPLIED BY THE APPROPRIATE UTILITY COMPANIES. UTILITY LOCATIONS SHOWN ON THIS DRAWING ARE APPROXIMATE ONLY. PRIOR TO BEGINNING ANY CONSTRUCTION, THE CONTRACTOR SHALL VERIFY THE EXACT LOCATION OF EACH UTILITY.

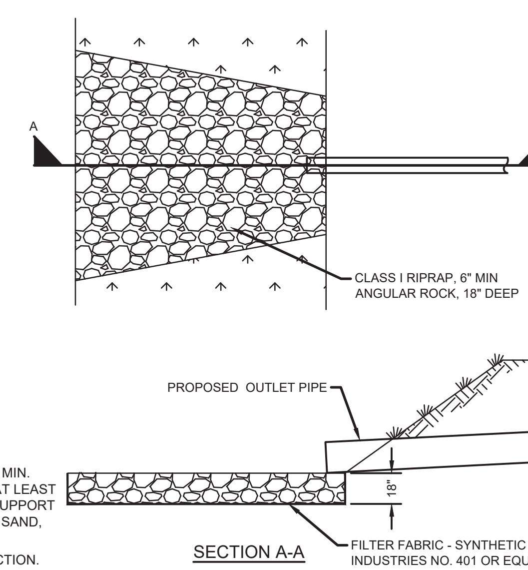
SCALE: 1 INCH = 100 FEET (100 50 0 100 200)



1 DETENTION BASIN — SCALE: NTS



2 BIORETENTION BASIN — SCALE: NTS



3 RIPRAP OUTLET PROTECTION — SCALE: NTS

COFFMAN ENGINEERS
www.coffman.com

PROJECT INFORMATION

CLIENT INFORMATION

REV	DATE	DESCRIPTION

PROJ. NO. ######
DRAWN LB
CHECKED RB
DATE 7/15/2024

SHEET TITLE:
PRELIMINARY STORMWATER PLAN

SHEET NO:
C-2.0

SHEET OF XXX

Appendix B

NOAA Precipitation Estimates

NOAA Atlas 14, Volume 6, Version 2
Location name: Tracy, California, USA*
Latitude: 37.712°, Longitude: -121.5769°
Elevation: 468 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.088** (0.074-0.104)	**0.107** (0.091-0.127)	**0.134** (0.114-0.161)	**0.159** (0.133-0.192)	**0.196** (0.158-0.246)	**0.227** (0.179-0.292)	**0.263** (0.201-0.347)	**0.303** (0.224-0.414)	**0.365** (0.258-0.523)	**0.421** (0.286-0.626)
10-min	**0.126** (0.107-0.149)	**0.153** (0.130-0.183)	**0.193** (0.163-0.230)	**0.228** (0.191-0.275)	**0.281** (0.226-0.352)	**0.326** (0.256-0.419)	**0.377** (0.288-0.498)	**0.434** (0.322-0.593)	**0.524** (0.370-0.749)	**0.604** (0.410-0.898)
15-min	**0.152** (0.129-0.181)	**0.185** (0.157-0.221)	**0.233** (0.197-0.279)	**0.276** (0.231-0.333)	**0.340** (0.273-0.426)	**0.394** (0.310-0.506)	**0.455** (0.348-0.602)	**0.525** (0.389-0.717)	**0.633** (0.447-0.906)	**0.730** (0.496-1.09)
30-min	**0.206** (0.175-0.246)	**0.252** (0.213-0.300)	**0.317** (0.268-0.379)	**0.375** (0.314-0.452)	**0.462** (0.372-0.579)	**0.536** (0.421-0.689)	**0.619** (0.473-0.818)	**0.714** (0.529-0.974)	**0.861** (0.608-1.23)	**0.992** (0.674-1.48)
60-min	**0.290** (0.246-0.345)	**0.353** (0.299-0.421)	**0.444** (0.376-0.531)	**0.525** (0.440-0.634)	**0.648** (0.522-0.812)	**0.752** (0.591-0.966)	**0.869** (0.664-1.15)	**1.00** (0.742-1.37)	**1.21** (0.853-1.73)	**1.39** (0.945-2.07)
2-hr	**0.418** (0.355-0.497)	**0.506** (0.429-0.603)	**0.631** (0.533-0.754)	**0.740** (0.620-0.893)	**0.902** (0.727-1.13)	**1.04** (0.816-1.33)	**1.19** (0.908-1.57)	**1.35** (1.00-1.85)	**1.60** (1.13-2.29)	**1.81** (1.23-2.69)
3-hr	**0.511** (0.434-0.608)	**0.618** (0.524-0.737)	**0.770** (0.651-0.920)	**0.902** (0.755-1.09)	**1.10** (0.883-1.38)	**1.26** (0.990-1.62)	**1.44** (1.10-1.90)	**1.63** (1.21-2.22)	**1.91** (1.35-2.74)	**2.15** (1.46-3.20)
6-hr	**0.687** (0.583-0.818)	**0.836** (0.709-0.996)	**1.04** (0.882-1.25)	**1.22** (1.02-1.48)	**1.48** (1.20-1.86)	**1.70** (1.34-2.18)	**1.93** (1.47-2.55)	**2.18** (1.61-2.97)	**2.54** (1.80-3.64)	**2.85** (1.93-4.23)
12-hr	**0.887** (0.753-1.06)	**1.10** (0.934-1.31)	**1.40** (1.18-1.67)	**1.65** (1.38-2.00)	**2.02** (1.63-2.53)	**2.32** (1.82-2.98)	**2.64** (2.02-3.48)	**2.98** (2.21-4.06)	**3.47** (2.45-4.96)	**3.87** (2.63-5.76)
24-hr	**1.14** (1.00-1.34)	**1.45** (1.27-1.70)	**1.87** (1.63-2.20)	**2.23** (1.93-2.63)	**2.74** (2.30-3.31)	**3.14** (2.60-3.87)	**3.57** (2.90-4.48)	**4.03** (3.20-5.18)	**4.68** (3.59-6.21)	**5.20** (3.88-7.11)
2-day	**1.42** (1.24-1.66)	**1.80** (1.57-2.10)	**2.30** (2.00-2.69)	**2.72** (2.35-3.21)	**3.30** (2.78-4.00)	**3.76** (3.12-4.63)	**4.24** (3.44-5.32)	**4.73** (3.76-6.08)	**5.42** (4.16-7.21)	**5.97** (4.46-8.16)
3-day	**1.60** (1.40-1.87)	**2.01** (1.76-2.36)	**2.57** (2.24-3.01)	**3.02** (2.61-3.56)	**3.64** (3.07-4.41)	**4.13** (3.42-5.09)	**4.63** (3.76-5.81)	**5.15** (4.09-6.61)	**5.86** (4.50-7.78)	**6.41** (4.79-8.77)
4-day	**1.75** (1.53-2.05)	**2.20** (1.92-2.58)	**2.80** (2.44-3.28)	**3.29** (2.84-3.88)	**3.95** (3.33-4.79)	**4.46** (3.70-5.50)	**4.99** (4.05-6.26)	**5.52** (4.39-7.10)	**6.26** (4.80-8.32)	**6.83** (5.10-9.34)
7-day	**2.14** (1.87-2.50)	**2.68** (2.34-3.14)	**3.39** (2.96-3.98)	**3.97** (3.43-4.68)	**4.74** (4.00-5.74)	**5.33** (4.42-6.57)	**5.92** (4.81-7.44)	**6.53** (5.19-8.39)	**7.34** (5.64-9.76)	**7.96** (5.94-10.9)
10-day	**2.39** (2.09-2.79)	**3.00** (2.62-3.50)	**3.79** (3.30-4.44)	**4.42** (3.82-5.21)	**5.26** (4.43-6.37)	**5.90** (4.88-7.26)	**6.53** (5.30-8.20)	**7.17** (5.70-9.21)	**8.02** (6.16-10.7)	**8.67** (6.47-11.9)
20-day	**3.10** (2.71-3.62)	**3.92** (3.42-4.58)	**4.94** (4.30-5.79)	**5.74** (4.97-6.77)	**6.79** (5.72-8.22)	**7.55** (6.26-9.30)	**8.30** (6.74-10.4)	**9.04** (7.18-11.6)	**10.0** (7.67-13.3)	**10.7** (7.98-14.6)
30-day	**3.68** (3.21-4.30)	**4.66** (4.07-5.45)	**5.88** (5.12-6.88)	**6.81** (5.89-8.03)	**8.00** (6.74-9.69)	**8.86** (7.34-10.9)	**9.69** (7.87-12.2)	**10.5** (8.33-13.5)	**11.5** (8.83-15.3)	**12.2** (9.13-16.7)
45-day	**4.53** (3.96-5.29)	**5.76** (5.03-6.74)	**7.25** (6.32-8.50)	**8.38** (7.25-9.88)	**9.79** (8.25-11.9)	**10.8** (8.94-13.3)	**11.7** (9.54-14.7)	**12.6** (10.0-16.2)	**13.7** (10.6-18.3)	**14.5** (10.8-19.8)
60-day	**5.41** (4.73-6.32)	**6.89** (6.01-8.06)	**8.65** (7.53-10.1)	**9.95** (8.61-11.7)	**11.6** (9.74-14.0)	**12.7** (10.5-15.6)	**13.7** (11.2-17.3)	**14.7** (11.7-18.9)	**15.9** (12.2-21.2)	**16.7** (12.5-22.9)

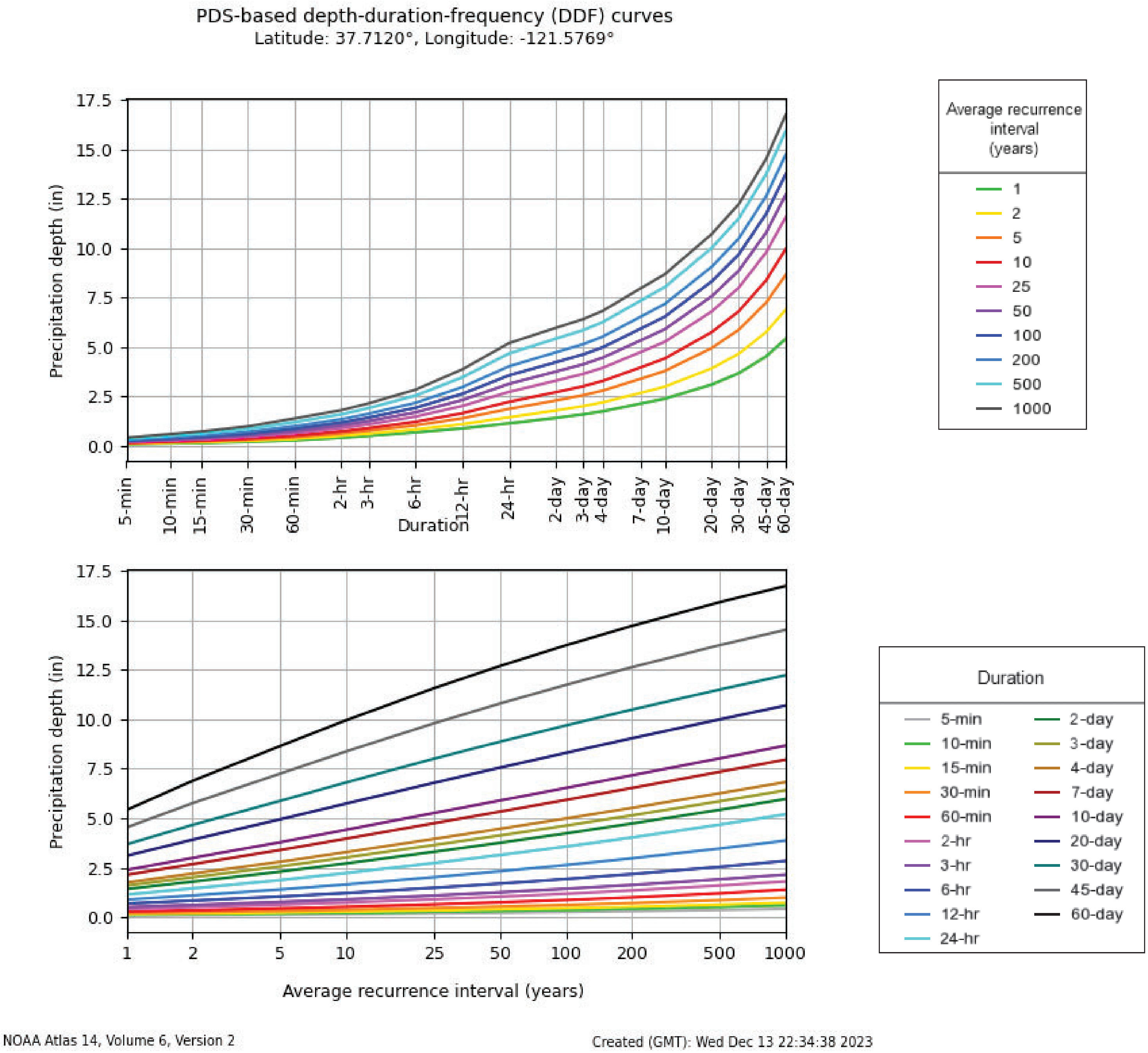
[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

Back to Top

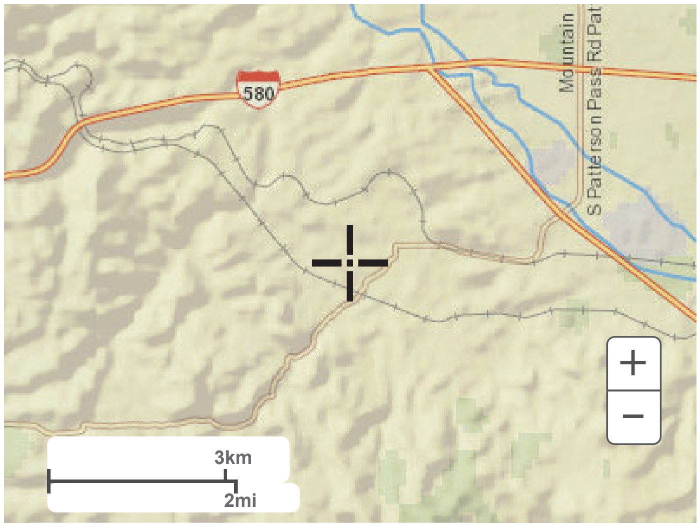
PF graphical



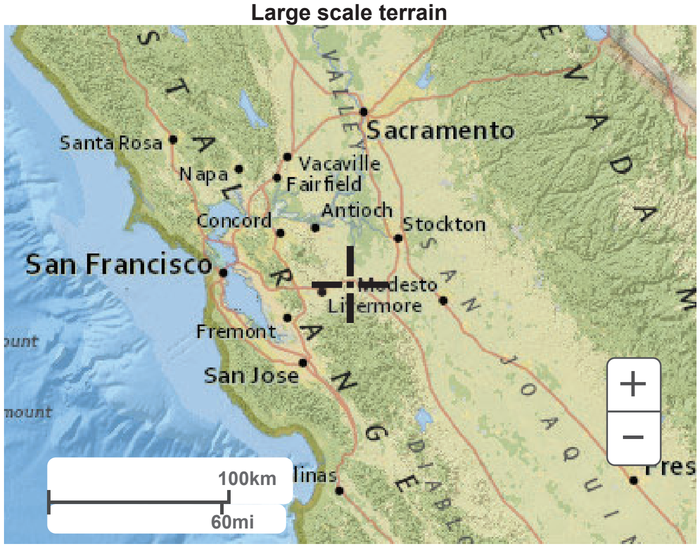
Back to Top

Maps & aerials

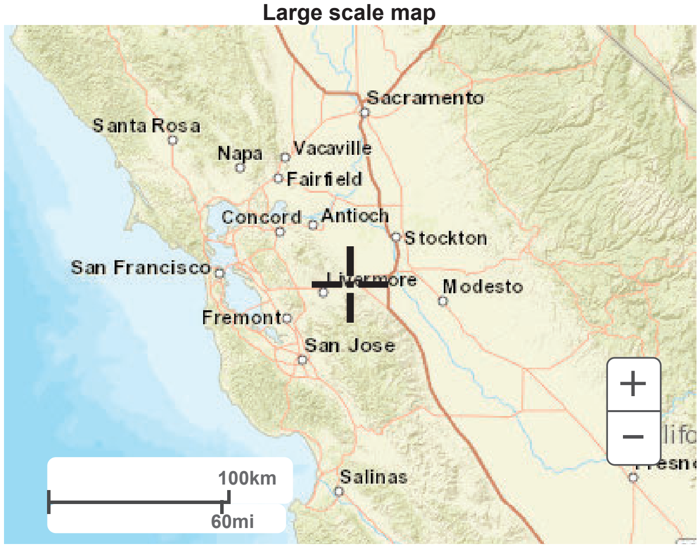
Small scale terrain



Large scale terrain



Large scale map



Large scale aerial

Back to Top

US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer