Appendix E-3

Determination of Biologically Equivalent or Superior Preservation

Determination of Biologically Equivalent or Superior Preservation Report

Double Butte Battery Energy Storage Project

MARCH 2025

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Acronyms and Abbreviations

Acronym/Abbreviation	Definition
applicant	Double Butte LLC
BESS	battery energy storage system
BMP	Best Management Practice
CDFW	California Department of Fish and Wildlife
DBESP	Determination of Biologically Equivalent or Superior Preservation
HUC	Hydrologic Unit Code
ILFP	In-Lieu Fee Program
MSHCP	Multiple Species Habitat Conservation Plan
project	Double Butte Battery Energy Storage System Project
SCADA	Supervisory Control and Data Acquisition
SCE	Southern California Edison

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1 Executive Summary

In compliance with Section 6.1.2, Protection of Species Associated with Riparian/Riverine Areas and Vernal Pools, of the Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP), a determination of biologically equivalent or superior preservation (DBESP) analysis is required by projects that will impact on-site riparian/riverine resources, if avoidance of these resources is not feasible (County of Riverside 2003). This DBESP report serves to demonstrate that the project design for the Double Butte Battery Energy Storage (BESS) Project (project), and proposed mitigation measures address impacts to MSHCP Section 6.1.2 Riparian/Riverine Areas in a manner that is equivalent or superior as compared to leaving the site undeveloped. The project is a covered activity under the MSHCP and would receive authorization for project-related impacts to protected species. Specifically, the project is located in the MSHCP Plan Area and must comply with relevant sections of the MSHCP. A review of the affected resources is summarized below and is provided in detail within the accompanying figures, aquatic resources jurisdictional delineation report (Appendix A), and Biological Technical Report with MSHCP consistency analysis (Appendix B) prepared for the project by Dudek.

2 Introduction

2.1 Project Area

The approximately 27.2-acre project site is located in the City of Menifee, in western Riverside County, at 28352-28392 Case/Matthews Road. The project site is generally south of Case/Matthews Road, east of San Jacinto Road, west of Palomar Road, and north of McLaughlin Road (Figure 1, Project Location). The approximate center of the project site corresponds to latitude 33.738205 and longitude -117.165467. The site occurs at an elevation that ranges from 1,440 feet to 1,456 feet above mean sea level and is located within Section 14 of Township 5 South, Range 3 West of the U.S. Geological Survey 7.5-minute Romoland, California, topographic quadrangle map. The project occurs across seven Assessor's Parcel Numbers: 331-119-0017, 331-119-0060, 331-119-0011, 331-119-0047, 331-119-0010, 331-119-0056, and 331-119-0014. Land use surrounding the project site includes various industrial and commercial properties to the east, a decommissioned rail line and industrial land to the north, the decommissioned Inland Empire Energy Center[1] immediately to the west, and the Southern California Edison (SCE) transmission corridor as well as a Riverside County Flood Control channel to the south.

2.2 Project Description

On-Site Improvements

Double Butte LLC (applicant) proposes to construct and operate a 500-megawatt Battery Energy Storage System (BESS) facility. Construction of the project is anticipated to occur in a single phase. It will interconnect with the SCE Valley Substation through newly constructed overhead generation tie lines. The BESS facility will utilize various battery technologies, such as lithium-ion and flow batteries, to store electrical energy from the grid. Key components

[1] On December 11, 2019, the California Energy Commission approved the premature decommissioning and demolition of the Inland Empire Energy Center. Subsequently, Calpine Corporation received approval from the City of Menifee to demolish the Inland Empire Energy Center and repurpose the site with a BESS.

include battery modules and power conversion equipment, with external access-only containers housing the battery modules. These containers will be equipped with robust HVAC systems to maintain proper operating temperatures and monitored via a Supervisory Control and Data Acquisition (SCADA) platform. Safety measures include a 7-foot wall and tubular steel fencing around the perimeter of the site for security.

Interconnection involves the construction of a 500/34.5/13/8-kilovolt substation on site and overhead generation tie lines to connect with the SCE Valley Substation. The generation tie line design and structures are adaptable to meet final engineering and SCE's requirements. SCADA systems will enable remote monitoring and control of the facility, with an emphasis on safety. Site access is provided by driveways on Palomar Road and San Jacinto Road, with on-site parking for operational and maintenance personnel. The project will include perimeter walls, landscaping, signage, and lighting to enhance security and safety, pursuant to city requirements. SCE will meet utilities, public services, and infrastructure needs, with no on-site water or sewer services required. Roadway improvements along Palomar Road and San Jacinto Road will provide adequate site access for workers and emergency services. Figure 2, Conceptual Site Plan, includes a full set of site plans including an overall electrical plan, detailed preliminary landscape plan, and lighting plan.

Storm water runoff will travel via sheet flow to inlets entering the underground system which conveys runoff to the detention and water quality basin along the southern project boundary before ultimately discharged to the adjacent storm water channel. Stormwater runoff will be collected and conveyed by the proposed storm drain system and routed for treatment using one or more of the following methods: a bio-infiltration basin, modular wetland system, or Filterra treatment system. Low flows will enter the water quality best management practices (BMPs) for treatment, and high flows will overtop and sheet flow into the detention basin in the southwest corner of the site. The infiltration system shall percolate the sheet flow storm-drain water for the proposed development. Due to the flat topography of the site and proposed grading, it is anticipated the stormwater drainage by sheet flow will be collected by proposed concrete swales and/or ribbon gutters and continue to the proposed infiltration basin. Attenuated flows will discharge into the existing Riverside County Flood Control District channel.

Off-site runoff that presently travels across the southeastern portion of the site will be intercepted at a newly constructed 24-by-24-inch inlet along the northern project boundary and routed around the project site down Palomar Road in an underground drainage system where it is discharged south of the site as under existing condition (see Appendix C, Preliminary Grading and Off-Site Plan; and Appendix D, Preliminary Water Quality Management Plan).

Upon completion of remedial grading, fine grading would be conducted to create development pads, establish access roads, and construct a water quality/detention basin. The infiltration basin shall percolate sheet flow storm-drain water and maintain the natural drainage through the site. Permanent cut slopes would be constructed at a slope angle ratio not exceeding 4:1 (horizontal: vertical) at the water quality basin and 2:1 around site perimeter.

Off-Site Improvements

The project includes improvements to frontage roads to provide adequate site access for workers and emergency services. Roadway improvements are proposed along Palomar Road; the roadway segment would extend from the intersection with Case/Matthews Road south to the intersection with McLaughlin Road. San Jacinto Road along the western project boundary shall also be improved to City roadway design standards and specifications, extending from McLaughlin Road to a terminus at the north-west corner of the Project site, in coordination with the adjacent property owner (Calpine Corporation.)

Off-Site Construction Laydown and Mitigation Area

During project construction a temporary staging/laydown yard is planned on the northwestern 4 acres of a 16.5-acre parcel (Assessor's Parcel Number 331-240-011) located approximately 600 feet southeast of the project site (see Figure 1A, Project Location: BESS Site and Figure 1B, Project Location: Laydown Site). The laydown yard is bordered by McLaughlin Road to the north, a developed container storage facility to the east, and similarly undeveloped (and previously farmed) land to the south and west. Access to the laydown yard would be taken from Mc Laughlin Road at a point 500 feet east of the intersection with Palomar Road. The laydown yard would serve as the site for storage of equipment and materials used during construction and for staging work crews.

Land proposed for the laydown yard is flat and earthwork is not required. Disturbance would be limited to spreading and compacting gravel to minimize fugitive dust and provide all weather surface for movement of equipment. A temporary, six-foot tall chain link fence would be installed around the perimeter to secure the yard. A portable toilet and handwashing station would also be placed at the laydown yard consistent with Cal OSHA health and safety standards.

The remaining portion of the off-site parcel is being evaluated for mitigation planning, design, and implementation to provide applicant-lead off-site mitigation at a minimum of 1:1 establishment or rehabilitation that would provide equivalent or superior preservation to compensate for impacts to Multiple Species Habitat Conservation Plan (MSHCP) Section 6.1.2. Riverine/Riparian features on the project site.

2.3 Existing Conditions

Site Description

The project site for the proposed BESS facility is an open, vacant disturbed infill lot that has been heavily plowed and frequently disced in many areas. This is presumed to be for weed abatement and fire prevention. The project area is comprised of bare ground, disturbed areas, and areas where fill was previously discarded. The project site is surrounded by developed land to the west, east, and north. The southern boundary has a strip of fallow land, but developed land continues past the narrow fallow field. The majority of the project site is relatively flat and areas that support ponding water are on a large, graded pad that includes a mix of gravel, hard-packed soil, and ruderal vegetation. The largest ponded areas are situated in the northwest, within excavated areas. Representative photographs of the project site are included in Appendices B, C, and D.

The approximately 27-acre project site supports a vernal pool (0.12 acres) that contains common versatile fairy shrimp (*Branchinecta lindahli*) and western spadefoot (*Spea hammondi*) and is dominated by a vernal pool plant indicator species (slender woolly-marbles [*Psilocarphus tenellus*]) as detected in surveys conducted by Dudek in 2022 and 2023 (Appendix B). The vernal pool therefore meets the Western Riverside County MSHCP Section 6.1.2 vernal pool definition due to the presence of aquatic invertebrates, ephemeral inundation, and vernal pool plant indicator species (County of Riverside 2003). Additionally, an ephemeral swale/drainage ditch (0.11 acres) is present on the project site and contains freshwater flows for part of the year. Accordingly, the proposed project site contains 0.12 acres of MSHCP Section 6.1.2 vernal pool resources and 0.11 acres of MSHCP Section 6.1.2 riverine resources.

The project site is surrounded by developed land to the west, east, and north. The southern boundary has a strip of fallow land but developed land continues past the narrow fallow field. The project site is within an area designated for industrial use by the City of Menifee General Plan Land Use Element (City of Menifee 2013). Immediately

adjacent to the project site is the approved Calpine NOVA BESS facility, and to the northeast of the project site is an existing substation (SCE Valley Substation) that serves as the project point of interconnection into the regional grid system.

Off-Site Construction Laydown Area

The off-site parcel for the temporary construction laydown area consists of a mix of native and non-native habitats (Figure 3, Vegetation Communities and Land Cover Types). The temporary construction laydown area will be staged on the northwestern 4 acres of the project site, on disturbed habitat and Eucalyptus woodland that is devoid of riverine/riparian resources. The temporary off-site construction laydown area would avoid any MSHCP Section 6.1.2 Riparian/Riverine resources on the off-site parcel (Figure 4, MSHCP Section 6.1.2 Riparian Riverine Resources).

Historic Aerial Imagery

A review of historical imagery shows that the proposed project site was historically upland habitat (grassland) from 1985–2002 (Historic Aerials 2024; Google Earth 2024). After 2002, the site became disturbed and actively graded within most of the site. Other areas were more heavily disturbed. For example, in 2007, a large portion of the western side of the site had been developed and utilized as a storage facility with roads. In 2009, this storage facility was abandoned. Based upon historical aerials the site has been disturbed, developed, or left fallow as of 2009, when the northwestern section of the site had large piles of soil or gravel placed on site potentially as a storage site (Historical Aerials 2024. The northwestern section of the site was paved, potentially for access and placement of gravel or soil storage.

Between 2002 and 2016, approximately 25% of the site (the northwestern corner) consisted of fill. Aerial images show sand fill, gravel fill, and large rock fill consistently changing at the site from year to year. Therefore, the site was actively utilized as a fill site. In 2016, fill was removed from the northwestern portion of the site leaving behind heavily compacted fill soils and uneven ground. In 2016, a very small isolated ponded area formed on this compacted soil, likely due to fill creating uneven ground. Another potential scenario is that minimal ponding was already occurring that could not be observed through aerial photography. Ponded water is observed within this northwestern section in 2016, 2018, and 2019 on aerial imagery (Google Earth 2024).

On the eastern side of the site is a swale that drains into the site and abates into upland. Historical imagery shows the swale changing in length over time, likely based on water runoff from the road. From 2003 to 2012, the length of the swale ranged from 0.12 miles to 0.17 miles. From 2012 to 2016, the length ranged from 0.05 miles to 0.10 miles. From 2016 to 2022, the length ranged from 0.20 miles to 0.29 miles. Therefore, road runoff changed over time determining the length of the swale.

Field Surveys

Dudek conducted the following biological surveys between November 2022 and July 2024: field reconnaissance, including vegetation mapping and habitat assessment of both the project site and off-site laydown yard/mitigation area; formal jurisdictional aquatic resources delineation on the project site; focused rare plant survey on the project site; protocol-level surveys for burrowing owl (*Athene cunicularia*) on the project site; and protocol 2022/2023 wet season fairy shrimp surveys on the project site. The survey dates, focus, scope, conditions, and personnel for each survey can be found in Table 1 of Appendix B. Results of the field surveys and photos of the project site can be

found in the specific survey reports included within Appendix A; Appendix B; and Appendix E, Focused Fairy Shrimp Survey Results Report.[2]

Soils

According to the geotechnical engineering report prepared for AES by Bruin Geotechnical Services (Appendix F), the site consists of older alluvial fan and channel deposits that emanate from the base of the eastern banks of the San Jacinto and Santa Ana Mountains, described as well consolidated gravel and sand with layers of silt and clay. No springs or areas indicative of shallow ground water were mapped or observed on the project site.

Five soil types are present on the project: Exeter sandy loam (2% to 8% slopes), eroded; Exeter sandy loam, deep (2% to 8% slopes), eroded; Greenfield sandy loan, deep, (2% to 8% slopes), eroded; Monserate sandy loam, (0% to 5% slopes); Monserate sandy loam, shallow, (5% to 15% slopes), eroded (USDA 2024a). These soil types are not listed as hydric (USDA 2024b).

- Exeter Series consists of a moderately deep to a duripan, moderately well drained soil that is formed in alluvium mainly from granitic sources. Exeter soils are on alluvial fans and stream terraces and have slopes of 0% to 9%. Exeter soils are on hummocky, undulated to gently rolling alluvial fans and stream terraces at elevations of 20 feet to 700 feet. In most areas the hummocky relief has been smoothed by leveling. (USDA 2024a). This soil series dominates the most western and most eastern portions of the project site. The Exeter series is a member of the fine-loamy, mixed, superactive, thermic typic durixeralfs.
- Monserate Series consists of moderately well-drained soils to well-drained soils; slow to rapid runoff; permeability is moderately slow formed in alluvium from granitic rocks. These soils typically occur within alluvial fans and terraces (USDA 2024a). This soil series dominates the majority of the central portion of the project site. The Monserate series is a member of the fine-loamy, mixed, thermic family of typic durixeralfs.
- Greenfield Series consists of deep, well drained soils that formed in moderately coarse and coarse textured alluvium derived from granitic and mixed rock sources. The Greenfield series have slow to medium runoff and moderate to rapid permeability. Greenfield soils are on alluvial fans and terraces and have slopes of 0% to 30% (USDA 2024a). The Greenfield series occurs within the central portion of the project site.

Vegetation

One native vegetation community and two non-natural land cover types were documented within the project site: sparsely vegetated playa (ephemeral annuals/vernal pool), disturbed habitat, and urban/developed (Figure 3, Vegetation Communities and Land Covers). Vegetation communities were mapped according to the *Vegetation Alliances of Western Riverside County, California* (Klein and Evens 2006). For vegetation communities that did not conform to this classification system, the *Habitat Classification System* of Orange County (Gray and Bramlet 1992) was used to best describe that vegetation community as observed on the project site. Table 1 provides a summary of each vegetation community and land cover's extent within the project site.

[2] In consultation with staff at the Carlsbad U.S. Fish and Wildlife Service office the survey methodology included a second wet season survey to replace the protocol dry season survey (USFWS 2017).

Table 1. Vegetation Communities and Land Covers Within the Project Site

Vegetation Community/Land Cover	Acreage
Vegetation Communities	
Sparsely Vegetated Playa (Ephemeral Annuals) (CDFW) Vernal Pools, Seeps and Meadows Southern Hardpan Vernal Pool*	0.12
Non-natural Land Covers	
Disturbed Habitat	20.25
Urban/Developed	6.83
Total	**27.20**

Notes: CDFW = California Department of Fish and Wildlife.
* **Source:** Gray and Bramlet 1992.

Sparsely Vegetated Playa (Ephemeral Annuals) Southern Hardpan Vernal Pool

As defined by Gray and Bramlet (1992), southern hardpan vernal pools have an underlying deep clay or hardpan layer often time on a mesa. Seasonal surface water is present with water for insects, amphibians, shorebirds and invertebrates. Characteristic species that occur within the vernal pools include slender woolly-marbles, sedges (*Eleocharis* species), hairy waterclover (*Marsilea vestita*), American pillwort (*Pilularia americana*), pigmy weed (*Crassula aquatica*), California adder's tongue (*Ophioglossum californicum*), water starwort (*Callitriche* species), American waterwort (*Elatine* species), and hyssop loosestrife (*Lythrum hyssopifolia*).

The Western Riverside County MSHCP defines vernal pools as seasonal wetlands that occur in depression areas that have wetlands indicators of all three parameters (soils, vegetation, and hydrology) during the wetter portion of the growing season but normally lack wetlands indicators of hydrology and/or vegetation during the drier portion of the growing season. Obligate hydrophytes and facultative wetlands plant species are normally dominant during the wetter portion of the growing season, while upland species (annuals) may be dominant during the drier portion of the growing season.

The project site contains 21 basins in the northwestern area; of those, aquatic invertebrates were detected at Main Pool 1 (Figure 4, MSHCP Section 6.1.2 Riparian/Riverine Resources) and supported sparsely vegetated playa (ephemeral annuals) consisting of one vernal pool indicator species, slender wooly-marble, at a density of almost 90% cover. The vernal pool (Main Pool 1) was monotypic with only slender woolly-marbles. A field analysis was conducted with a knife in the soils to determine if American pillwort and other species were present. This vernal pool habitat on the project site is considered an MSHCP Section 6.1.2 Riparian/Riverine Resource.

Disturbed Habitat

The classification of disturbed habitat is due to the predominance of bare ground, non-native plant species, and other disturbance-tolerant plant species. Oberbauer et al. (2008) describes disturbed habitat as areas that have been physically disturbed by previous human activity and are no longer recognizable as a native or naturalized vegetation association, but that continue to retain a soil substrate. Typically, vegetation, if present, is nearly exclusively composed of non-native annual plant species.

Within the study area, disturbed habitat includes areas that were previously disced or have highly damaged soil crusts and contain a mix of non-native and ruderal species including low covers of redstem stork's bill (*Erodium cicutarium*), Maltese star-thistle (*Centaurea melitensis*), and small patches of red brome (*Bromus rubens*) that have

undergone recent or repetitive disturbance. Several of the 21 inundated basins occurred within the disturbed habitat on the project site.

Urban/Developed Land

Urban/developed land is defined by Oberbauer et al. (2008) as areas that have been constructed on or disturbed so severely that native vegetation is no longer supported. Urban/developed lands include areas with permanent or semi-permanent structures, pavement or hardscape, landscaped areas, and areas with a large amount of debris or other materials.

On site, urban/developed land takes the form of historical development that previously consisted of paved road and paved lands that are degrading in sections. Several of the 21 inundated basins occurred within the urban/developed habitat on site, in tire tracks and gravel depressions.

Wildlife

A total of 15 native wildlife species were observed on site. Seven bird species were detected within the study area, including Anna's hummingbird (*Calypte anna*), common raven (*Corvus corax*), northern mockingbird (*Mimus polyglottos*), killdeer (*Charadrius vociferus*), mallard (*Anas platyrhynchos*), yellow rumped warbler (*Setophaga coronata),* and white crowned sparrow (*Zonotrichia leucophrys*). No active bird nests were observed within the project site; however, the few shrubs on site could provide habitat for nesting birds. No riparian birds were detected. One amphibian species was observed: western spadefoot. One reptile species was observed during the survey: western fence lizard (*Sceloporus occidentalis*). Two mammal species were detected during the survey: coyote (*Canis latrans*) and black-tailed jackrabbit (*Lepus californicus*). One invertebrate species was observed: versatile fairy shrimp.

Western spadefoot is a California Department of Fish and Wildlife (CDFW) Species of Special Concern and is proposed for listing as federally threatened by U.S. Fish and Wildlife Service (USFWS 2024). This species is fully covered under the MSHCP.

No species listed within MSHCP Section 6.1.2: Protection of Species Associated with Riparian/Riverine Areas and Vernal Pools were detected on the project site during the field surveys (County of Riverside 2003).

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3 MSHCP Section 6.12 Riparian/ Riverine Resources

3.1 Methods

The MSHCP defines riparian/riverine areas as "lands which contain habitat dominated by trees, shrubs, persistent emergent, or emergent mosses and lichens, which occur close to, or which depend upon soil moisture from a nearby fresh water source; or areas with fresh water flow during all or a portion of the year." The MSHCP further clarifies those areas "demonstrating characteristics as described above which are artificially created are not included in these definitions" (County of Riverside 2003).

Factors to be considered when describing the functions and values of riparian and riverine resources include hydrologic regime, flood storage and flood flow modification, nutrient retention and transformation, sediment trapping and transport, toxicant trapping, public use, wildlife habitat, and aquatic habitat. Given this definition, the maximum extent of streambed, as defined by CDFW, was used to aid in the delineation of MSHCP riparian/riverine resources during the formal aquatic resources jurisdictional delineation. During the delineation of jurisdictional waters, Dudek delineated streambeds from the top of bank and/or the extent of the associated riparian vegetation.

The following available resources were reviewed to assess the potential for MSHCP riparian/riverine resources: aerial photographs (Google Earth 2024); the U.S. Geological Survey 7.5-minute topographic quadrangle (USGS 2015; the Natural Resources Conservation Service Web Soil Survey (USDA 2024a); Environmental Protection Agency Watershed Assessment, Tracking & Environmental Results System (EPA 2024), which includes the U.S. Geological Survey National Hydrography Dataset; and the U.S. Fish and Wildlife Service National Wetland Inventory (USFWS 2024).

3.2 Results and Impacts

3.2.1 Results

The project site supports southern hardpan vernal pool habitat consisting of Main Pool 1 in the northwestern portion of the site (Figure 4). A total of 21 ephemeral basins were identified on the project site and sampled during protocol-level surveys for fairy shrimp in the 2022/2023 wet season. Only Main Pool 1 contained common versatile fairy shrimp and was dominated by a vernal pool plant indicator species (woolly-marbles) constituting hardpan vernal pool (ephemeral annuals, sparsely vegetated playa) habitat (Appendix E) (Figure 4). Note that western spadefoot (*Spea hammondi*), an MSHCP covered amphibian species and CDFW Species of Special Concern that is federally proposed for listing as threatened (USFWS 2024), was incidentally detected at Main Pool 1 as well. As such, Main Pool 1 is considered a high quality MSHCP Section 6.1.2 vernal pool resource. In addition, an ephemeral swale that functions as a drainage ditch totaling 0.11 acres is present along the southeastern portion of the project site and contains freshwater flows during a part of the year. Although it abates on site and does not contain riparian habitat, the swale/drainage ditch is considered a low quality MSHCP Section 6.1.2 riverine feature.

The drainage ditch and vernal pool MSHCP Section 6.1.2 Riparian/Riverine features are discussed in more detail below.

Description of Pre-project Riparian Functions and Values

The project site does not support any riparian habitat. The project site does contain scattered mulefat (*Baccharis salicifolia*) found in disturbed habitats as well as in wetlands, but is small in its extent, lacks understory or closed-canopy features, lacks continuity with higher quality habitat, and is not contiguous. As such, the scattered mulefat on the project site were not mapped as a vegetation community nor are they considered riparian habitat as defined by the MSHCP due to the fact it is scattered and not associated with a drainage. Rather, as discussed within the results of the aquatic resources delineation report (Appendix A), wetland sampling points determined no hydric soils or wetland hydrology where stands of mulefat were observed on the project site, with insufficient amount of hydrophytic vegetation to be considered a wetland. As described in Appendix A, stands of mulefat were observed in a historic infill area on the northwestern portion of the project site. Mulefat is considered a facultative plant, which is equally likely to occur in wetlands and non-wetlands according to the U.S. Army Corps of Engineers Arid West Region of the National Wetland Plant List. In addition, the scattered stands of mulefat are not sufficient in canopy width or density to support MSHCP riparian bird species such as least Bell's vireo (*Vireo bellii pusillus*), southwestern willow flycatcher (*Empidonax traillii extimus*), or yellow-billed cuckoo (*Coccyzus americanus*). No riparian bird species were detected during the November 2022–October 2023 field surveys.

Description of Pre-project Riverine Functions and Values

Watershed

The study area occurs within the Perris Valley San Jacinto River (Hydrologic Unit Code [HUC] 180702020306) of the Lower San Jacinto River watershed (HUC 1807020203) in the San Jacinto subbasin (HUC 18070202) (USGS 2024) (Figure 5, Hydrologic Setting).

Hydrology

Based on the results of the aquatic resources jurisdictional delineation (Appendix A), the project site contains an ephemeral drainage ditch that functions as a swale and a total of 21 ephemeral basins. Runoff from the road conveys water into a storm drain and past the storm drain into the drainage ditch. The drainage ditch does not support any riparian or wetland vegetation. Most of the vegetation within the drainage ditch consists of tumbleweed (*Salsola tragus*). The drainage ditch inlets beneath off Matthews Road at the northeastern project boundary and flows southwest, then west, parallelling the southern project site boundary, before terminating on site near the southwestern portion of the project site (Figure 4). The swale contains freshwater flow during a portion of the year; it flows directly south and then west before abating on site into upland. As such, the project has no downstream connectivity to wildlife habitat, areas already conserved or those that are described for conservation in the MSHCP. The drainage ditch/swale within the project site would be considered a MSHCP Section 6.1.2 riverine resource as it contains freshwater flow during a portion of the year. In total, the project site supports 0.11 acres of MSHCP Section 6.1.2 riverine resources (swale).

In its existing condition, the drainage ditch on the project site does not demonstrate hydrologic connection to downstream features, nor does it support groundwater recharge, sediment transport, or nutrient cycling, as the drainage ditch abates on site. Due to the narrow width, ephemeral hydrology, and disturbed, ruderal vegetation within the upland drainage ditch, its hydrologic function and value as an MSHCP riverine resource is limited and low-quality.

Furthermore, the 21 basins identified on the project site occur on frequently disced/disturbed, gravelly sandy soil with poor infiltration in disturbed and developed habitats. A total of 20 of the 21 basins did not contain any vernal pool indicator species or aquatic invertebrates (Appendix E). However, Main Pool 1 contained common versatile fairy shrimp and was dominated by monotypic woolly-marble (*Psilocarphus brevissimus*) vegetation, a vernal pool indicator plant. In addition, western spadefoot toad, a CDFW Species of Special Concern, was detected at Main Pool 1. This amphibian species is known to inhabit vernal pools and ephemeral wetlands. Although Main Pool 1 occurs on marginally suitable substrate, due to the dominance of woolly-marbles vegetation and one special-status amphibian, is considered moderate-quality MSHCP Section 6.1.2 vernal pool/fairy shrimp habitat.

In total, the project site supports 0.11 acres of MSHCP Section 6.1.2 riverine resources (swale) and 0.12 acres of fairy shrimp/vernal pool habitat, totaling 0.23 acres of MSHCP Section 6.1.2 Riparian/Riverine Resources (Figure 4).

Vernal Pools

The MSHCP defines vernal pools as the following (County of Riverside 2003):

> [S]easonal wetlands that occur in depression areas that have wetlands indicators of all three parameters (soils, vegetation and hydrology) during the wetter portion of the growing season but normally lack wetlands indicators of hydrology and/or vegetation during the drier portion of the growing season. Obligate hydrophytes and facultative wetlands plant species are normally dominant during the wetter portion of the growing season, while upland species (annuals) may be dominant during the drier portion of the growing season. The determination that an area exhibits vernal pool characteristics, and the definition of the watershed supporting vernal pool hydrology, must be made on a case-by-case basis. Such determinations should consider the length of the time the area exhibits upland and wetland characteristics and the manner in which the area fits into the overall ecological system as a wetland. Evidence concerning the persistence of an area's wetness can be obtained from its history, vegetation, soils, and drainage characteristics, uses to which it has been subjected, and weather and hydrologic records.

MSHCP further clarifies “With the exception of wetlands created for the purpose of providing wetlands Habitat or resulting from human actions to create open waters or from the alteration of natural stream courses, areas demonstrating characteristics as described above which are artificially created are not included in these definitions” (County of Riverside 2003).

The project site contains ponded areas (basins) situated in the northwest of the site, within excavated areas. These ponded areas did merge on a couple of occasions due to the amount of rainfall. One of the areas stayed hydrated for most of the 2022–2023 focused fairy shrimp surveys (Appendix E). A total of 21 basins were detected on the project site (Figure 4). The basins appear to be filled by direct rainfall and surrounding surface slows. The majority of the basins provide low quality habitat for fairy shrimp because they occur on gravelly fill soils and appear to be repeatedly impacted by vehicle traffic due to mowing, discing, and other maintenance activities. The basins include excavated basins, road ruts, ditches, tire tracks, and other depressions capable of providing fairy shrimp habitat. During the focused fairy shrimp surveys from November 2022 to October 2023, the basins filled, dried, and refilled. All but Main Pool 1 and Main Pool 2 were dry when the study concluded.

In addition, 1 vernal pool indicator plant species was observed within the 21 basins: slender woolly-marbles (Appendix E; Figure 4). The vernal pool habitat consisted of almost 90% cover of slender woolly-marbles. An aerial desktop review was conducted using historical aerial imagery (Historical Aerials 2024). Based on this desktop

review, the one ephemeral depression was observed immediately south of Matthews Road on site. This depression appears to have held water in 2020, 2016, and 2012. The vernal pool habitat mapped on the project site totals 0.12 acres (Main Pool 1) and meets the MSHCP vernal pool definition due to the presence of aquatic invertebrates, ephemeral inundation, and vernal pool plant indicator species. This habitat is moderate quality as it supports a dominance of obligate vernal pool indicator plants and one special-status/MSHCP covered amphibian species.

Fairy Shrimp Habitat

In addition to vernal pools, fairy shrimp habitat also includes ephemeral pools and other features such as road ruts or stock ponds. Results of the protocol 2022–2023 wet season fairy shrimp surveys were negative for all six listed fairy shrimp species, including those covered under Section 6.1.2 of the MSHCP.

Of the 21 basins, one common fairy shrimp species was detected in Main Pool 1 during the protocol 2022/2023 wet season surveys: versatile fairy shrimp. Main Pool 1 is considered MSHCP Section 6.1.2 vernal pool and fairy shrimp habitat due to the presence of aquatic invertebrates and ponded water supporting common fairy shrimp. Main Pool 1/hardpan vernal pool habitat on the project site totals 0.12 acres (Figure 4).

3.2.2 Impacts to MSHCP Section 6.1.2 Riparian/ Riverine Resources

The project would result in unavoidable impacts to riparian/riverine resources as defined by the MSHCP and as summarized in Table 2. The proposed project would result in the permanent loss of approximately 0.11 acres of drainage ditch/swale, considered a low-quality Section 6.1.2 Riverine resource, and 0.12 acres of vernal pool habitat, considered a high-quality Section 6.1.2 vernal pool resource. There would be no temporary impacts on the project site.

Table 2. Impacts to Section 6.1.2 Riparian/Riverine Resources Within the Project Site

Vegetation Community/Land Cover Type	Impacts to MSHCP Riverine Resources (Acres/Linear Feet)
Vernal Pool/Riparian Resource	
Sparsely Vegetated Playa (Ephemeral Annuals) (CDFW) Vernal Pools, Seeps and Meadows Southern Hardpan Vernal Pool*	0.12
Riverine Resource	
Drainage Ditch	0.11/1,311
Total	**0.23/1,311**

Notes: CDFW = California Department of Fish and Wildlife.
* **Source:** Gray and Bramlet 1992.

3.3 Mitigation and Equivalency

3.3.1 Mitigation Options

As the proposed project cannot demonstrate avoidance of riparian/riverine resources in perpetuity, this (DBESP) report proposes compensatory mitigation at a minimum 1:1 establishment or rehabilitation that would demonstrate

equivalent or superior function and value of the resources that are impacted from project implementation. Specifically, with proposed design and compensation measures, the project would be biologically equivalent or superior to that which would occur from avoiding impacts to these resources, based on one of the following factors: 1) Effects on conserved habitats; 2) Effects on the species listed in Section 6.1.2 of the MSHCP; 3) Effects on riparian linkages and function of the MSHCP Conservation Area.

Prior to initiating construction activities, the applicant shall compensate for 0.23 acres of permanent impacts to MSHCP Section 6.1.2 vernal pool and riverine habitat in compliance with the Western Riverside County MSHCP Section 6.1.2, Protection of Species Associated with Riparian/Riverine Areas and Vernal Pools. The mitigation strategy will ensure replacement of any lost functions and values of riparian/riverine habitat as it relates to vernal pool and riverine resources, and will include the following mitigation strategy, in combination or entirety:

A. Payment of the MSHCP Local Development Mitigation Fee to fund acquisition and conservation of certain land.
B. Permanent impacts to 0.12 acre of MSHCP Section 6.1.2 riparian/riverine habitat consisting of the on-site ephemeral drainage ditch would be mitigated at a 1:1 ratio through the purchase of 0.12 acre of rehabilitation credits from the Riverpark Mitigation Bank. Permanent impacts to 0.11 acres of vernal pools would be mitigated at a 6:1 ratio through the purchase of 0.45 acre of reestablishment credits and 0.25 acre of rehabilitation credits from Riverpark Mitigation Bank. The project shall provide proof of the completed purchase of credits at Riverpark Mitigation Bank. Proof of purchase of mitigation bank credits consists of two documents: (1) a copy of the receipt for the purchase of the credits, and (2) a copy of the credit purchase agreement between the Applicant and the Riverpark Mitigation Bank; the purchase agreement/contract should name the Double Butte BESS Project as the development project for which the mitigation credits were purchased. The two requested documents shall be provided prior to the issuance of a grading permit for the Project; no other documents shall be accepted.

   Should Riverpark Mitigation become unavailable in the future, an alternative mitigation strategy through another mitigation bank within the MSHCP Plan Boundary shall be reviewed and approved by the RCA and Wildlife Agencies (CDFW and USFWS) prior to issuance of a grading permit.

A summary of Minimum Mitigation Acreage Proposed for Impacts to Section 6.1.2 Riparian/Riverine Areas is included in Table 3 below.

Table 3. Summary of Minimum Mitigation Acreage Proposed for Impacts to Section 6.1.2 Riparian/Riverine Areas

MSHCP Riparian/Riverine Feature Name	Impact Acreage	Mitigation Credit Ratio	Mitigation Acreage
Sparsely Vegetated Playa (Ephemeral Annuals) (CDFW) Vernal Pools, Seeps and Meadows Southern Hardpan Vernal Pool*	0.11	4:1 reestablishment and 2:1 rehabilitation**	0.70
Drainage Ditch/swale	0.12	1:1 rehabilitation	0.12
Total	**0.23**	—	**0.82**

Notes: MSHCP = Multiple Species Habitat Conservation Plan; CDFW = California Department of Fish and Wildlife.
* **Source:** Gray and Bramlet 1992.
** Total vernal pool mitigation ratio of 6:1.

If sufficient mitigation credits are not available to reestablish and rehabilitate lands within the mitigation bank area, then the deficit in credits would be filled by one or a combination of the following:

A. Applicant-lead off-site mitigation through purchase of a 16.5-acre immediately adjacent off-site parcel located southeast of the project site along Palomar Road and McLaughlin Road, of which the northwestern approximately 4-acre portion shall be used as a temporary construction laydown yard for the project (pending final planning and design). A habitat assessment conducted in 2024 by Dudek for the off-site parcel determined the existing conditions contain topographic characteristics to support prolonged inundation and is capable of restoring the habitat function (establishment of native riparian or riverine habitat in place of existing non-native disturbed or developed habitat). Applicant-lead off-site mitigation shall restore and create vernal pool habitat at a minimum 1:1 establishment or rehabilitation (a higher ratio of 3:1 or above may be required for vernal pool mitigation) to ensure equivalent preservation for the MSHCP Section 6.1.2 resources lost from project implementation, as determined by the wildlife agencies. A permanent conservation easement or deed restriction shall be put in place over the mitigation parcel by the applicant/permittee to ensure resources are protected in perpetuity. A restoration plan for the Applicant-lead off-site mitigation shall be prepared and submitted to the wildlife agencies for review and approval. The restoration plan shall include details on establishing and relocating the population of western spadefoot toads on the project site to the off-site mitigation parcel.

These mitigation habitats would be funded, implemented, monitored, and reported on for a minimum of 5 years. The mitigation habitat would then enter into long-term management which would be funded through an endowment in perpetuity. A long-term management plan would also be prepared to ensure that the mitigation site is successful. Each of these plans, and the funding proposed, would be reviewed and approved by the responsible wildlife agencies.

3.3.1.1 Off-Site Applicant-Lead Mitigation Option

3.3.1.1.1 Existing Conditions

The proposed off-site temporary construction laydown yard and mitigation area consists of undeveloped agricultural land which based on analysis of historical aerial imagery appears to have been intermittently farmed since 1985 (Google Earth 2024). Evidence of recent tillage and discing of on-site soils was noted during 2024 reconnaissance surveys. It is bordered by Palomar Road to the west, McLaughlin Road to the north, a developed container storage facility to the east, and similarly undeveloped (and previously farmed) land to the south. The northern 4 acres lack riverine/riparian resources; the remaining 13 acres contain several drainage ditches and inundated ponds that support similar riverine and vernal pool functions as would be lost on the project site from construction and operation of the project (Figure 6: Conceptual Mitigation Area Map).

Vegetation on the off-site parcel is comprised of disturbed habitat and shows evidence of recent soil tillage and discing from agricultural activities throughout (Figure 3). Non-native, invasive grasses and ruderal herbaceous plant species such as cheeseweed (*Malva parviflora*), shortpod mustard (*Hirschfeldia incana*), and prickly lettuce (*Lactuca serriola*) dominate the site and several non-native, mature eucalyptus trees are established in the northwestern portion of the site. Areas of the southern portion of the site which appear to be seasonally inundated are dominated by non-native wetland indicator plants like curly dock (*Rumex crispus*) and annual rabbitsfoot grass (*Polypogon monspeliensis*).

According to the U.S. Department of Agriculture Web Soil Survey database, soils underlaying the off-site parcel are dominated by Ramona sandy loam (0% to 2% slopes) with small pockets of Monserate sandy loam (shallow, 5% to 15% slopes, eroded) and Exeter sandy loam (2% to 8% slopes, eroded) (USDA 2024). However, during 2024 reconnaissance surveys, Dudek biologists noted that portions of the site appeared to contain very finely textured and clay-like soils in some locations. It is possible that the existing soil mapping is not entirely accurate on the finer scale that the field assessment occurred within, or that a history of agricultural use has modified the soils over time.

The Ramona soil series, which dominates the mitigation site, is described as a well-drained, fine-loamy, mixed soil with upper layers containing more than 15% combined coarse and very coarse sand and 5% to 35% fine rock fragments of 2mm to 5mm size. It is noted that after excessive cultivation or trampling, the upper layers of these soils become very hard, especially when dry. This may lead to their clay-like appearance and texture which was noted in 2024 mitigation site surveys.

Exeter and Monserate soils, which occur in smaller pockets along the northern and western boundaries of the site, have similar fine-loamy, mixed characteristics but are only moderately well-drained and may possess a subsurface hardpan known as a duripan, which is a restrictive layer of cemented silica at 20 inches to 40 inches underground.

The soil series mapped at the off-site parcel are similar to the project site to the northwest, which contains Exeter sandy loam, Greenfield sandy loam, and Monserate sandy loam.

3.3.1.1.2 Existing Aquatic Resources

Several existing aquatic features are present on the off-site parcel, including two ephemeral basins along the southeastern boundary (Figure 6: Conceptual Mitigation Area Map). The basins contained ponded water in January of 2024 and showed clear evidence of wetland indicators like soil cracks and hydrophytic non-native vegetation in June 2024 reconnaissance surveys.

Additionally, a larger ephemeral basin/seasonal wetland exists at the southwest corner of the site (Figure 6) where vegetation is dominated by the ruderal, non-native wetland indicator plant curly dock. This feature was inundated in February 2024 and is adjacent (to the north of) to a larger feature that appears to be subject to significant ponding on historical aerial imagery. The National Wetlands Inventory displays a mapped freshwater emergent wetland on the site adjacent to this feature (USFWS 2024). No other National Wetlands Inventory features are mapped within the mitigation site boundaries.

Although not clearly discernible during 2024 reconnaissance surveys due to the flat topography and disturbed nature of the site, a minor upland swale which bisects the northern portion of the site is clearly visible on historical aerial imagery, showing clearly defined drainage patterns and soil moisture (Google Earth 2024). A drainage ditch, which shows minor evidence of bed and bank, is present along the northern boundary of the site and the swale may have directed water toward this feature. A similar drainage ditch is present along the southeast boundary of the site, just south of the existing ephemeral basins.

Lastly, two minor road ruts are located along the central-western boundary of the site, just east of Palomar Road, which held ponded water in February and March 2024.

This initial assessment of existing aquatic resources on the mitigation site was informal and a formal jurisdictional delineation of these resources is recommended to determine the regulatory status and characteristics of these aquatic features.

3.3.2 Off-Site Applicant-Lead Mitigation Approach

Dudek recommends a mitigation approach that rehabilitates (i.e., restores) existing aquatic features and reestablishes (i.e., creates) new aquatic features within the southern portion of the site to provide mitigation for impacts to MSHCP Section 6.1.2 vernal pool and riverine resources on the project site to the northwest. The goals for the mitigation area will be to create a diverse, high-functioning vernal pool complex within the currently degraded and disturbed parcel. The target plant community and habitat type would be consistent with other alkali vernal pools and alkali grassland/playa habitats in western Riverside County. Such an approach would allow the mitigation site to potentially support vernal pool fauna like western spadefoot and fairy shrimp.

The mitigation approach outlined below focuses primarily on vernal pool mitigation given that vernal pools should be able to serve as mitigation for the low-quality swale feature that is proposed to be impacted, which is a riverine resource. In general, vernal pools are rarer and more unique habitats than swales, and the potentially impacted swale on the project site is heavily disturbed and dominated by non-native ruderal weedy species. As such, any available vernal pool mitigation should count toward the swale mitigation given the superior ecological function and value of the vernal pools which will result from the proposed mitigation approach. However, opportunities to rehabilitate disturbed swales/drainage ditches within the mitigation site if additional riverine mitigation credits are needed (i.e., if the vernal pools cannot be used as mitigation for the swale or if the amount of vernal pool area is insufficient to cover all mitigation needs). If needed, these additional swale rehabilitation opportunities can be assessed in future planning discussions.

This mitigation approach is designed to mitigate only proposed impacts at the project site. If the northern portion of the mitigation parcel is used as a laydown yard, and requires aquatic resource mitigation, then additional considerations should be included in the final mitigation site configuration.

3.3.2.1 Rehabilitation of Existing Aquatic Features

Surveys have observed three existing ephemeral basins on the off-site parcel (along the southeastern edge and in the southwest corner) that are candidates for rehabilitation (i.e., restoration). This mitigation approach includes the recontouring and expansion of these topographic depressions to create greater ponding area, and to improve the native plant community within them. These features are shown on Figure 6. Existing Feature 1 (southwest) should be deepened by approximately 6 inches to 12 inches to improve the ponding of the basin and the depression should be expanded to provide additional area for vernal pool plants to establish. Existing Feature 2 and 3 should be expanded to allow for greater ponded area and more gradual slopes, which would allow for a higher level of occupation by vernal pool plant species. Rehabilitation of these three features would provide approximately 0.25 acres of vernal pool rehabilitation (Figure 6).

Subsequent seeding of the recontoured areas with a mix of native and regionally appropriate vernal pool plant species would lead to the establishment of a high functioning and diverse alkali vernal pool plant community. Recontouring should be performed such that it adds topographic complexity and encourages the establishment of a variety of vernal pool plant species which have different tolerances for inundation.

3.3.2.2 Reestablishment of Aquatic Features

This mitigation approach also includes creation of a large vernal pool complex, and several individual vernal pools, in the southern portion of the mitigation site (Figure 6). The existing aquatic features (i.e., basins) on the off-site

parcel, in combination with the remarkably clay-like soils noted in this area during 2024 reconnaissance surveys, indicate that these locations would likely facilitate establishment of high-quality vernal pools. The large vernal pool complex would consist of a deep central pool connected to several smaller, slightly shallower pools via shallow swales. These swales would provide connectivity between pools in the complex during periods of high-water inundation and offer additional aquatic resource mitigation. Several additional small pools could be created to the west of the larger complex in topographically isolated areas. Creation of these features would provide approximately 0.45 acres of vernal pool reestablishment and 0.02 acres of swale reestablishment (Figure 6; Table 4).

Precise locations and depths for the newly created pools and connecting swales would depend on accurate site topography maps and additional site investigations. Created pools would be seeded with a mix of native and regionally appropriate vernal pool plant species. The restoration plan shall include details on establishing and relocating the population of western spadefoot toads on the project site to the off-site Applicant-lead mitigation parcel.

3.3.2.3 Vernal Pool Watershed Restoration

This mitigation approach includes the restoration of the watersheds around the aquatic features to alkali grassland to provide an appropriate high functioning buffer. The watershed restoration areas are anticipated to be within the overall off-site parcel (Figure 6), but the shape and area is subject to refinement depending on mitigation needs/crediting and resource agency requirements. Restoration of the watershed area will help increase the likelihood of success of the mitigation project by limiting the input of non-native plant propagules into the aquatic features. Restoration of vernal pool watershed would occur within approximately 4.22 acres (Figure 6). This area may be considered as part of the vernal pool mitigation given their function as watersheds for the vernal pools.

3.4 Equivalency Summary

The mitigation approach contained herein could result in up to approximately 0.25 acres of vernal pool rehabilitation, 0.45 acres of vernal pool reestablishment, and 0.02 acres of swale reestablishment which could serve as mitigation for impacts to 0.12 acres of MSHCP Section 6.1.2 vernal pool and 0.11 acres of riverine resources on the project site to the northwest (Table 1). Enhancement of upland buffer zones around vernal pools would offer approximately 4.22 acres of mitigation which may count toward vernal pool mitigation. Although not included in this initial mitigation approach, additional rehabilitation of disturbed swales/drainage ditches area could possibly offer up to approximately 0.25 acres of additional riverine mitigation if, if necessary.

Table 4 summarizes the estimated mitigation credits that would result from implementing the above proposed applicant-lead off-site mitigation plan.

Table 4. Estimated Mitigation Credits Resulting from Proposed Applicant-Lead Off-Site Mitigation

Aquatic Resource	Potential Mitigation Credit Acreage (Approximate)		
	Reestablishment	Rehabilitation	Total
Vernal Pool*	0.45	0.25	0.70
Swale (Connecting Pools in Vernal Pool Complex)**	0.02	N/A	0.02
Vernal Pool Watershed (Upland)	N/A	4.22	4.22

Total	**0.47**	**4.47**	**4.94**

Notes: N/A = Not applicable.
* Assumes 4:1 reestablishment and 2:1 rehabilitation for a total of 6:1 vernal pool mitigation credit ratios as described in Table 3.
** Assumes 1:1 rehabilitation swale/drainage ditch credit ratio as described in Table 3.

Applicant-lead off-site mitigation through vernal pool restoration as described in this preliminary conceptual mitigation approach resulting in 0.70 acres of total restoration could provide at least a 3:1 mitigation ratio for project impacts to 0.23 acres of aquatic resources on the project site (0.12 acres of vernal pool resources and 0.11 acres of riverine resources [swale]). If upland rehabilitation of vernal pool watershed can count toward vernal pool mitigation, much higher mitigation ratios may be achieved (up to 20:1). If vernal pool mitigation cannot be used for riverine/swale mitigation, or if higher mitigation ratios are required, revisions to this conceptual mitigation approach may be able to provide additional mitigation on the site.

Therefore, although the project cannot avoid direct impacts to riparian and riverine resources on the project site, with proposed design and applicant-lead off-site mitigation compensation measures, the project would be biologically equivalent or superior to that which would occur under an avoidance alternative without these measures.

Subsequent Steps to Implementing the Proposed Off-Site Mitigation Option

Since the off-site proposed mitigation area appears suitable to provide sufficient mitigation for impacts to MSHCP Section 6.1.2 vernal pool and riverine resources on the project, mitigation would be achieved through rehabilitation (i.e., restoration) of existing vernal pools, and reestablishment (i.e., creation) of additional vernal pools and swales. Dudek believes that a minimum 3:1 mitigation ratio for both vernal pool and riverine resources should be sufficient for mitigation since the restored and created habitat on the mitigation site would be far superior to impacted habitat at the project site. The vernal pools would be designed to contain significantly greater microtopography and vernal pool indicator plant diversity than the resources within the project site, in addition to providing high-quality habitat for aquatic species (e.g., fairy shrimp and western spadefoot). The swales would be designed to support a high-functioning alkali grassland vegetation community; in contrast to the swale on the project site which is heavily disturbed and dominated by ruderal non-native plant species.

To support the next step of mitigation design concept if this option is decided, the following is required:

1. An evaluation of mitigation site soil conditions, including the depth to the restrictive layer, by excavating small test pits and/or collecting soil density measurements with ground-penetrating radar
2. A jurisdictional delineation and biological resources survey to determine opportunities and constraints for restoration activities
3. A topographic survey of the site to guide final aquatic feature design and topographic recontouring needs

Permits would be required from each of the regulatory agencies and entail providing mitigation to offset the impacts and loss of beneficial uses, functions, and values to the jurisdictional waters and habitats. Through permitting and off-site mitigation to address unavoidable impacts to MSHCP Section 6.1.2 Riparian/Riverine resources on the project site, implementation of the proposed project will result in overall benefits to riparian and riverine functions and values by providing off-site applicant-lead conservation of similar resources in perpetuity via habitat restoration and endowment of a conservation easement on the adjacent property to be restored.

Additionally, coordination with the resource agencies in a pre-application meeting would facilitate early review of this mitigation approach and ideally provide feedback on what mitigation ratios the agencies would require.

Following initial confirmation on the mitigation approach from the project's regulatory partners, a formal restoration plan should be prepared to guide restoration activities on the mitigation site. The plan would require a minimum of 5 years of maintenance and monitoring to support the restoration of the site and to help track the progress of mitigation establishment.

3.4.1 Indirect Effects: MSHCP Urban/Wildland Interface Guidelines

Although the project is not within an MSHCP Conservation Area, it is committed to following the MSHCP Section 6.1.4 Urban/Wildland Interface Guidelines. The proposed project does not conflict with MSHCP Section 6.1.4.

Implementation of MSHCP Urban/Wildland Interface Guidelines will ensure that all direct and indirect project-related impacts to riparian/riverine habitat, including that which may result from drainage, toxins, lighting, noise, invasive plant species, and grading/land development, are avoided or minimized to the greatest extent possible. Each of the Urban/ Wildland Interface Guidelines are further discussed below.

- **Drainage/Toxics:** The project will include the development of a stormwater pollution prevention plan. A stormwater pollution prevention plan shall be prepared and implemented to prevent all construction pollutants from contacting stormwater during construction activities, with the intent of keeping sediment and any other pollutants from moving off site and into receiving waters. A project-specific water quality management plan shall be implemented along with the regional National Pollutant Discharge Elimination System requirements to ensure that the quantity and quality of runoff discharged into adjacent areas is not altered in an adverse way when compared to existing conditions. In particular, measures would be put in place to avoid discharge of untreated surface runoff from developed and paved areas in into the adjacent municipal sewer system. Stormwater systems have been designed to prevent the release of toxins, chemicals, petroleum products, exotic plant materials, or other elements that might degrade or harm biological resources or ecosystem processes within sensitive areas adjacent to the project site. Regular maintenance would occur to ensure effective operations of runoff control systems. All development for the project would be subject to adhere to the National Pollutant Discharge Elimination System permit for the County of Riverside. Compliance with regulations, standards, and guidelines established by the Environmental Protection Agency, state, county, and local agencies relating to the storage, use, and disposal of hazardous waste/toxins reduce the potential risk of toxins exposure to a level that is less than significant.

  BMPs incorporated into the project-specific water quality management plan would be employed on site during construction to reduce potential impacts that may occur from drainage and toxic runoff created during installation of the project. The Stormwater BMPs include an infiltration basin installed on the southwestern portion of the project site, and installing biofiltration.

  In addition, to reduce fugitive dust resulting from project construction and to minimize adverse air quality impacts, the project would employ dust control measures in accordance with the Air Quality Management District's Rules 401 and 403.2, which would limit the amount of fugitive dust generated during construction.

  With implementation of these measures, the project would be consistent with these requirements of the MSHCP, and no further actions are required. In addition, during project construction, the following BMPs will be implemented in order to avoid unintended drainage into off-site areas:

  - Construction limits shall be clearly flagged so that any adjacent native vegetation and/or riverine features are avoided.
  - Silt fencing and straw waddles will be employed at the edge of construction boundaries, including cut and fill slopes, in order to prevent unintended runoff from draining off site.
  - Construction work and operations areas shall be kept clean of debris, such as trash and construction materials. Fully covered trash receptacles that are animal-proof will be installed and used during construction to contain all food, food scraps, food wrappers, beverage containers, and other miscellaneous trash. Trash contained within the receptacles will be removed at least once a week from the project site.
  - Staging and storage areas for spoils, equipment, materials, fuels, lubricants, and solvents shall be located within the designated impact area or adjacent developed areas, away from riverine features.
- Lighting: Lighting associated with the construction phase of the project shall be directed to avoid light spill into any adjacent areas. Lighting will be shielded and directed towards work areas to prevent lighting overcast directed outside of the site boundaries. Streetlights and other project related illumination sources will be positioned, directed, and shielded to avoid light spill and shall consist of low-intensity light fixtures fitted with hooded shields. The level of on-site lighting and lighting fixtures will comply with the applicable requirements and policies of Riverside County Ordinance No. 655. Therefore, night lighting and noise will not impact existing or future MSHCP Conservation Areas and the project would be consistent with these requirements of the MSHCP.
- Noise: Construction-related noise shall be mitigated by limiting construction activities to daytime hours. In addition, project-related noise impacts are anticipated to be less than significant due to the operational hours of commercial business and the existing noise levels produced from adjacent industrial development and Interstate 15.
- Barriers: Although a wall shall be installed around the BESS facility, the barrier would not impede wildlife movement as the project site does not function as a corridor for wildlife. Additionally, the area is not identified as a wildlife movement corridor by the MSHCP; therefore, the project would be consistent with the requirements of the MSHCP.
- Grading/Land Development: No manufactured slopes are proposed or shall extend within existing or planned Conservation Areas. Therefore, the project would be consistent with the requirements of the MSHCP.
- Invasives: Invasive species provided in MSHCP Table 6-2 are not to be used in development or restoration plan activities for projects adjacent to conservation areas. As described in the project's biological technical report (Appendix B) (Dudek 2024), the project shall not use invasive species as defined in the MSHCP Table 6-2. The Preliminary Landscaping Site Plan is included in Appendix G. With implementation of this measure, the project would be consistent with this requirement of the MSHCP.
- Fuel Modification: Any weed abatement and/or fuel modification zones will not encroach into existing or planned Conservation Areas as the project is not within or adjacent to an MSHCP Conservation Area; therefore, the project would be consistent with these requirements of the MSHCP.

Finally, a project-specific Water Quality Management Plan (Appendix D) prepared for AES by Kimbley-Horn outlines the implementation of stormwater BMPs during the projects' construction and complies with the requirements of the City of Menifee Water Quality Ordinance (Municipal Code Section 15.01). Appendix F includes the geotechnical investigation for the project. The project incorporates the construction of shallow basins for the purpose of infiltrating runoff water. Drainage velocity reducers, swales, riprap, etc. will be implemented as determined by the project civil engineer as deemed necessary to prevent erosion and scouring.

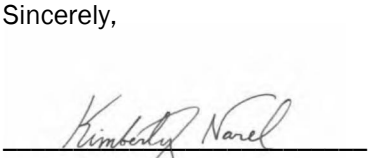
4 Conclusion

The project will directly impact 0.23 acres of Section 6.1.2 MSHCP riparian/riverine resources on the project site consisting of 0.12 acre of ephemeral swale and 0.11 acre of vernal pool resources. The project shall provide biological superior preservation to the MSHCP Section 6.1.2 resources lost from project development through compensatory mitigation at Riverpark Mitigation Bank. Permanent impacts to 0.12 acre of the ephemeral swale would be mitigated at a 1:1 ratio through the purchase of 0.12 acre of rehabilitation credits; permanent impacts to 0.11 acres of vernal pools would be mitigated at a total 6:1 ratio through the purchase of 0.45 acre of reestablishment credits (4:1) and 0.25 acre of rehabilitation credits (2:1), totaling 0.82 acre of compensatory mitigation. Should Riverpark Mitigation become unavailable in the future, an alternative mitigation strategy through another mitigation bank within the MSHCP Plan Boundary shall be reviewed and approved by the RCA and Wildlife Agencies (CDFW and USFWS) prior to issuance of a grading permit.

Conversely, applicant-lead off-site compensatory mitigation of the immediately adjacent temporary laydown yard parcel as described in this report would provide superior or equivalent preservation of riparian and riverine resources as well. The off-site mitigation approach could result in up to approximately 0.25 acres of vernal pool rehabilitation, 0.45 acres of vernal pool reestablishment, and 0.02 acres of swale reestablishment which could serve as a total of 0.72 acres of mitigation (minimum 3:1 mitigation) for impacts to MSHCP Section 6.1.2 vernal pool and riverine resources on the project site. Enhancement of upland buffer zones around vernal pools would offer approximately 4.22 acres of mitigation which may also count toward vernal pool mitigation, providing superior preservation than what currently exists and would be impacted on the project site. Furthermore, implementation of stormwater BMPS and the MSHCP Urban/Wildlife Interface Guidelines will reduce indirect project impacts to MSHCP riparian/riverine resources.

If you have any questions regarding this DBESP letter report, please feel free to contact me at knarel@dudek.com or at 949.508.5745.

Sincerely,



Kimberly Narel
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Brock Ortega, Senior Biologist
Keith Carwana, Project Manager
Jake Marcon, Habitat Restoration Specialist

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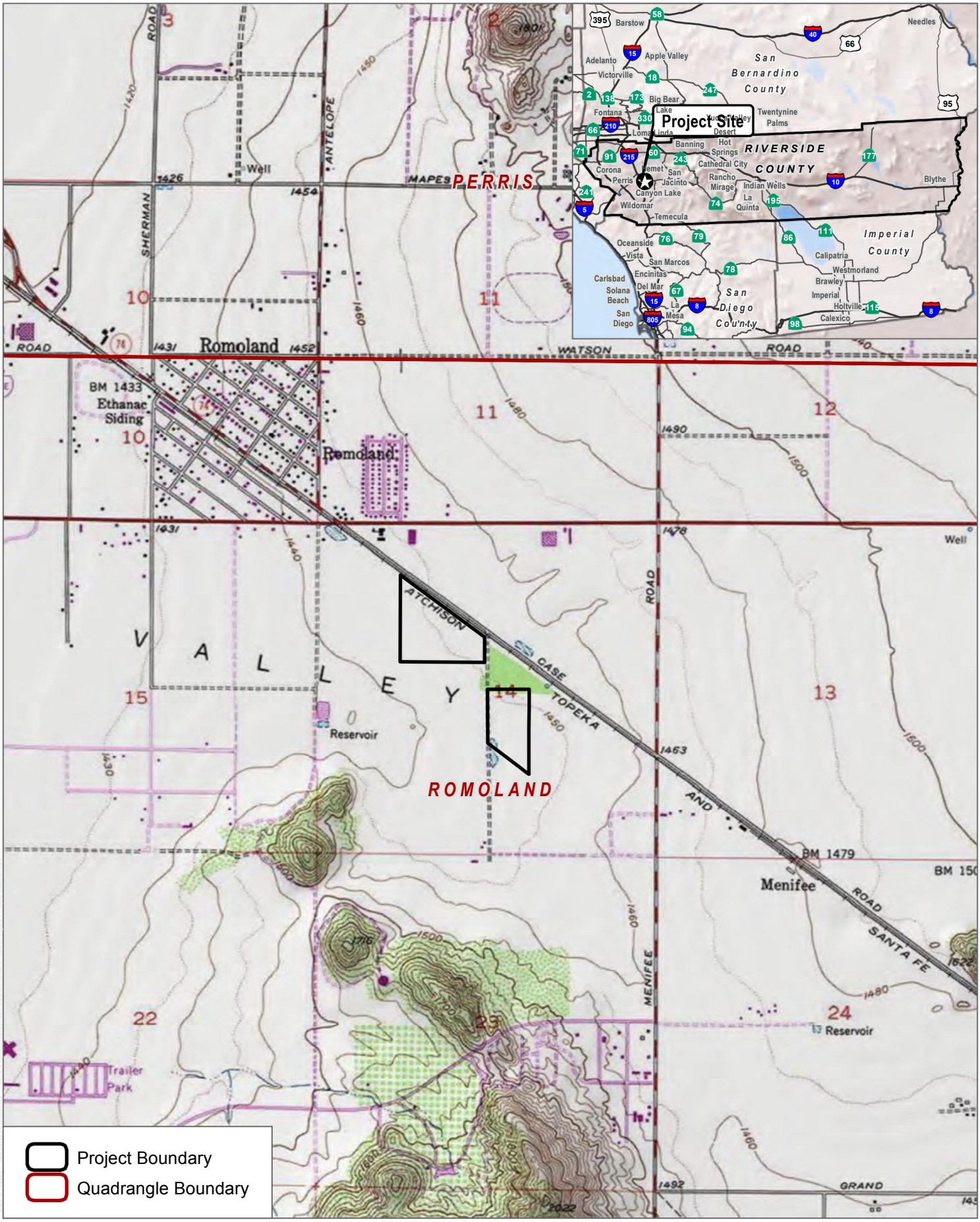

SOURCE: USA Topo Maps 7.5 Minute Series Romoland Quadrangle
Township 5S; Range 3W; Section 14

DUDEK

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1:24,000

FIGURE 1

Project Location

Double Butte Battery Energy Storage Project

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SOURCE: Esri Clarity Basemap, OpenStreetMap

DUDEK

0 250 500 Feet
1:6,000

FIGURE 1A

Project Location: BESS Site

Double Butte Battery Energy Storage Project

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SOURCE: Esri Clarity Basemap, OpenStreetMap

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1:1,200

FIGURE 1B

Project Location: Laydown Yard

Double Butte Battery Energy Storage Project

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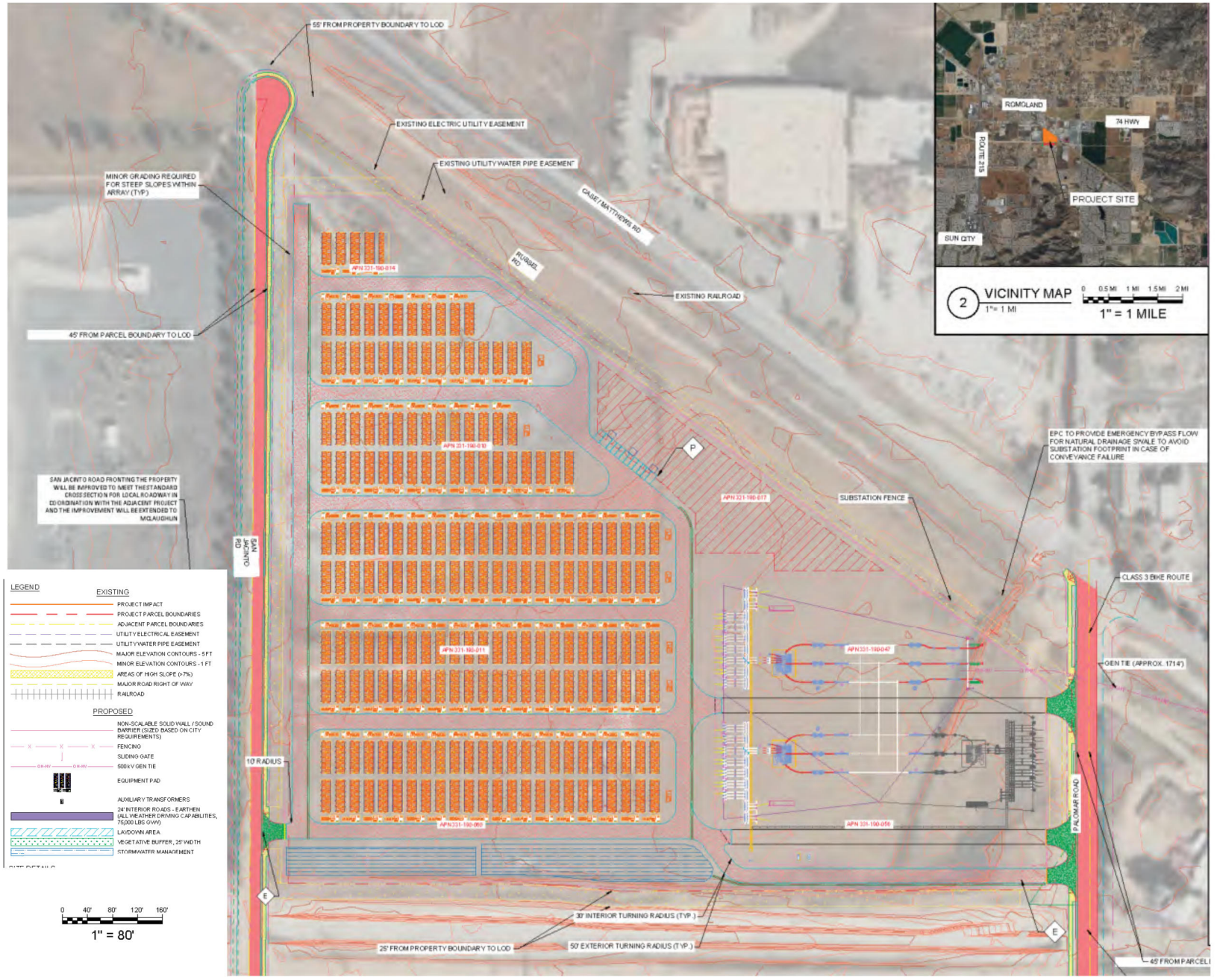

SOURCE: AES, 2024

FIGURE 4

Conceptual Site Plan

Double Butte Battery Energy Storage Project

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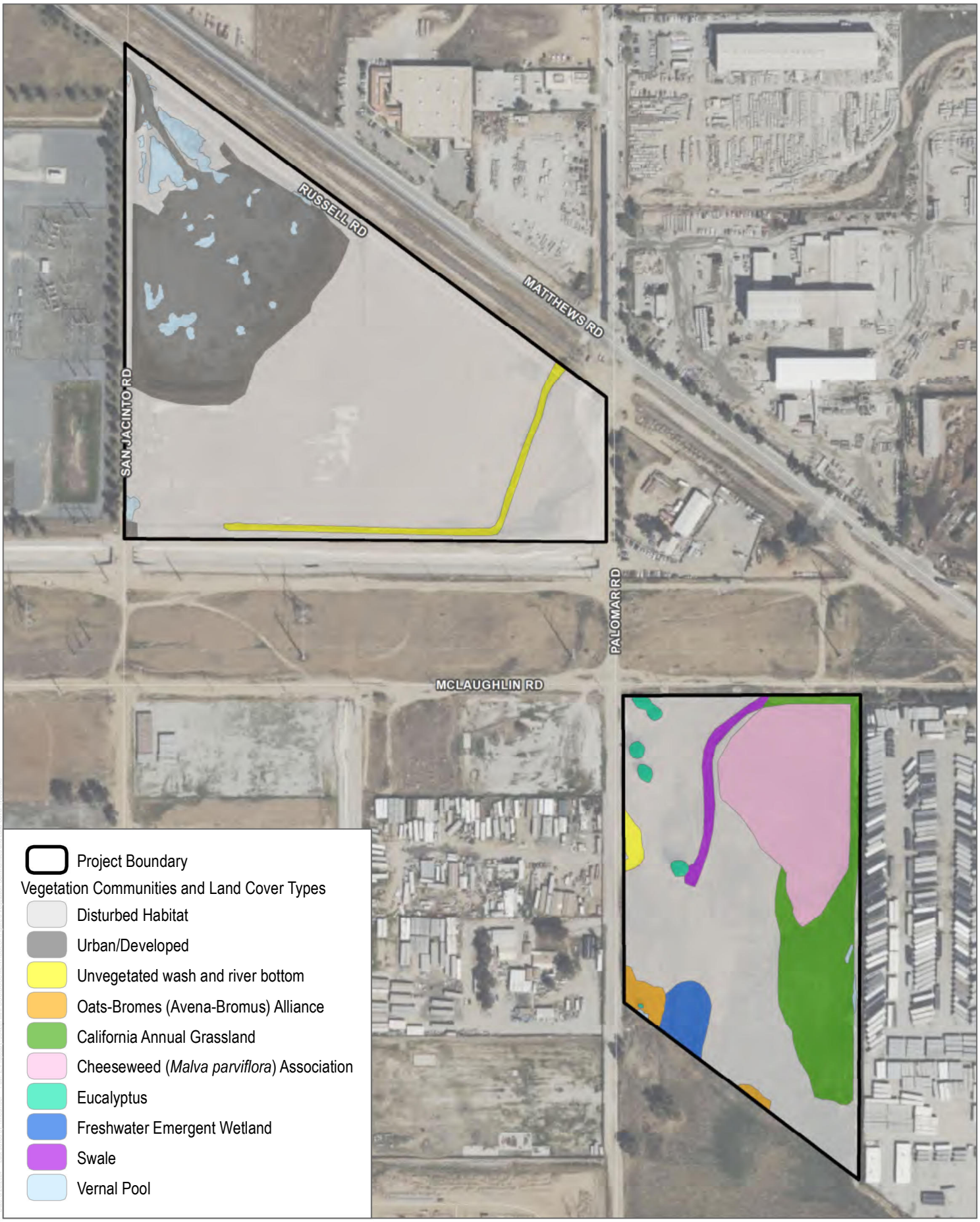

SOURCE: Bing Maps; County of Riverside 2022

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FIGURE 3

Vegetation Communities and Land Cover Types

Double Butte Battery Energy Storage Project

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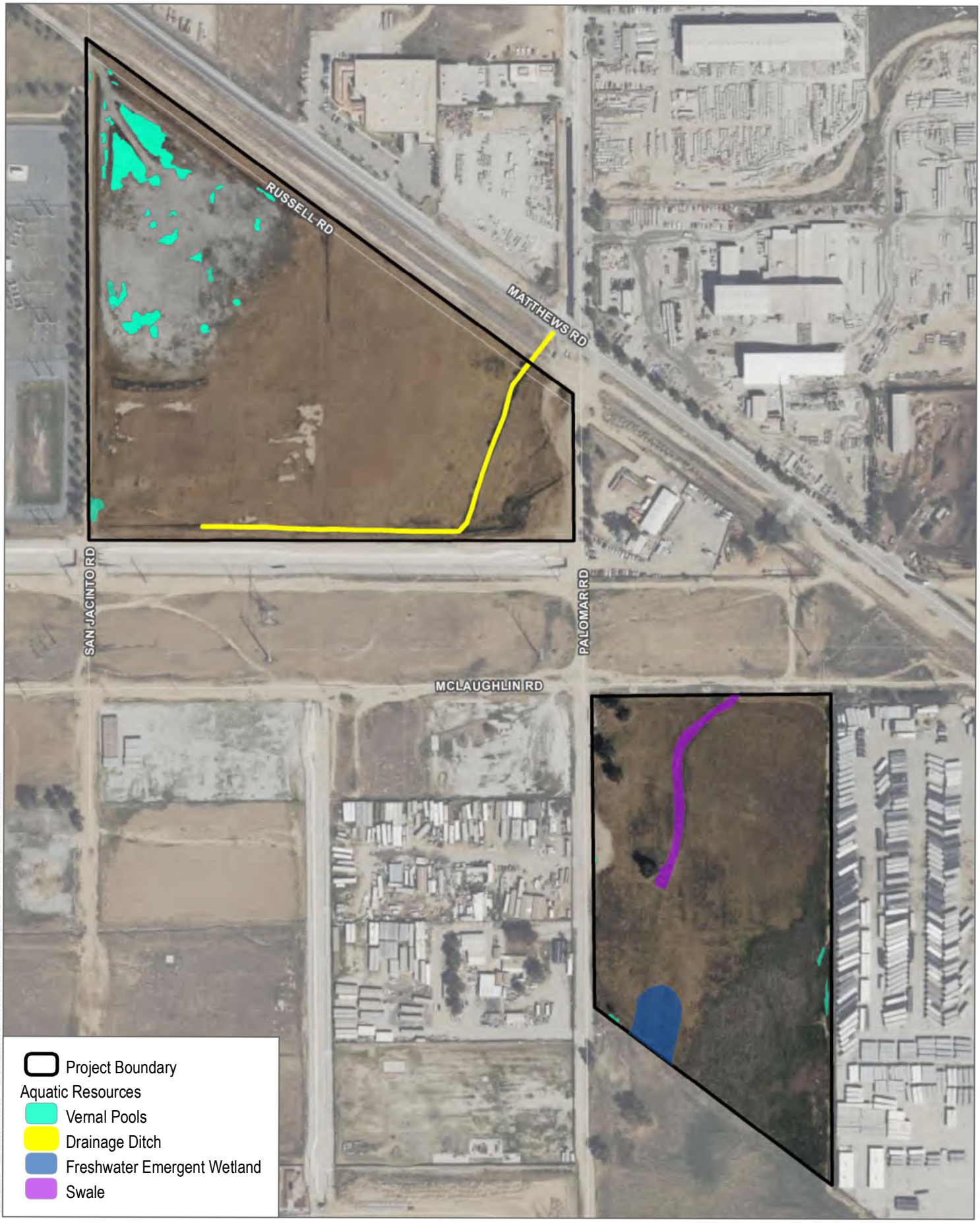

SOURCE: Bing Maps; Riverside County 2023

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FIGURE 4

MSHCP Section 6.1.2 Riparian Riverine Resources

Double Butte Battery Energy Storage Project

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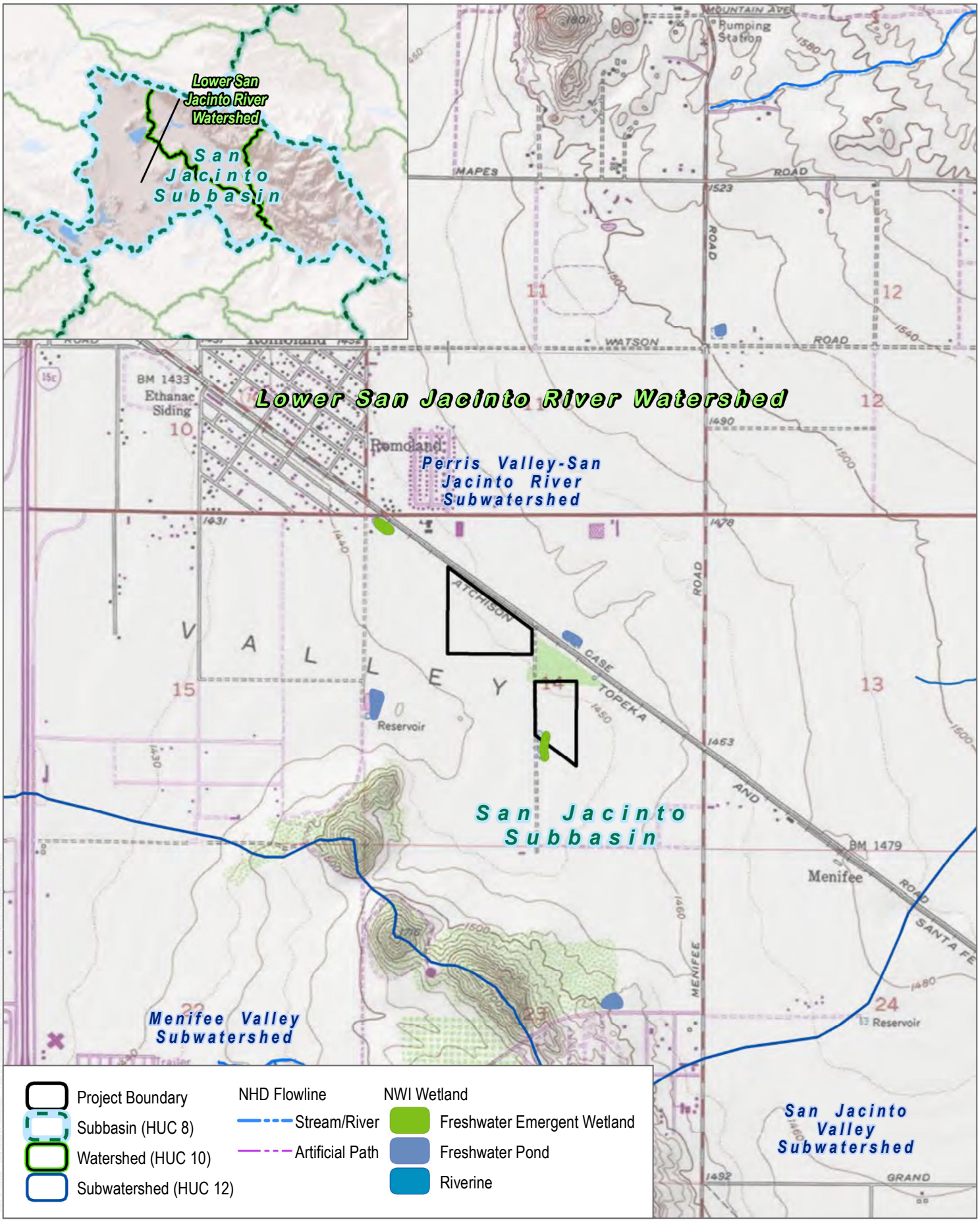

SOURCE: USA Topo; NWI 2022; NHD 2022; USGS WBD 2022

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FIGURE 5

Hydrologic Setting

Double Butte Battery Energy Storage Project

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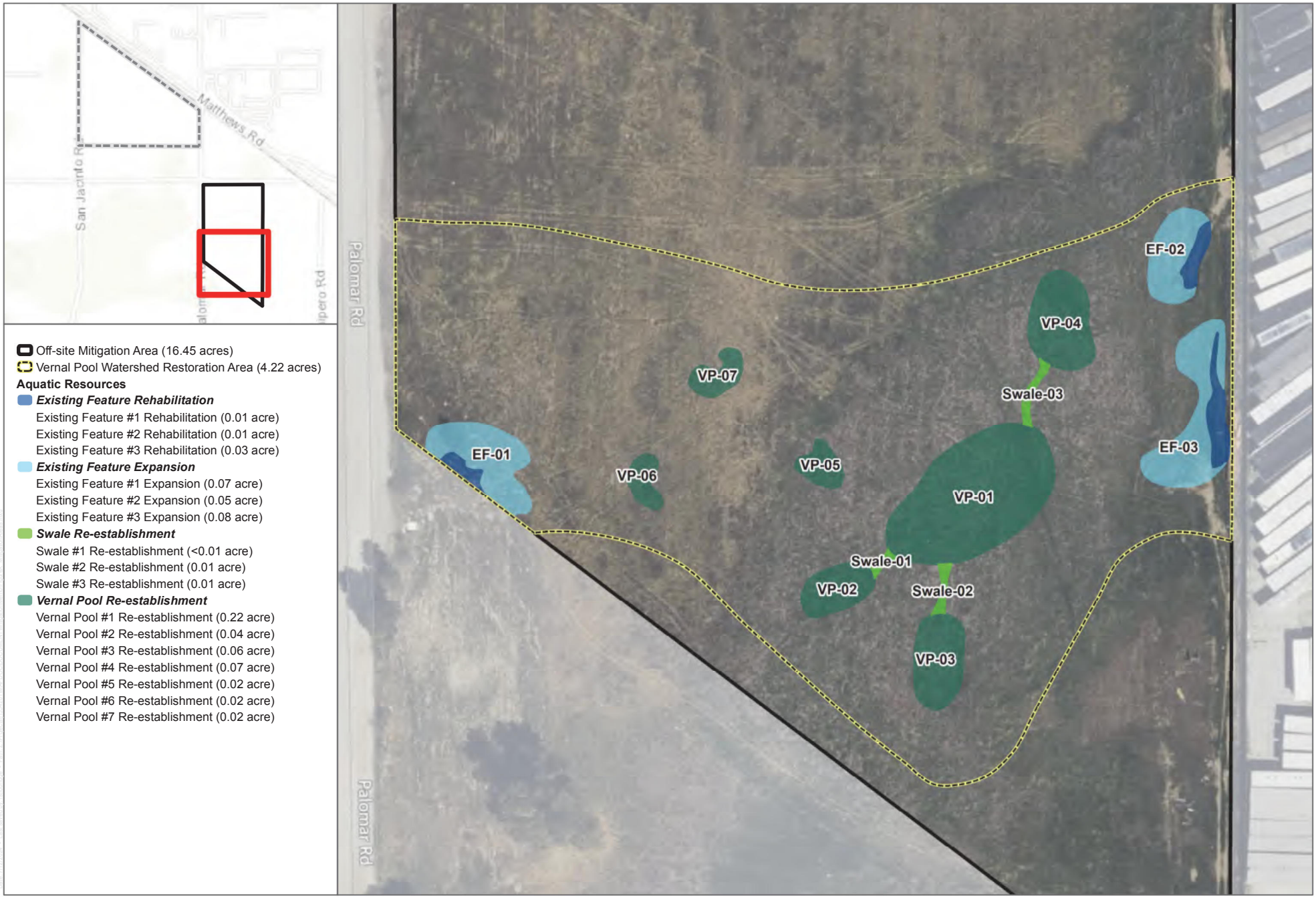

Off-site Mitigation Area (16.45 acres)
Vernal Pool Watershed Restoration Area (4.22 acres)

Aquatic Resources

Existing Feature Rehabilitation
- Existing Feature #1 Rehabilitation (0.01 acre)
- Existing Feature #2 Rehabilitation (0.01 acre)
- Existing Feature #3 Rehabilitation (0.03 acre)

Existing Feature Expansion
- Existing Feature #1 Expansion (0.07 acre)
- Existing Feature #2 Expansion (0.05 acre)
- Existing Feature #3 Expansion (0.08 acre)

Swale Re-establishment
- Swale #1 Re-establishment (<0.01 acre)
- Swale #2 Re-establishment (0.01 acre)
- Swale #3 Re-establishment (0.01 acre)

Vernal Pool Re-establishment
- Vernal Pool #1 Re-establishment (0.22 acre)
- Vernal Pool #2 Re-establishment (0.04 acre)
- Vernal Pool #3 Re-establishment (0.06 acre)
- Vernal Pool #4 Re-establishment (0.07 acre)
- Vernal Pool #5 Re-establishment (0.02 acre)
- Vernal Pool #6 Re-establishment (0.02 acre)
- Vernal Pool #7 Re-establishment (0.02 acre)

SOURCE: Bing Maps 2023

DUDEK

0 50 100 Feet

Conceptual Mitigation Area Map

Double Butte City of Menifee

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Appendix A

Aquatic Resources Jurisdictional Delineation Report

DUDEK
2280 HISTORIC DECATUR ROAD, SUITE 200
SAN DIEGO, CALIFORNIA 92106
T 619.591.1370 F 619.591.1399

December 20, 2022

Adam Furman
Senior Manager, Permitting
AES Clean Energy

Subject: Aquatic Resources Jurisdictional Delineation Report for the Double Butte Battery Energy Storage System, Riverside County, California

Dear Adam Furman:

This technical report presents the findings of a jurisdictional delineation of aquatic resources conducted by Dudek for the proposed Double Butte Battery Energy Storage System (BESS) Project (project), located near the City of Menifee in Riverside County, California (all figures are provided in Attachment A). The purpose of this investigation was to evaluate the presence and extent of aquatic resources that may be subject to the jurisdiction of the U.S. Army Corps of Engineers (USACE), Regional Water Quality Control Board (RWQCB), and/or California Department of Fish and Wildlife (CDFW). The investigation included an analysis of aquatic resources within the privately owned 500-megawatt BESS project site totaling approximately 27.1 acres (study area).

This report was prepared in accordance with the Corps Wetlands Delineation Manual (USACE 1987), Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0) (USACE 2008a), and A Field Guide to the Identification of the Ordinary High-Water Mark (OHWM) in the Arid West Region of the United States (USACE 2008b). The information herein is intended to identify and describe aquatic resources potentially regulated by USACE under Section 404 of the federal Clean Water Act, RWQCB under Section 401 of the federal Clean Water Act and the Porter-Cologne Water Quality Control Act, and CDFW per California Fish and Game Code Section 1600.

1 Study Area Location and Description

The study area for the proposed battery storage facility is a disturbed infill lot that has been heavily plowed in many areas. The project area is comprised of bar eground, disturbed areas, and areas where fill was previously discarded. This landcover type is considered disturbed and occurs within Sun City/Menifee, Riverside County, California. The study area is located on Assessor Parcel Numbers 331-119-0017, 331-119-0060, 331-119-0011, 331-119-0047, 331-119-0010, 331-119-0056, and 331-119-0014. The battery storage facility will interconnect to the Southern California Edison Valley Substation.

The study area occurs at an elevation that ranges from 1,440 to 1,456 feet above mean sea level and is located within Section 14 of Township 5 South, Range 3 West of the U.S. Geological Survey (USGS) 7.5-minute Romoland, California topographic quadrangle (Figure 1, Project Location, in Attachment A). The project site is located at 28352–28392 Mathews Road. The project site is south of Mathews Road, east of San Jacinto Road, west of Palomar Road, and north of McLaughlin Road within the city of Sun City/Menifee. The site is accessible from the intersection of Mathews Road and Palomar Road.

2 Methods

Data regarding aquatic resources present within the study area were obtained through a review of pertinent literature and field assessments. Both are described in detail below.

2.1 Literature Review

Prior to conducting field reviews for jurisdictional aquatic resources on site, Dudek reviewed aerial maps depicting the property boundary of the survey area. Dudek conducted an extensive desktop review of the survey area, which included historical land use, local and regional climatic data, and aerial photography (including historical aerials) with topographic configurations and vegetative signatures occurring within the survey area. The information was evaluated by consulting the following available resources:

- USGS 7.5-minute quadrangle map (and surrounding quads) (USGS 1975)
- Historical aerials
- The web-based National Wetlands Inventory Wetlands Mapper (NWI) (USFWS 2022)
- The web-based National Hydrography Dataset (USGS 2022)
- The web-based Web Soil Survey (USDA 2022a)
- The latest and available state and federal regulatory definitions, guidance document, and delineation manuals for state and federally regulated waters (including wetlands)

2.2 Aquatic Resources Field Delineation

Dudek senior biologists and wetland scientists Callie Amoaku and Erin Bergman performed a formal (routine) jurisdictional delineation within the study area on November 11, 2022, to determine potential jurisdictional resources under Section 404/401 of the Clean Water Act and Sections 1600–1616 of the California Fish and Game Code, and the Porter-Cologne Water Quality Control Act. Current USACE delineation procedures and guidance were used to identify and delineate any wetlands and/or waters of the United States potentially subject to USACE and RWQCB jurisdiction (USACE 1987, 2008a, 2008b; 2018; Lichvar and McColley 2008; Curtis and Lichvar 2010). Likewise, current CDFW procedures and guidance were used to identify and delineate any streambeds, rivers, or associated riparian habitat potentially subject to CDFW jurisdiction.

For potential wetland areas, data on vegetation, hydrology, and soils were collected on standardized wetland delineation data forms in representative locations to assess the potential for hydric soils, hydrophytic vegetation, and hydrology (Attachment B, Jurisdictional Delineation Forms). The wetland indicator status was assigned to each plant species using the Wetland Plant List (USACE 2020), as shown in Table 1 below. Dominant plant species encountered within the study area were identified to the lowest taxonomic level needed to determine wetland plant indicator status.

Table 1. Summary of Wetland Indicator Status

Category	Probability
Obligate Wetland (OBL)	Almost always occur in wetlands (estimated probability of >99%)
Facultative Wetland (FACW)	Usually occur in wetlands (estimated probability of 67% to 99%)
Facultative (FAC)	Equally likely to occur in wetlands/non-wetlands (estimated probability of 34% to 66%
Facultative Upland (FACU)	Usually occur in non-wetlands (estimated probability of 67% to 99%
Obligate Upland (UPL)	Almost always occur in non-wetlands (estimated probability of >99%)
No Indicator (NI)	--

Non-wetland waters of the United States are delineated based on the limits of an Ordinary High Water Mark (OHWM). During the jurisdictional delineation, drainage features were examined for evidence of an OHWM, saturation, presence of surface water, wetland vegetation, and nexus to a traditional navigable water of the United States. If any of these criteria were met, transects were run to determine the extent of each regulatory agency's jurisdiction.

Features were mapped in the field based on the extent of their indicators. Sample points were collected in the field using an aerial photograph and topographic map of the study area, a Trimble R1 GNSS Receiver with sub-meter accuracy, and ArcGIS Collector app for iOS. A Dudek geographic information system (GIS) technician digitized the jurisdictional extents and GPS data into a project-specific GIS using ArcGIS software.

3 Results

Dudek used the methods described above to determine the presence or absence of USACE, RWQCB, and CDFW jurisdictions within the study area. A swale and potential for wetlands and vernal areas were investigated within the study area. The determination of aquatic resources within the study area was supported by information obtained from the USGS topographic map, Web Soil Survey, USFWS, NWI, National Hydrography Dataset, and field assessments. Information obtained from each source is described below.

3.1 Landscape Setting

3.1.1 USGS Topographic Watershed Map Review

The USGS 7.5-minute Romoland, California, topographic maps (USGS 2015) were reviewed to identify natural and human-made features occurring within the vicinity of the study area. Information obtained from the maps included contour lines, streets, rivers, creeks, lakes, aqueducts, and reservoirs. The Romoland topographic map was based on National Agriculture Imagery Program imagery from 2012 and National Elevation Dataset contours from 1999.

The study area occurs within the Perris Valley San Jacinto River (Hydrologic Unit Code (HUC) 180702020306) of the Lower San Jacinto River watershed (HUC 1807020203) in the San Jacinto subbasin (HUC 18070202) (Data Basin 2019) (Figure 2, Hydrologic Resources, in Attachment A). Sources of hydrology in the study area include annual precipitation and runoff from surrounding areas.

3.1.2 Soil Survey Review

The U.S. Department of Agriculture, Natural Resources Conservation Service's Web Soil Survey for Riverside, California, was consulted, and four soil types were identified: Exeter sandy loam, 2% to 8% slopes, eroded (EnC2); Greenfield sandy loam, 2% to 8% slopes, eroded (GyC2); Monserate sandy loam, 0% to 5% percent slopes (MmB); and Exeter sandy loam, deep, 2% to 8% slopes, eroded (EpC2) (USDA 2022a). These soil types are listed as non-hydric soils (USDA 2022b).

3.1.3 National Wetlands Inventory Review

A review of the NWI dataset revealed no mapped wetlands within the project site or near the edges of the project site. The NWI dataset is based on coarse aerial mapping and may not capture aquatic resources that are obscured by tree canopy or are otherwise not visible in aerial photography.

3.1.4 Climate and Rainfall Data Review

The study area is located in the South Coast geographic subdivision of the California Floristic Province (Jepson Flora Project 2022). Average annual temperatures in the study area region range from 41°F to 92°F, and the average annual precipitation is 12 inches (NOAA 2022).

3.2 Aquatic Resources Field Delineation

3.2.1 History

A review of historical imagery shows that the proposed project site was historically upland habitat (grassland) from 1985–2002 (Historic Aerials 2022; Google Earth 2002). After 2002, the site became disturbed and actively graded within most of the site. Other areas were more heavily disturbed. For example, in 2007, a large portion of the western side of the site had been developed and utilized as a storage facility with roads. In 2009, this storage facility was abandoned.

Between 2002 and 2016, approximately 25% of the site (the northwestern corner) consisted of fill. Aerial images show sand fill, gravel fill, and large rock fill consistently changing at the site from year to year. Therefore, the site was actively utilized as a fill site. In 2016, fill was removed from the northwestern portion of the site leaving behind heavily compacted fill soils and uneven ground. In 2016, likely due to fill creating uneven ground a very small isolated ponded area formed on this compacted soil. Another potential scenario is that minimal ponding was already occurring that could not be observed through aerial photography. Ponded water is observed within this northwestern section in 2016, 2018, and 2019 on aerial imagery (Google Earth 2022).

On the eastern side of the site is a swale that drains into the site and abates into upland. Historical imagery shows the swale changing in length over time, likely based on water runoff from the road. From 2003–2012, the length of the swale ranged from 0.12 miles to 0.17 miles. From 2012–2016, the length ranged from 0.05 miles to 0.10 miles. From 2016–2022, the length ranged from 0.20 miles to 0.29 miles. Therefore, road runoff changed over time determining the length of the swale.

3.2.2 Aquatic Resources - Results

Wetland Sampling Points -Wetland sampling points were taken at two locations within the proposed site where minimal hydrophytic vegetation was present (see Figure 3, Aquatic Resources, in Attachment A). Both areas are within the northwestern corner of the site. No NWI or National Hydrography Dataset data was identified on site.

Data stations 1a and 1b. The first set of data stations were within a small, ponded area that was within a historical fill site. A data station could only be dug approximately 3 inches into fill before hitting "concrete like" material. No hydrophytic vegetation or hydrophytic soils were present at the edge of the small, ponded area. One caveat is that because the small, ponded area was full of water at the time of the jurisdictional delineation, potential vegetation could not be observed within the small, ponded area. Vegetation can only be observed after the pool is dry during spring. Therefore, a vegetation study when the pool is dry would determine if the small, ponded area could be considered an isolated vernal area or vernal pool feature. An isolated vernal area or vernal pool would be considered a water of the state (RWQCB and CDFW). It has been noted that brachiopods are present within the small, ponded area. Since the area was previously used as a fill site, the likelihood of a potential isolated vernal area or vernal pool is low.

Data stations 2a and 2b. The next set of data stations were dug in another historical fill site near some hydrophytic vegetation containing mulefat (*Baccharis salicifolia*). The soils consisted of fill materials including gravel, and no hydrology was present. This area did not have hydric soils, enough hydric vegetation, or hydrology; therefore, there are no wetlands within this study area. Attachment B contains the wetland data forms completed during the aquatic field delineation, which are also summarized in Section 3.2.3.

Figure 3, Aquatic Resources, in Attachment A illustrates the location and extent of feature 1 within the study area. A description of feature 1 is provided below, and representative photographs of this resource is provided in Attachment C.

Feature 1 Swale. The swale conveys flows from road run-off but does not demonstrate an OHWM or a defined bed and bank. Based upon the field site visit, aerial imagery, and the elevation profile from Google Earth, runoff from the road conveys water into a storm drain and past the storm drain into the swale. The swale eventually abates into upland. The swale totals approximately 0.11 acres on site. No water or soil saturation was present within the swale during the field site visit. The swale does not support any riparian or wetland vegetation. Most of the vegetation within the swale consists of tumbleweed (*Salsola tragus*). This feature is not considered a jurisdictional water of the United States as it does not contain an OHWM. The swale could be considered jurisdictional via the state (RWQCB, CDFW).

3.2.3 Data Summary

Results from observable field indicators from four wetland data stations based upon two potential wetland aquatic resources occur within the study area (see Figure 3 in Attachment A). The data collected at each data point are included in Attachment B and summarized in Table 2 below.

Table 2. Wetland Data Station Summary

Data Point	Wetland Determination Field Indicators			Location		Preliminary Determination
	Vegetation	Soils	Hydrology	Latitude	Longitude	
1a	No	No	Yes	33.7399941	-117.1670104	Non-wetland
1b	No	No	No	33.7407009	-117.1647368	Non-wetland
2a	No	No	No	33.7401640	-117.1668588	Non-wetland
2b	No	No	No	33.7399828	117.1670065	Non-wetland

3.2.4 Preliminary Jurisdictional Determination

As described in Section 3.2.2, one swale feature that doesn't have an OHWM or a defined bed and bank occurs on the eastern side of the site. This swale is considered a water of the state (RWQCB and CDFW) and is not considered a federal water due to the lack of a bed and bank, lack of OHWM, and lack of a nexus to a traditional navigable water.

Based on this information, the feature on site is likely not regulated by USACE (federal). However, the swale on site would likely be regulated by the state (RWQCB and CDFW). It should be noted that the results of the delineation have not been verified by the regulatory agencies. The results of this delineation are considered preliminary until each of these agencies can review the study area.

One potential small, ponded area should be studied during the dry season in spring to determine the status of the small, ponded area. If no vernal pool plant species or wetland indicator species are present, no further studies will be required. If this is the case, a swale would be the only jurisdictional feature on site.

3.3 Sensitive Plants and Wildlife

Incidental sensitive plants were observed during the aquatic resource delineation. San Diego tarplant (*Deinandra paniculata*) (California Native Plant Society sensitive species list 4.2) was observed in a variety of locations within the northwestern corner of the site. A rare plant survey report can further define these findings along with the spring study of the small, ponded area.

4 Conclusion

The purpose of this report is to identify and delineate all jurisdictional aquatic resources regulated by the USACE, RWQCB, and CDFW within the study area. This report represents existing conditions only and does not address any activities proposed within the study area. One swale regulated by the state (RWQCB and CDFW) is present on site. In addition, one small, ponded area should be reviewed during spring to determine if any wetland obligate or vernal pool plant species are present. It should be noted that the results of the delineation have not been verified by the regulatory agencies. The results of this delineation are considered preliminary until each of these agencies can review the study area.

If you have any questions regarding the contents of this report, please contact me by email ebergman@dudek.com or by phone at 760.274.3927.

Sincerely,

Erin Bergman
Biologist

Att.: *A – Figures 1–3*
B –Jurisdictional Delineation Forms
C – Representative Photographs
cc: *Keith Carwana, Dudek*
Callie Ford, Dudek
Brock Ortega, Dudek

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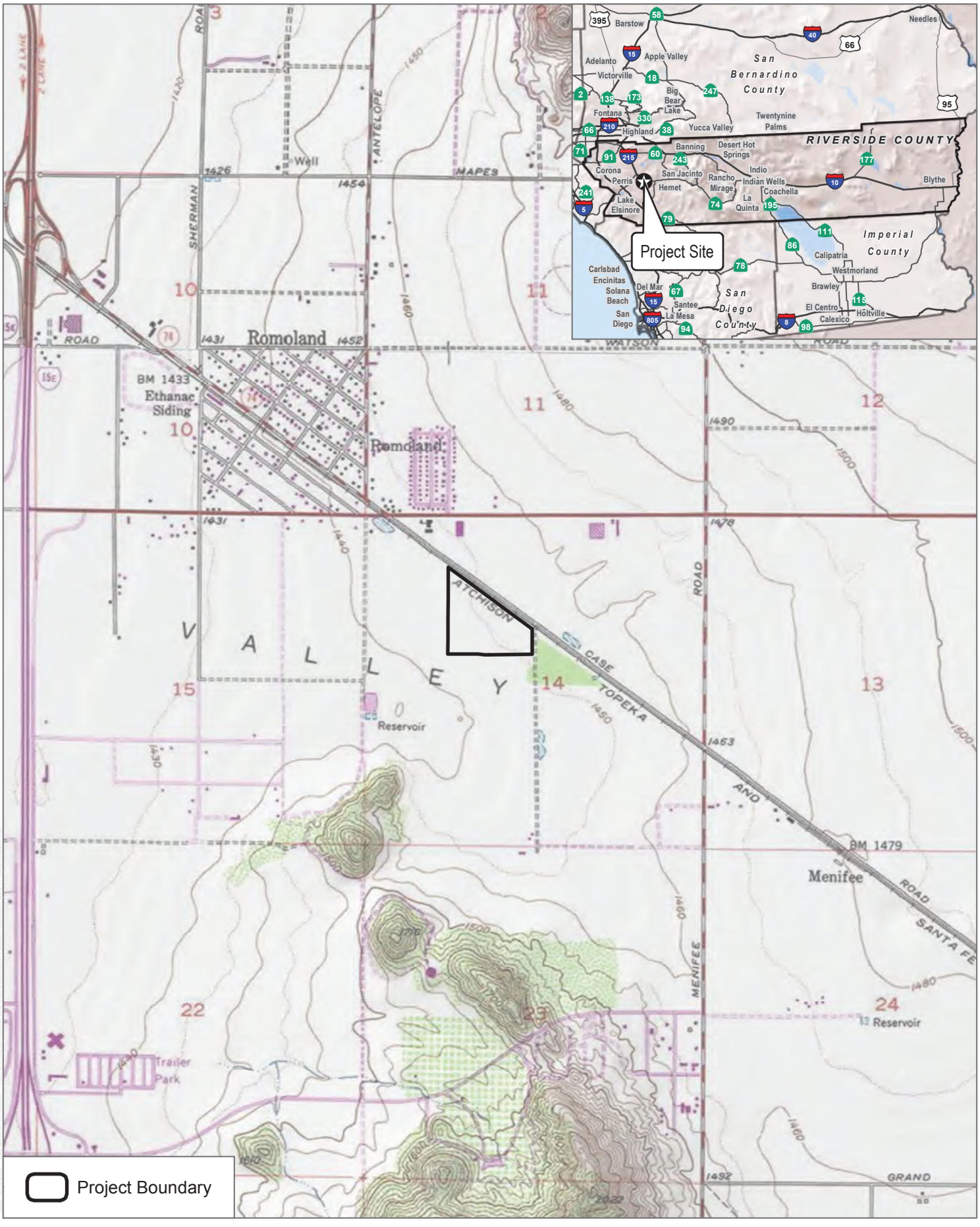
Attachment A

Figures 1–3



SOURCE: USGS 7.5-Minute Series Romoland Quadrangle
Township 5S; Range 3W; Section 14

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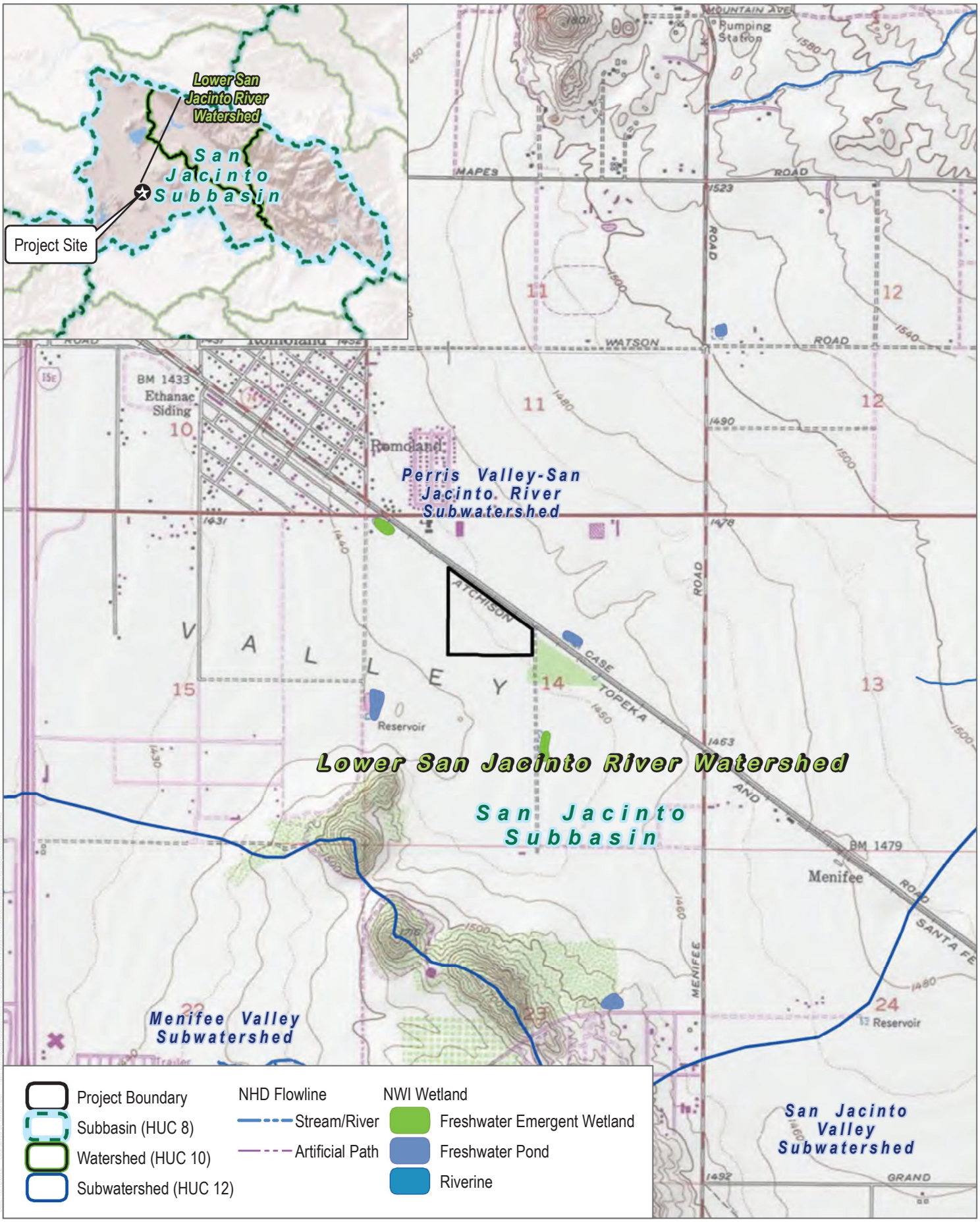
0 1,000 2,000 Feet

FIGURE 1

Project Location

Double Butte Project



SOURCE: USA Topo; NWI 2022; NHD 2022; USGS WBD 2022

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0 1,000 2,000 Feet

FIGURE 2

Hydrologic Resouces

Double Butte Project

SOURCE: Bing Maps; Riverside County 202

DUDEK

0 100 200 Feet

FIGURE 3

Aquatic Resources

Double Butte Project

Attachment B

Jurisdictional Delineation Forms

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Double Butte City/County: Menifee/Riverside Sampling Date: 2022-11-11

Applicant/Owner: State: California Sampling Point: WSP 01a

Investigator(s): Callie Amoaku, Erin Bergman Section, Township, Range:

Landform (hillslope, terrace, etc.): Upland, Depression Local relief (concave, convex, none): Slope (%): 2

Subregion (LRR): C 19 Lat: 33.7399941 Long: -117.1670104 Datum: WGS 84

Soil Map Unit Name: Exeter sandy loam, 2 to 8 percent slopes, eroded (EnC2) NWI classification: None

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

Are Vegetation ✓, Soil ✓, or Hydrology ✓ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ✓

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

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

Hydrophytic Vegetation Present?	Yes ____	No ✓	**Is the Sampled Area within a Wetland?** Yes ____ No ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks:

The soil is fill material and the depression is in an area regularly graded and maintained. Rains occurred on 11/8/22.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 5 ft r)			
1. Tamarix sp.	5	✓	FAC
2.			
3.			
4.			
5.			
	5% = Total Cover		
Herb Stratum (Plot size: 5 ft r)			
1. Ambrosia acanthocarpa	5	✓	UPL
2. Heliotropium curassavicum	5	✓	FACU
3. Deinandra paniculata	1		FACU
4.			
5.			
6.			
7.			
8.			
	11% = Total Cover		
Woody Vine Stratum (Plot size: 30 ft r)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

Dominance Test worksheet:

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

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	5	x 3 =	15
FACU species	6	x 4 =	24
UPL species	5	x 5 =	25
Column Totals:	16 (A)		64 (B)

Prevalence Index = B/A = 4.0

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes ____ No ✓

Remarks:

SOIL

Sampling Point: WSP 01a

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 3	5Y 4/2	100					Sandy Loam	Fill
-								
-								
-								
-								
-								
-								
-								

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

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

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

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

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

Restrictive Layer (if present):

Type: Fill material

Depth (inches): 3

Hydric Soil Present? Yes _____ No ✓

Remarks:

Unable to dig due to hard fill/rocky material

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (2 or more required)

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

Field Observations:

Surface Water Present? Yes ✓ No _____ Depth (inches): 1

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ✓ No _____ Depth (inches): 0

Wetland Hydrology Present? Yes ✓ No _____

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

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Double Butte City/County: Menifee/Riverside Sampling Date: 2022-11-11

Applicant/Owner: State: California Sampling Point: WSP 01b

Investigator(s): Callie Amoaku, Erin Bergman Section, Township, Range:

Landform (hillslope, terrace, etc.): Upland, Depression Local relief (concave, convex, none): Slope (%): 1

Subregion (LRR): C 19 Lat: 33.7407009 Long: -117.1647368 Datum: WGS 84

Soil Map Unit Name: Exeter sandy loam, 2 to 8 percent slopes, eroded (EnC2) NWI classification: None

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

Are Vegetation ✓, Soil ✓, or Hydrology ✓ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ✓

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

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

Hydrophytic Vegetation Present?	Yes ____	No ✓	**Is the Sampled Area within a Wetland?** Yes ____ No ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ____	No ✓	

Remarks:

Fill material

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 5 ft r)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 5 ft r)			
1. Ambrosia acanthocarpa	5	✓	UPL
2. Bromus rubens	5	✓	UPL
3. Heliotropium curassavicum	5	✓	FACU
4. Salsola tragus	1		FACU
5.			
6.			
7.			
8.			
	16% = Total Cover		
Woody Vine Stratum (Plot size: 30 ft r)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	6	x 4 =	24
UPL species	10	x 5 =	50
Column Totals:	16 (A)		74 (B)

Prevalence Index = B/A = 4.6

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes ____ No ✓

Remarks:

SOIL

Sampling Point: WSP 01b

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 4	5YR 2.5/2	100					Loamy Sand	Fill
-								
-								
-								
-								
-								
-								

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

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

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

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

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

Restrictive Layer (if present):

Type: _____
Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (2 or more required)

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

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____
Water Table Present? Yes _____ No ✓ Depth (inches): _____
Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✓

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

Remarks:

None

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Double Butte City/County: Menifee/Riverside Sampling Date: 2022-11-11

Applicant/Owner: State: California Sampling Point: WSP 02a

Investigator(s): Callie Amoaku, Erin Bergman Section, Township, Range:

Landform (hillslope, terrace, etc.): Upland, Depression Local relief (concave, convex, none): Slope (%): 1

Subregion (LRR): C 19 Lat: 33.7401640 Long: -117.1668588 Datum: WGS 84

Soil Map Unit Name: Exeter sandy loam, 2 to 8 percent slopes, eroded (EnC2) NWI classification: None

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

Are Vegetation ✓, Soil ✓, or Hydrology ✓ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ✓

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

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

Hydrophytic Vegetation Present?	Yes ____	No ✓	**Is the Sampled Area within a Wetland?** Yes ____ No ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ____	No ✓	

Remarks:

The soil is fill material and the depression is in an area regularly graded and maintained. Rains occurred on 11/8/22. No water at sample point.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 5 ft r)			
1. Baccharis salicifolia	7	✓	FAC
2.			
3.			
4.			
5.			
	7% = Total Cover		
Herb Stratum (Plot size: 5 ft r)			
1. Ambrosia acanthocarpa	2	✓	UPL
2. Erigeron bonariensis	1	✓	FACU
3. Helianthus annuus	1	✓	FACU
4.			
5.			
6.			
7.			
8.			
	4% = Total Cover		
Woody Vine Stratum (Plot size: 30 ft r)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

Dominance Test worksheet:

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

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 25 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	7	x 3 =	21
FACU species	2	x 4 =	8
UPL species	2	x 5 =	10
Column Totals:	11 (A)		39 (B)

Prevalence Index = B/A = 3.5

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes ____ No ✓

Remarks:

SOIL

Sampling Point: WSP 02a

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 5	7.5YR 4/4	100					Sandy Loam	
-								
-								
-								
-								
-								
-								
-								

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

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

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

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

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

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (2 or more required)

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

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✓

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

Remarks:

None

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Double Butte City/County: Menifee/Riverside Sampling Date: 2022-11-11

Applicant/Owner: State: California Sampling Point: WSP 02b

Investigator(s): Callie Amoaku, Erin Bergman Section, Township, Range:

Landform (hillslope, terrace, etc.): Upland, Depression Local relief (concave, convex, none): Slope (%): 1

Subregion (LRR): C 19 Lat: 33.7399828 Long: -117.1670065 Datum: WGS 84

Soil Map Unit Name: Exeter sandy loam, 2 to 8 percent slopes, eroded (EnC2) NWI classification: None

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

Are Vegetation ✓, Soil ✓, or Hydrology ✓ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ✓

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

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

Hydrophytic Vegetation Present?	Yes ____	No ✓	**Is the Sampled Area within a Wetland?** Yes ____ No ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ____	No ✓	

Remarks:

The soil is fill material and the depression is in an area regularly graded and maintained. Rains occurred on 11/8/22. No water at sample point.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 5 ft r)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 5 ft r)			
1. Helianthus annuus	20	✓	FACU
2. Ambrosia acanthocarpa	2		
3. Deinandra paniculata	2		FACU
4.			
5.			
6.			
7.			
8.			
	24% = Total Cover		
Woody Vine Stratum (Plot size: 30 ft r)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	22	x 4 =	88
UPL species	0	x 5 =	0
Column Totals:	22 (A)		88 (B)

Prevalence Index = B/A = 4.0

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes ____ No ✓

Remarks:

SOIL

Sampling Point: WSP 02b

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 4	7.5YR 4/4	100						Gravel
-								
-								
-								
-								
-								
-								
-								

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

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

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

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

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

Restrictive Layer (if present):

Type: Gravel

Depth (inches): 4

Hydric Soil Present? Yes _____ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (2 or more required)

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

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✓

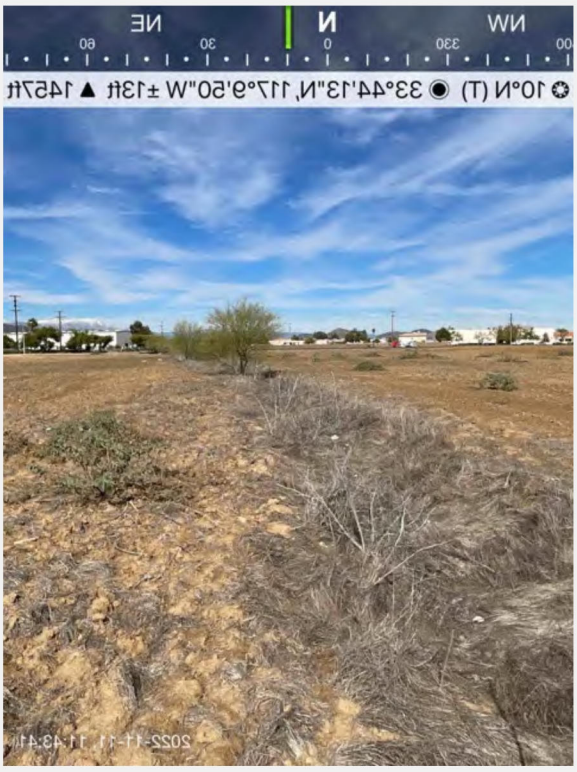
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

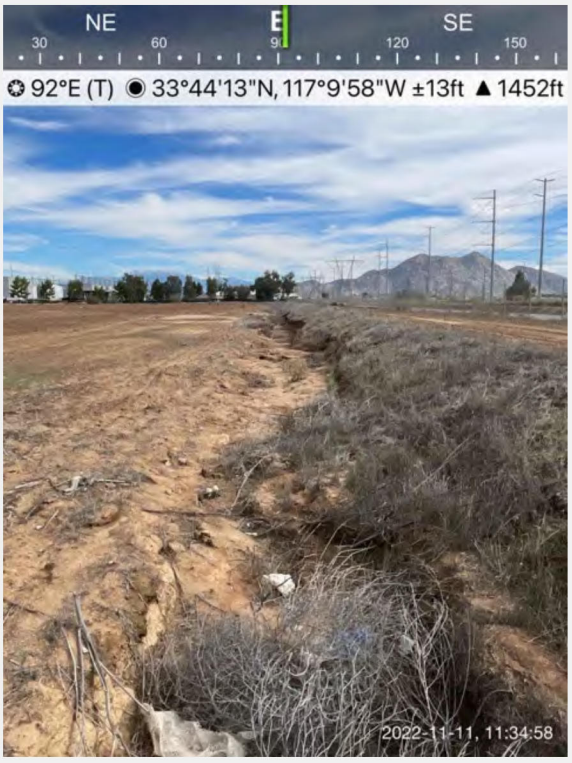
None

Attachment C

Representative Photographs



Swale on site facing north within central portion of the swale. Photo taken November 11, 2022.



Swale facing east at the lower portion of the swale. Photo taken November 11, 2022.

Area to be reviewed in spring. Photo taken November 11, 2022.

Data station 1a: Area holding water to be surveyed in spring. Photo taken November 11, 2022.

Data Station 2a: Soils consist of fill. Photo taken November 11, 2022.

Data Station 2b: Soils consist of fill. Photo taken November 11, 2022.

Appendix B

Biological Resources Letter Report and MSHCP Consistency Analysis

DUDEK

November 22, 2023 15342

Adam Furman
Senior Manager, Permitting
AES Clean Energy

Subject: Biological Resources Letter Report and MSHCP Consistency Analysis for the Double Butte Battery Energy Storage System Project, City of Menifee, Riverside County, California

Dear Adam Furman:

This Biological Resources Letter Report and Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP) Consistency analysis describes the existing biological conditions of the proposed Double Butte Project (project) site. The proposed project is analyzed in the context of the California Environmental Quality Act (CEQA) and the MSHCP. This report is intended to describe the existing conditions of the approximate 27.2-acre project site. This report describes the general biological reconnaissance survey methods and results, discusses special-status biological resources present or potentially present on site, and analyzes potential impacts in terms of biological significance under both CEQA and the MSHCP. The report also includes avoidance, minimization, and mitigation measures to avoid and reduce potential impacts to special-status biological resources, if necessary, along with providing an MSHCP consistency analysis including the following requirements of the MSHCP (relevant MSHCP sections are identified in parentheses):

- Riparian/riverine, vernal pool, and fairy shrimp requirements (Section 6.1.2)
- Additional survey needs and procedures (Section 6.3.2)
- Urban/wildlife interface guidelines (Section 6.1.4)

1 Introduction

1.1 Project Location and Description

The project site is located in the City of Menifee. The project site is located at 28352–28392 Mathews Road. The project site is south of Mathews Road, east of San Jacinto Road, west of Palomar Road, and north of McLaughlin Road. The site is accessible from the intersection of Mathews Road and Palomar Road (Figure 1, Project Location; all figures can be found in Attachment A, Figures). The approximate center of the project site corresponds to 33.738205 latitude and -117.165467 longitude. The project occurs at an elevation that ranges from 1,440 to 1,456 feet above mean sea level and is located within Section 14 of Township 5 South, Range 3 West of the U.S. Geological Survey (USGS) 7.5-minute Romoland, California topographic quadrangle.

The project site for the proposed battery energy storage system (BESS) facility is a disturbed infill lot that has been heavily plowed in many areas. The project area is comprised of bare ground, disturbed areas, and areas where fill was previously discarded. This landcover type is considered disturbed. The project is located on Assessor's Parcel

Numbers 331-119-0017, 331-119-0060, 331-119-0011, 331-119-0047, 331-119-0010, 331-119-0056, and 331-119-0014. The BESS facility will interconnect to the Southern California Edison Valley Substation.

This Biological Resources Letter Report and MSHCP Consistency analysis will support future impact review pursuant to the CEQA that will identify potential constraints to developing the project.

1.2 Regional Planning Context

1.2.1 Western Riverside County Multiple Species Habitat Conservation Plan

The Western Riverside County MSHCP is a comprehensive, multijurisdictional habitat conservation plan focusing on conservation of species and their associated habitats in Western Riverside County. The MSHCP is one of several large, multijurisdictional habitat-planning efforts in Southern California with the overall goal of maintaining biological and ecological diversity within a rapidly urbanizing region. The MSHCP allows Riverside County and its cities, including the City of Menifee, to better control local land-use decisions and maintain a strong economic climate in the region while addressing the requirements of the state and federal endangered species acts (County of Riverside 2003).

The MSHCP serves as a habitat conservation plan pursuant to Section 10(a)(1)(B) of the federal Endangered Species Act (16 USC 1531 et seq.), as well as a Natural Communities Conservation Plan under the Natural Community Conservation Planning Act of 2001 (Fish and Game Code, Section 2800 et seq.). The MSHCP allows the participating jurisdictions to authorize "take" of plant and wildlife species identified within the Plan Area. The U.S. Fish and Wildlife Service (USFWS) and California Department of Fish and Wildlife (CDFW) have authority to regulate the take of threatened, endangered, and rare species. Under the MSHCP, the wildlife agencies have granted "take authorization" for otherwise lawful actions, such as public and private development that may incidentally take or harm individual species or their habitat outside of the MSHCP conservation area, in exchange for the assembly and management of a coordinated MSHCP conservation area.

The project is a covered activity under the MSHCP and would receive authorization for project-related impacts to protected species. Specifically, the project is located in the MSHCP Plan Area and must comply with relevant sections of the MSHCP. The project site is not within an MSHCP Criteria Cell (Figure 2, Western Riverside County MSHCP Plan Area); therefore, no Reserve Assembly requirements would apply to the project.

The project site is not located within MSHCP Section 6.1.3 Narrow Endemic Species Survey Area and is not located within MSHCP Section 6.3.2 Additional Survey Needs and Procedures for Criteria Area Species Survey area for plants, small mammals, or amphibians. The project does not support Delhi sands or in areas that would trigger additional review for Delhi sands flower-loving fly. (*Rhaphiomidas terminates abdominalis*). However, the project is located in MSHCP Section 6.3.2, Additional Survey Needs and Procedures for Burrowing Owl. The project's compliance with the relevant sections of the MSHCP is further discussed in Section 4 of this report.

Local Development Mitigation Fee

In order to implement the goals and objectives of the Western Riverside MSHCP and to mitigate the impacts caused by new development, the MSHCP seeks to acquire and conserve certain lands that support covered species. A MSHCP Local Development Mitigation Fee is necessary to supplement the financing of the acquisition of lands

supporting species covered by the MSHCP and to pay for new development's fair share of this cost (County of Riverside 2003). The MSHCP Local Development Mitigation Fee assists in the maintenance of biological diversity and protects vegetation communities that are known to support threatened, endangered, or sensitive populations of plant and wildlife species.

1.2.2 Stephens' Kangaroo Rat Habitat Conservation Plan

The Stephens' Kangaroo Rat Habitat Conservation Plan (HCP) describes the proposed conservation, mitigation, and monitoring measures to be implemented for the preservation of the federally endangered Stephens' kangaroo rat (*Dipodomys stephensi*). The Stephens' Kangaroo Rat HCP establishes a regional system of Core Reserves throughout western Riverside County for the specific conservation of Stephens' kangaroo rat and the ecosystem upon which it depends. A standard fee, known as the Development Mitigation Fee, is charged to development projects to supplement the financing of reserve management for the Stephens' Kangaroo Rat HCP.

The project is outside of the Stephens' Kangaroo Rat HCP Core Reserve Area; however, the project is located inside the Stephens' Kangaroo Rat HCP fee area. Therefore, the project is subject to the standard fee.

2 Methods

2.1 Literature Review

For this biological resources letter report, "special-status" species are those that are:

1. Listed, proposed for listing, or candidates for listing as threatened or endangered under the federal Endangered Species Act
2. Listed or candidates for listing as threatened or endangered under the California Endangered Species Act
3. A state fully protected species
4. A CDFW Species of Special Concern
5. A species listed on the California Native Plant Society Inventory of Rare and Endangered Plants with a California Rare Plant Rank of 1B or 2B
6. Species with additional requirements as stated by the MSHCP

Other special-status biological resources considered include sensitive vegetation communities; special consideration was given to vernal pools and ephemeral ponds due to their potential to occur at this site. Special-status vegetation communities are those communities identified as high priority for inventory in the List of Vegetation Alliances and Associations (CDFW 2020) by a state rarity ranking of S1, S2, or S3.

Special-status biological resources potentially present on the project site were identified through a literature search using the following sources:

- USFWS Critical Habitat and Occurrence Data (USFWS 2023a)
- CDFW California Natural Diversity Database (CDFW 2023)

- The California Native Plant Society's (CNPS) online Inventory of Rare, Threatened, and Endangered Plants (CNPS 2023a)
- The Calflora database, which compiles observation and plant data from both private and public institutions, including the Consortium of California herbaria (Calflora 2023)
- A Natural Resources Conservation Service soil map (USDA 2023a)
- USGS 7.5-minute topographic quadrangles (USGS 2023)
- U.S. Environmental Protection Agency Watershed Assessment, Tracking and Environmental Results System (EPA 2023), which includes the National Hydrography Dataset and the National Wetland Inventory (USFWS 2023b)

Searches were completed for the following USGS quadrangles (which include the quadrangle upon which the study area is depicted [Romoland] and the eight surrounding quadrangles): Lakeview, Perris, Steele Peak, Wildomar, Murrieta, Bahelor Mountain, Lake Elsinore, and Winchester.

2.2 Field Reconnaissance

Dudek Biologists Erin Bergman and Callie Amoaku conducted a general biological survey, rare plant survey, and jurisdictional delineation of the project site on November 11, 2022, from 9:05 a.m. to 3:50 p.m. The general biological survey and rare plant survey was conducted on foot. The site was walked thoroughly to complete the resource inventory and rare plant survey. The survey was conducted when weather conditions were favorable, with partly cloudy skies, wind speeds from 0 to 3 miles per hour, and temperatures ranging from 67°F to 81°F. All native and naturalized plant species encountered within the project were identified and recorded. Vegetation communities and land covers on site were mapped directly in the field. Dudek Biologist Erin Bergman conducted a vernal pool habitat assessment and rare plant survey on May 29, 2023, from 7:30 a.m. to 9:45 a.m., to determine if the site had vernal pool plant species after pooling water had dried and to determine if any rare plants were present in spring. Ms. Bergman recorded spring floral species and incidental wildlife observed during this study. The survey was conducted when weather conditions were favorable, with clear skies, wind speeds from 0 to 5 miles per hour, and temperatures ranging from 65°F to 70°F. The methodology and results of the jurisdictional delineation are provided under a separate cover and not further discussed in this report.

Latin and common names for plant species with a California Rare Plant Rank (formerly CNPS List) follow the California Native Plant Society On-Line Inventory of Rare, Threatened, and Endangered Plants of California (CNPS 2023a). For plant species without a California Rare Plant Rank, Latin names follow the Jepson Interchange List of Currently Accepted Names of Native and Naturalized Plants of California (Jepson Flora Project 2023), and common names follow the California Natural Community list (CDFW 2023) or the U.S. Department of Agriculture Natural Resources Conservation Service Plants Database (USDA 2023b). Natural vegetation communities were mapped in the field following A Manual of California Vegetation, second edition (Sawyer et al. 2009) where feasible, with modifications to accommodate the lack of conformity of the observed communities to those of Oberbauer et al. (2008). Land cover types (i.e., areas that lack vegetation communities) were described in accordance with Draft Vegetation Communities of San Diego County (Oberbauer et al. 2008). Latin and common names of animals follow Crother (2017) for reptiles and amphibians, American Ornithological Society (AOS 2023) for birds, Wilson and Reeder (2005) for mammals, North American Butterfly Association (NABA 2016) or San Diego Natural History Museum (SDNHM 2002) for butterflies, and Moyle (2002) for fish.

Dudek used geographic information system software (ArcGIS) to map biological resources and prepare figures.

2.3 Burrowing Owl Survey Methods

To meet requirements in the MSHCP, a habitat assessment (Step I) was conducted during the November 11, 2022, visit to identify suitable habitat for burrowing owl (*Athene cunicularia*) within the project site. This assessment was conducted in accordance with the Burrowing Owl Survey Instructions for the Western Riverside Multiple Species Habitat Conservation Plan Area (RCA 2006).

The burrowing owl is a California Species of Special Concern. With a relatively wide-ranging distribution throughout the west, burrowing owl is considered a habitat generalist (Lantz et al. 2004). In California, burrowing owl is a yearlong resident of open, dry grassland and desert habitats, and in grass, forb, and open shrub stages of pinyon–juniper and ponderosa pine habitats (Zeiner et al. 1990). Preferred habitat is generally typified by short, sparse vegetation with few shrubs; level to gently sloping topography; and well-drained soils (Haug et al. 1993).

The presence of burrows is the most essential component of burrowing owl habitat, as they are required for nesting, roosting, cover, and caching prey. In California, western burrowing owl most commonly lives in burrows created by California ground squirrels. Burrowing owl may occur in human-altered landscapes such as agricultural areas, ruderal grassy fields, vacant lots, and pastures if the vegetation structure is suitable (i.e., open and sparse), useable burrows are available, and foraging habitat is close (Gervais et al. 2008). Debris piles, riprap, culverts, and pipes can also be used for nesting and roosting.

Due to the presence of suitable habitat and the requirements of the MSHCP, from April through June 2023, Biologist Michael Moon conducted a focused burrow survey (Step II-A) and focused burrowing owl surveys (Step II-B) in accordance with the Burrowing Owl Survey Instructions for the Western Riverside Multiple Species Habitat Conservation Plan Area (RCA 2006). Table 1 lists the dates and conditions of these surveys. The area surveyed on foot was limited to the project site boundary, and a 500-foot buffer was surveyed with binoculars.

The focused burrow survey consisted of pedestrian transects spaced approximately 30 meters (approximately 100 feet) apart to allow for 100% visual coverage of the project site. All burrows suitable for burrowing owl were mapped using GPS and then digitized using ArcGIS.

Michael Moon conducted a total of four focused burrowing owl surveys during the burrowing owl breeding season (March 1–August 31). The burrowing owl survey area was the entire site based on mapped marginally suitable habitat. This area totaled the entire project site, 27.2 acres. The surveys were conducted when conditions were suitable for detecting owls (i.e., no rain, no high winds [>20 mph], dense fog, or temperatures over 90°F). See Table 1 for survey information.

Table 1. Burrowing Owl Surveys

Date	Hours	Survey Type	Conditions (temperature, cloud cover, wind)
4/10/23	5:41 a.m.–8:00 a.m.	BUOW 1, Burrow Mapping	46°F–53°F, 0%–10% cc, 0–1 mph winds
5/13/23	5:46 a.m.–7:54 a.m.	BUOW 2	54°F–57°F, 0%–10% cc, 0–2 mph winds
6/04/23	5:19 a.m.–7:00 a.m.	BUOW 3	57°F–57°F, 0%–70% cc, 0–1 mph winds
6/19/23	5:00 a.m.–7:14 a.m.	BUOW 4	59°F, 100% cc, 0–1 mph winds

Notes: °F = ° Fahrenheit; BUOW = burrowing owl; cc = cloud cover; mph = miles per hour

2.4 Aquatic Resources Field Delineation

Dudek Biologists and Wetland Scientists Callie Amoaku and Erin Bergman performed a formal (routine) jurisdictional delineation within the study area on November 11, 2022, to determine potential jurisdictional resources under Section 404/401 of the Clean Water Act, Sections 1600–1616 of the California Fish and Game Code, and the Porter-Cologne Water Quality Control Act. Current U.S. Army Corps of Engineers (USACE) delineation procedures and guidance were used to identify and delineate any wetlands and/or waters of the United States potentially subject to USACE and Regional Water Quality Control Board jurisdiction (USACE 1987, 2008a, 2008b, 2010, 2018). Likewise, current CDFW procedures and guidance were used to identify and delineate any streambeds, rivers, or associated riparian habitat potentially subject to CDFW jurisdiction.

For potential wetland areas, data on vegetation, hydrology, and soils were collected on standardized wetland delineation data forms in representative locations to assess the potential for hydric soils, hydrophytic vegetation, and hydrology (Attachment B, Jurisdictional Delineation Report). The wetland indicator status was assigned to each plant species using the Wetland Plant List (USACE 2020), as shown in Table 2 below. Dominant plant species encountered within the study area were identified to the lowest taxonomic level needed to determine wetland plant indicator status.

Table 2. Summary of Wetland Indicator Status

Category	Probability
Obligate Wetland (OBL)	Almost always occur in wetlands (estimated probability of >99%)
Facultative Wetland (FACW)	Usually occur in wetlands (estimated probability of 67% to 99%)
Facultative (FAC)	Equally likely to occur in wetlands/non-wetlands (estimated probability of 34% to 66%
Facultative Upland (FACU)	Usually occur in non-wetlands (estimated probability of 67% to 99%
Obligate Upland (UPL)	Almost always occur in non-wetlands (estimated probability of >99%)
No Indicator (NI)	—

Non-wetland waters of the United States are delineated based on the limits of an Ordinary High Water Mark (OHWM). During the jurisdictional delineation, drainage features were examined for evidence of an OHWM, saturation, presence of surface water, wetland vegetation, and nexus to a traditional navigable water of the United States. If any of these criteria were met, transects were run to determine the extent of each regulatory agency's jurisdiction.

Features were mapped in the field based on the extent of their indicators. Sample points were collected in the field using an aerial photograph and topographic map of the study area, a Trimble R1 GNSS Receiver with sub-meter accuracy, and ArcGIS Collector app for iOS. A Dudek geographic information system (GIS) technician digitized the jurisdictional extents and GPS data into a project-specific GIS using ArcGIS software.

2.5 Protocol Fairy Shrimp and Other Wildlife Survey Methods

Brock Ortega conducted surveys in spring 2023; results will be provided in a separate report at a later date.

2.6 Survey Limitations

Conditions were suitable for detection of most wildlife species. Surveys were conducted during the daytime, which usually results in few observations of mammals, many of which may be active at night. However, while conducting the surveys, biologist studied the ground for tracks of mammal species.

The current survey effort provides an accurate representation of the potential for special-status species to occur on the project site. The surveys conducted to date were thorough and comprehensive, and the results of the study contained herein provide a reasonable, accurate assessment of the project site.

3 Results

3.1 Site Description

The project site is characterized as open, vacant lands, the entire site has been frequently disced, disturbed or developed. This is presumed to be for weed abatement and fire prevention. On November 11, 2022, the site looked disced, and the northwestern section had areas that were previously paved. Some of the minimally paved areas were under water. Based upon historical aerials the site has been disturbed, developed, or left fallow. In 2009, the northwestern section of the site had large piles of soil or gravel placed on site potentially as a storage site (Historical Aerials 2023). The northwestern section of the site was paved, potentially for access and placement of gravel or soil storage. The project site is surrounded by developed land to the west, east, and north. The southern boundary has a strip of fallow land but developed land continues past the narrow fallow field. Representative photographs of the project site are included in Attachment C, Site Photographs.

3.2 Soils

Five soil series are mapped within the project: Exeter sandy loam (2% to 8% slopes), eroded; Exeter sandy loam, deep (2% to 8% slopes), eroded; Greenfield sandy loan, deep, (2% to 8% slopes), eroded; Monserate sandy loam, (0% to 5% slopes); Monserate sandy loam, shallow, (5% to 15% slopes), eroded (USDA 2023a). The spatial distribution of these soils is depicted in Figure 3, Soils.

- Exeter Series consists of a moderately deep to a duripan, moderately well drained soil that is formed in alluvium mainly from granitic sources. Exeter soils are on alluvial fans and stream terraces and have slopes of 0% to 9%. Exeter soils are on hummocky, undulated to gently rolling alluvial fans and stream terraces at elevations of 20 to 700 feet. In most areas the hummocky relief has been smoothed by leveling. (USDA 2023a). This soil series dominates the most western and most eastern portions of the project site. The Exeter series is a member of the fine-loamy, mixed, superactive, thermic typic durixeralfs.
- Monserate Series consists of moderately well-drained soils to well-drained soils; slow to rapid runoff; permeability is moderately slow formed in alluvium from granitic rocks. These soils typically occur within alluvial fans and terraces (USDA 2023a). This soil series dominates the majority of the central portion of the project site. The Monserate series is a member of the fine-loamy, mixed, thermic family of typic durixeralfs.
- Greenfield Series consists of deep, well drained soils that formed in moderately coarse and coarse textured alluvium derived from granitic and mixed rock sources. The Greenfield series have slow to medium runoff and moderate to rapid permeability. Greenfield soils are on alluvial fans and terraces and have slopes of 0% to 30% (USDA 2023a). The Greenfield series occurs within the central portion of the project site.

3.3 Vegetation Communities and Land Covers

One vegetation community and three non-natural land cover types were documented within the project: sparsely vegetated playa (ephemeral annuals/vernal pool), disturbed habitat, unvegetated channel, and urban/developed. Figure 4, Biological Resources and Vegetation Mapping, illustrates the distribution of vegetation communities and land covers, and Table 3 provides a summary of each vegetation community and land cover's extent within the project site.

Table 3. Vegetation Communities and Land Covers within the Project Site

Vegetation Community/Land Cover	Acreage
Vegetation Communities	
Sparsely Vegetated Playa (Ephemeral Annuals) (CDFW) Vernal Pools, Seeps and Meadows Southern -Hardpan Vernal Pool (Gray and Bramlet 1992)	0.12
Non-natural Land Covers	
Disturbed Habitat	20.25
Urban/Developed	6.83
Total	**27.20**

Note: Acreage may not total due to rounding.

3.3.1 Sparsely Vegetated Playa (Ephemeral Annuals) Southern Hardpan Vernal Pool

As defined by Gray and Bramlet (1992) southern hardpan vernal pools are defined as having an underlying deep clay or hardpan layer often time on a mesa. Seasonal surface water is present with water for insects, amphibians, shorebirds and invertebrates. Characteristic species that occur within the vernal pools include slender woolly-marbles (*Psilocarphus tenellus*), sedges (*Eleocharis* species), hairy waterclover (*Marsilea vestita*), American pillwort (*Pilularia americana*), pigmy weed (*Crassula aquatica*), California adder's tongue (*Ophioglossum californicum*), water starwort (*Callitriche* species), American waterwort (*Elatine* species), and hyssop loosestrife (*Lythrum hyssopifolia*). The Western Riverside County MSHCP defines vernal pools as seasonal wetlands that occur in depression areas that have wetlands indicators of all three parameters (soils, vegetation, and hydrology) during the wetter portion of the growing season but normally lack wetlands indicators of hydrology and/or vegetation during the drier portion of the growing season. Obligate hydrophytes and facultative wetlands plant species are normally dominant during the wetter portion of the growing season, while upland species (annuals) may be dominant during the drier portion of the growing season.

Within the project site, the vernal pool consisted of having aquatic invertebrates and was covered in slender wooly-marbles with density of almost 90% cover. The vernal pool was monotypic with only slender woolly-marbles. A field analysis was conducted with a knife in the soils to determine if American pillwort and other species were present.

Vernal pools are considered a special-status vegetation community under CEQA even without listed species based upon the sensitivity of vernal pools to local and regional plans.

3.3.2 Disturbed Habitat

The classification of disturbed habitat is due to the predominance of bare ground, non-native plant species, and other disturbance-tolerant plant species. Oberbauer et al. (2008) describes disturbed habitat as areas that have been physically disturbed by previous human activity and are no longer recognizable as a native or naturalized vegetation association, but that continue to retain a soil substrate. Typically, vegetation, if present, is nearly exclusively composed of non-native annual plant species.

Within the study area, disturbed habitat includes areas that were previously disced or have highly damaged soil crusts and contain a mix of non-native and ruderal species including low covers of redstem stork's bill (*Erodium cicutarium*), Maltese star-thistle (*Centaurea melitensis*), and little patches of red brome (*Bromus rubens*) that have undergone recent or repetitive disturbance.

Disturbed habitat is not recognized by CDFW (2023); therefore, this non-natural land cover is not considered a special-status vegetation community under CEQA.

3.3.3 Urban/Developed

Urban/developed is defined by Oberbauer et al. (2008) as areas that have been constructed on or disturbed so severely that native vegetation is no longer supported. Urban/developed lands includes areas with permanent or semi-permanent structures, pavement or hardscape, landscaped areas, and areas with a large amount of debris or other materials.

On site, urban/developed land takes the form of historical development that previously consisted of paved road and paved lands that are degrading in sections.

Urban/developed is not recognized by CDFW (2023); therefore, this non-natural land cover is not considered a special-status vegetation community under CEQA.

3.4 Floral Diversity

A total of 30 species of native or naturalized plants, 12 native (40%) and 18 non-native (60%), were recorded within the study area. This relatively low plant diversity and high non-native percent cover reflects the study area's location in an urbanized setting. Plant species observed within the study area are listed in Attachment D, Vascular Plant Species.

3.5 Wildlife

A total of 15 native wildlife species were observed on site. A total of 7 bird species were detected within the study area, including Anna's hummingbird (*Calypte anna*), common raven (*Corvus corax*), northern mockingbird (*Mimus polyglottos*), killdeer (*Charadrius vociferus*), mallard (*Anas platyrhynchos*), yellow rumped warbler (*Setophaga coronata),* and white crowned sparrow (*Zonotrichia leucophrys*). No active bird nests were observed within the project site; however, the few shrubs onsite could provide habitat for nesting birds. One amphibian species was observed: western spadefoot (*Spea hammondii*). One reptile species was observed during the survey: western fence lizard (*Sceloporus occidentalis*). Two mammal species were detected during the survey: coyote (*Canis latrans*) and

black-tailed jackrabbit (*Lepus californicus*). One invertebrate species was observed: versatile fairy shrimp (*Branchinecta lindahli).* Wildlife species observed within the study area are listed in Attachment E, Wildlife Species.

3.6 Special-Status Plant Species

Attachment F, Special-Status Plant Species Detected or Potentially Occurring on the Project Site, lists special-status plant species that have been documented in the USGS 7.5-minute Romoland quadrangle and the eight surrounding quadrangles; Lakeview, Perris, Steele Peak, Wildomar, Murrieta, Bachelor Moountain, Lake Elsinore, and Winchester (CDFW 2023; CNPS 2023). For each species listed, a determination was made regarding the potential for the species to occur in the study area based on information gathered during the field reconnaissance, including the location of the site, habitats present, current site conditions, and past and present land use. Listed species with a potential to occur and non-listed special-status species with a moderate or higher potential to occur, or species requiring additional survey requirements under the MSHCP, are discussed herein. Those special-status plant species that occur in the region, but that are not expected, or have low potential to occur in the study area due to a lack of suitable habitat, are also included in Attachment F; however, these species are not discussed further because no significant direct or indirect impacts are expected.

Focused special-status plant surveys were conducted on the reconnaissance survey November 11, 2022, and on May 29, 2023, during the vernal pool check and rare plant survey. No federally or state-listed special-status plant species were detected during the surveys. One CNPS California Rare Plant Rank 4.2 species—San Diego tarweed (*Deinandra paniculata*)—was observed and mapped. San Diego tarweed can typically occur in disturbed and highly disturbed areas as tarplants/tarweeds are tolerant of disturbance. No federally or state-listed species have high or moderate potential to occur within the study area. No other non-listed special-status plant species have high or moderate potential to occur.

3.7 Special-Status Wildlife Species

Attachment G, Special-Status Wildlife Species Detected or Potentially Occurring in the Study Area, lists special-status wildlife species that have been documented in the USGS 7.5-minute Romoland quadrangle and the eight surrounding quadrangles: Lakeview, Perris, Steele Peak, Wildomar, Murrieta, Bachelor Mountain, Lake Elsinore, and Winchester (CDFW 2023). For each special-status wildlife species, a determination was made regarding potential use of the project site based on information gathered during the field reconnaissance, rare plant and wildlife surveys, known habitat preferences, and knowledge of the species' relative distributions in the area. Listed species with a potential to occur and non-listed special-status species with a moderate or higher potential to occur are discussed herein. Those special-status wildlife species that occur in the region, but that are not expected, or have low potential to occur in the study area due to a lack of suitable habitat, are also included in Attachment G; however, these species are not discussed further because no significant direct or indirect impacts are expected.

Focused special-status wildlife surveys were conducted. No federally or state-listed wildlife species were observed or incidentally observed during any of the surveys.

One species of special concern—western spadefoot—was detected within the project site; however, this species is a fully covered species under the MSHCP. Therefore, compliance with the MSHCP offsets potential direct and indirect impact to this species.

The federally and state-listed Stephen's kangaroo rat was determined to have a low potential to occur. Stephens' kangaroo rat is a fully covered species under the MSHCP; therefore, with MSHCP consistency, there will be no further requirements for this species. A fee is required and discussed further in Section 5, Impacts Analysis and Recommendations, of this report.

In addition, there is one non-listed special-status wildlife species with a moderate potential to occur: bobcat (*Lynx rufus*), a fully covered species under the MSHCP; therefore, with MSHCP consistency, there will be no further requirements for this species. While burrowing owl is covered under the MSHCP, there are additional requirements that are further discussed in Section 3.7.1 of this report.

3.7.1 Burrowing Owl Habitat Assessment and Focused Survey Results

The proposed project is located within the MSHCP Burrowing Owl Habitat Assessment Area. In accordance with the MSHCP Burrowing Owl Survey Instructions (RCA 2006), a habitat assessment (Step I) was conducted for this species on November 11, 2022, which was determined to be marginally suitable.

The project site is vacant, consisting of open disturbed and developed land comprised of primarily non-native weed species. The open disturbed land provides potential for foraging habitat for burrowing owl. Some erosional features contain interstitial space marginally suitable for the nesting of burrowing owl, and adjacent grasslands are present for potential foraging. Therefore, burrowing owl has marginal potential to occur within the project site.

As described in Section 2.3 of this document, Step II-A focused burrow search and Step II-B focused burrowing owl surveys were conducted between April to June 2023 (Figure 6). No burrows greater than 4 inches in diameter, no human-made potential burrows (e.g., boulder piles, concrete, pipes, catch basins), and no burrowing owls or signs of burrowing owls (e.g., feathers, whitewash, pellets) were observed within the project site.

3.8 Nesting Birds

The project site provides potential nesting habitat for commonly occurring birds such as Anna's hummingbird or house finch (*Haemorhous mexicanus*). The project site did contain some shrubs and ornamental trees. No active nests were observed during wildlife surveys within the project site. No habitat for mud nesters like barn swallows (*Hirundo rustica*) is present.

3.9 Wildlife Corridors and Habitat Linkages

Wildlife corridors are linear features that connect large patches of natural open space and provide avenues for the migration of animals. Habitat linkages are small patches that join larger blocks of habitat and help reduce the adverse effects of habitat fragmentation; they may be continuous habitat or discrete habitat islands that function as stepping stones for wildlife dispersal. The project site and the surrounding environment to the north, east, west, and south contain developed lands, roads, commercial buildings, and disturbed lands. The disturbed lands likely function as open habitat. The project site may provide local movement for some urban-adapted wildlife species (i.e., coyote [*Canis latrans*], striped skunk [*Mephitis mephitis*], raccoon [*Procyon lotor*], and Virginia opossum [*Didelphis virginiana*]), but these species would be expected to continue to use the developed, disturbed spaces adjacent to the project site and the area post-project. The project would not alter any wildlife connections.

3.10 Jurisdictional Delineation

Results of the jurisdictional delineation are discussed in a separate report prior to the vernal pool analysis (Dudek 2022). Results after the vernal pool analysis are shown in figure 5. One vernal pool was present.

4 Western Riverside County MSHCP Consistency Analysis

The proposed project is located in the MSHCP Plan Area and is subject to consistency with relevant sections of the MSHCP. The project is not within an MSHCP Criteria Cell (Figure 2); therefore, no Reserve Assembly requirements would apply to the project. The project is located within MSHCP Section 6.3.2 Additional Survey Needs and Procedures for Criteria Area for Burrowing Owl. The project is not located in MSHCP Section 6.1.3 Narrow Endemic Species Survey Area or Section 6.3.2 Additional Survey Needs and Procedures for Criteria Area Species Survey area for plants, small mammals, and Delhi sands flower-loving fly; therefore, additional survey requirements for these biological resources would not apply to the project and are not further discussed. The project's compliance with the relevant sections of the MSHCP is detailed in the following sections.

4.1 MSHCP Section 6.1.2 Riparian/Riverine Resources

4.1.1 Riparian/Riverine Resources

The MSHCP defines riparian/riverine areas as "lands which contain habitat dominated by trees, shrubs, persistent emergent, or emergent mosses and lichens, which occur close to or which depend upon soil moisture from a nearby fresh water source; or areas with fresh water flow during all or a portion of the year." The MSHCP further clarifies those areas "demonstrating characteristics as described above which are artificially created are not included in these definitions" (County of Riverside 2003).

The project site does not support any riparian habitat. The project site supports a few scattered individuals of mulefat (*Baccharis salicifolia*). This riparian vegetation is small in its extent, lacks understory or closed-canopy features, lacks continuity with higher quality habitat, and is not contiguous. These scattered individuals are not considered a riparian/riparian resource as defined by the MSHCP.

A swale was mapped off Matthews Road and runs near the eastern and southern border of the project site. These areas contain freshwater flow during a portion of the year and lack any vegetation. Therefore, the swale within the project site would be considered a MSHCP Section 6.1.2 riparian/riverine resource. In total, the project site supports 0.11 acres of MSHCP Section 6.1.2 riparian/riverine resources. If the proposed project cannot demonstrate avoidance of riparian/riverine resources in perpetuity, a Determination of Biologically Equivalent or Superior Preservation (DBESP) Report would be required in which to propose mitigation that demonstrates equivalent or superior function and value.

4.1.2 Vernal Pools and Fairy Shrimp Habitat

The MSHCP defines vernal pools as the following (County of Riverside 2003):

> [S]easonal wetlands that occur in depression areas that have wetlands indicators of all three parameters (soils, vegetation and hydrology) during the wetter portion of the growing season but normally lack wetlands indicators of hydrology and/or vegetation during the drier portion of the growing season. Obligate hydrophytes and facultative wetlands plant species are normally dominant during the wetter portion of the growing season, while upland species (annuals) may be dominant during the drier portion of the growing season. The determination that an area exhibits vernal pool characteristics, and the definition of the watershed supporting vernal pool hydrology, must be made on a case-by-case basis. Such determinations should consider the length of the time the area exhibits upland and wetland characteristics and the manner in which the area fits into the overall ecological system as a wetland. Evidence concerning the persistence of an area's wetness can be obtained from its history, vegetation, soils, and drainage characteristics, uses to which it has been subjected, and weather and hydrologic records.

The MSHCP further clarifies "With the exception of wetlands created for the purpose of providing wetlands Habitat or resulting from human actions to create open waters or from the alteration of natural stream courses, areas demonstrating characteristics as described above which are artificially created are not included in these definitions" (County of Riverside 2003).

Fairy shrimp habitat also includes ephemeral pools and other features such as road ruts or stock ponds.

Vernal Pools

The project site contains one vernal pool where one vernal pool indicator species was observed to be abundant: slender woolly-marbles (Attachments B and D). The vernal pool consisted of almost 90% cover of slender woolly-marbles. An aerial desktop review was conducted using historical aerial imagery (Historical Aerials 2023). Based on this desktop review, the one ephemeral depression was observed immediately south of Matthews Road on site. This depression appears to have held water in 2020, 2016, and 2012. These records also depend on what season the aerial photography was performed. This area would meet the MSHCP vernal pool definition.

Fairy Shrimp Habitat

Brock Ortega conducted surveys in spring 2023; results will be provided in a separate report at a later date.

4.1.3 Riparian Birds

The proposed project supports a few scattered mulefat shrubs. These isolated individual plants are small in extent, lack understory or closed-canopy features, lack continuity with higher quality habitat, and are not contiguous; therefore, these areas are not sufficient to support riparian bird species such as least Bell's vireo (*Vireo bellii pusillus*), southwestern willow flycatcher (*Empidonax traillii extimus*), or yellow-billed cuckoo (*Coccyzus americanus*).

4.2 MSHCP Section 6.1.3 Narrow Endemic Plant Species Survey Area

The project is located outside a survey area for Narrow Endemic Plant Species; therefore, no further actions are needed under.

4.3 MSHCP Section 6.3.2 Additional Survey Needs and Procedures

The MSHCP establishes habitat assessment requirements for certain species of plants, birds, mammals, and amphibians. The project site is within a required habitat assessment area for burrowing owl. As discussed above under Section 2.3 and 3.7.1, Special-Status Wildlife Species, of this report, the habitat assessment (Step I) did identify potential burrowing owl habitat, including open areas that provide line of sight. As such, Step II (focused surveys, census, and mapping) was conducted with negative results; however, due to presence of suitable habitat, pre-construction surveys will be required to be consistent with the MSHCP.

4.4 MSHCP Section 6.1.4 Urban/Wildlife Interface Guidelines

According to the MSHCP, the Urban/Wildlands Interface Guidelines are intended to address indirect effects associated with locating development in proximity to the MSHCP Conservation Area (County of Riverside 2003). The project site is not within any conserved areas. The proposed project features a swale that flows directly south and then west. This swale abates on site. Therefore, the project has no downstream connectivity to areas already conserved or that are described for conservation. Furthermore, no MSHCP Conserved Lands occur near the project site. No criteria cells with a conservation description are adjacent to the to the project site. The closest criteria cell with a conservation description is 3279, which is 2.16 miles away. The Urban/Wildlife Interface Guidelines are not applicable.

5 Impacts Analysis and Recommendations

This section addresses potential impacts to special-status biological resources that could result from implementation of the proposed project. This section follows the CEQA checklist for biological resources as identified below. For the impacts analysis, the project site plans were overlaid with biological resources (Table 4, Permanent Impacts to Vegetation Communities and Land Covers within the Project Site). All impacts on site are permanent. Table 4 summarizes the land covers within each project component and the total area of impact used in the impact analysis.

Significance Thresholds

The following are the significance thresholds for biological resources provided in the CEQA Appendix G Environmental Checklist, which states that project activities could potentially have a significant affect if they:

1. Impact-BIO-1: Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFW or USFWS (Threshold Bio-1).

2. **Impact-BIO-2:** Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the CDFW or USFWS (Threshold Bio-2).
3. **Impact-BIO-3:** Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means (Threshold Bio-3).
4. **Impact-BIO-4:** Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors or impede the use of native wildlife nursery sites (Threshold Bio-4).
5. **Impact-BIO-5:** Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance (Threshold Bio-5).
6. **Impact-BIO-6:** Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state Habitat Conservation Plan (Threshold Bio-6).

Table 4. Permanent Impacts to Vegetation Communities and Land Covers within the Project Site

Vegetation Community/Land Cover	Impact Acreage
Vegetation Communities	
Sparsely Vegetated Playa (Ephemeral Annuals) (CDFW) Vernal Pools, Seeps and Meadows Southern -Hardpan Vernal Pool (Gray and Bramlet 1992)	0.12
Non-Natural Land Covers	
Disturbed Habitat	6.83
Urban/Developed	20.25
Total	**27.20**

Note: Acreage may not total due to rounding.

5.1 Impact-Bio-1: Special-Status Species

5.1.1 Special-Status Plants

One non-listed special-status plant was documented on the project site: San Diego tarweed (CNPS 4.2). San Diego tarweed not considered significant. No other special-status listed, or non-listed plant species were detected within the project site. No listed or non-listed special-status plant species have moderate or high potential to occur within the project site.

5.1.2 Special-Status Wildlife

One species of special concern—western spadefoot—was detected within the project site; however, this species is a fully covered species under the MSHCP. Therefore, compliance with the MSHCP offsets potential direct and indirect impact to this species.

5.1.2.1 Burrowing Owl

The focused burrowing owl surveys concluded that burrowing owls were absent from the project site; however, burrowing owl could move into the project site prior to initiation of construction activities. The area is considered by the Riverside MSHCP as a Burrowing owl survey area (Figure 6). Direct impacts to burrowing owl would be significant if they occupy the site (Impact-BIO-1). Additionally, if burrowing owl occupy surrounding habitat within 500 feet of construction activities, indirect impacts could be significant. To avoid potential for significant impacts to burrowing owl during construction activities and to remain consistent with the MSHCP, a pre-construction burrowing owl survey should be conducted and avoidance measures implemented if burrowing owl are present (MM-BIO-1, Burrowing Owl Pre-Construction Surveys).

5.2 Impact-Bio-2: Riparian and Special Status Vegetation Communities

There are no special-status vegetation communities as defined by CDFW within the project site; therefore, the project would not result in direct or indirect impacts to special-status vegetation communities (Impact-Bio-2). The project would result in impacts to riparian/riverine resources as defined by the MSHCP and as summarized in Table 5. Impacts to riparian/riverine resources are further discussed in Section 4.1, of this report and in MSHCP Section 6.1.2, Riparian/Riverine Resources.

Table 5. Impacts to MSHCP Riverine Resources within the Project Site

Vegetation Community/Land Cover	Impacts to MSHCP Riverine Resources (Acres/Linear Feet)	Total Acreage/ Linear Feet
Vegetation Communities		
Sparsely Vegetated Playa (Ephemeral Annuals) (CDFW) Vernal Pools, Seeps and Meadows Southern -Hardpan Vernal Pool (Gray and Bramlet 1992)	0.12	0.12
Non-natural Land Covers		
Swale	0.11/1311.74	0.11/1,311
Disturbed Habitat	—	—
Urban/Developed	—	—
Total	**—**	**0.23/1,311**

Note: Acreage may not total due to rounding.

5.3 Impact-Bio-3: Jurisdictional Waters

Impacts to jurisdictional waters are discussed in a separate report (Dudek 2022).

5.4 Impact-BIO-4: Migratory Birds and Wildlife Corridor/Nursery Sites

5.4.1 Nesting Birds

Project construction could result in direct and indirect impacts to nesting birds, including the loss of nests, eggs, and fledglings (Impact-BIO-4) if ground-disturbing activities occur during the nesting season (generally February 15 through August 31). Construction activities during this time may result in reduced reproductive success and may violate the federal Migratory Bird Treaty Act and California Fish and Game Code. If construction (including any ground-disturbing activities) occurs during the nesting season, a nesting bird survey must be conducted by a qualified biologist prior to grading activities. If nesting birds are observed within or adjacent to the construction activities, avoidance of active bird nests should occur as determined by the qualified biologist to ensure compliance with these regulations. With implementation of MM-BIO-2 (Nesting Birds), no significant impacts to nesting birds would occur.

5.4.2 Wildlife Corridors and Nursery Sites

The project site currently does not function as a wildlife corridor and does not support any wildlife nursery sites. As a result, implementation of the proposed project would not result in impacts to these resources (Impact-Bio-4).

5.5 Impact-Bio-5: Other Local Ordinances

There are no applicable local ordinances related to biological resources; therefore, the project would be consistent with local ordinances.

5.6 Impact-Bio-6: Habitat Conservation Plans

The project site overlaps both the MSHCP and the Stephens' Kangaroo Rat Habitat Conservation Plan and must be consistent with each of these plans for compliance with Impact-Bio-6.

5.6.1 Western Riverside Multiple Species Habitat Conservation Plan

The project site is within the MSHCP Plan Area and must comply with applicable sections of the MSHCP as well as pay the applicable MSHCP Development Mitigation Fee and Stephen's Kangaroo Rat mitigation fee based upon the location of the site prior to accessing the grading permits (RCHCA 2023).

5.6.1.1 MSHCP Section 6.1.2 Riparian/Riverine Resources and Vernal Pool

As described in Section 4.1 of this letter report, the project site supports riparian/riverine resources and vernal pool as defined by the MSHCP. The proposed project would result in the permanent loss of approximately 0.11 acres of MSHCP riparian/riverine resources and 0.12 acres of vernal pool resource. There would be no temporary impacts to riparian/riverine resources or the vernal pool resource. To remain consistent with the MSHCP, the project must prepare a DBESP identifying avoidance, minimization, and mitigation measures for impacts to riverine resources.

With implementation of MM-BIO-3 (Determination of Biologically Equivalent or Superior Preservation), the project is consistent with Section 6.1.2 of the MSHCP.

5.6.1.2 MSHCP Section 6.3.2 Additional Survey Needs and Procedures

The project does support burrowing owl habitat, and burrowing owls have the potential to occupy the site in the future. With implementation of MM-BIO-1, which includes burrowing owl pre-construction surveys, and avoidance and minimization measures if applicable, the project would be consistent with the MSHCP burrowing owl requirements.

5.6.2 Stephens' Kangaroo Rat Habitat Conservation Plan

The project site is within the Stephens' Kangaroo Rat Habitat Conservation Plan boundary. With payment of the Stephens' Kangaroo Rat Habitat Conservation Plan Development Mitigation Fee, the proposed project would be consistent with the Stephens' Kangaroo Rat Habitat Conservation Plan (RCHCA 1996).

6 Avoidance, Minimization, and Mitigation Measures

MM-BIO-1 Burrowing Owl Pre-Construction Surveys

Due to the presence of potentially suitable habitat, a 30-day preconstruction survey for burrowing owls is required prior to initial ground-disturbing activities (including vegetation clearing, clearing and grubbing, tree removal, site watering, equipment staging, grading, etc.) to ensure that no owls have colonized the site in the days or weeks preceding the ground-disturbing activities. If burrowing owls have colonized the project site prior to the initiation of ground-disturbing activities, the project proponent will immediately inform the Regional Conservation Authority (RCA) and the Wildlife Agencies and will need to coordinate further with RCA and the Wildlife Agencies, including the possibility of preparing a Burrowing Owl Protection and Relocation Plan, prior to initiating ground disturbance. If ground-disturbing activities occur, but the site is left undisturbed for more than 30 days, a pre-construction survey will again be necessary to ensure burrowing owl has not colonized the site since it was last disturbed. If burrowing owl is found, the same coordination described above will be necessary.

MM-BIO-2 Nesting Birds.

To maintain compliance with the Migratory Bird Treaty Act and California Fish and Game Code, if ground-disturbing and/or vegetation clearance activities are scheduled to occur during the avian nesting season (typically February 15 through August 31), a pre-construction nesting bird survey shall be conducted by a qualified biologist within the project site and a 500-foot buffer around the project site. Surveys shall be conducted within 3 days prior to initiation of activity and shall be conducted between dawn and noon.

If an active nest is detected during the nesting bird survey, avoidance buffers shall be implemented as determined by a qualified biologist. The buffer shall be of a distance to ensure avoidance of adverse effects to the nesting bird by accounting for topography, ambient

conditions, species, nest location, and activity type. All nests shall be monitored as determined by the qualified biologist until nestlings have fledged and dispersed or it is confirmed that the nest has been unsuccessful or abandoned.

MM-BIO-3 Determination of Biologically Equivalent or Superior Preservation

Prior to initiating construction activities, the applicant shall prepare and have reviewed by the wildlife agencies a Determination of Biologically Equivalent or Superior Preservation (DBESP) for impacts to vernal pool and riverine habitat in compliance with the Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP) Section 6.1.2, Protection of Species Associated with Riparian/Riverine areas and Vernal Pools. The DBESP will ensure replacement of any lost functions and values of riparian/riverine habitat as it relates to vernal pool and riverine resources, and will include the following:

- Definition of the project area;
- A written project description, demonstrating why an avoidance alternative is not possible;
- A written description of biological information available for the project site, including the results of resource mapping;
- Quantification of unavoidable impacts to swale and vernal pool, associated with the project;
- A written description of project design features and mitigation measures that reduce indirect effects, such as edge treatments, landscaping, elevation difference, minimization, and/or compensation through restoration or enhancement; and
- A finding demonstrating that, although the proposed project would not avoid impacts, with proposed design and compensation measures, the project would be biologically equivalent or superior to an avoidance alternative without these measures, based on one of the following factors: 1) Effects on conserved habitats; 2) Effects on the species listed in Section 6.1.2 of the MSHCP; 3) Effects on riparian linkages and function of the MSHCP Conservation Area

MM-BIO-4 General Avoidance, Minimization Measures and MSHCP Best Management Practices

The following best management practices, as applicable, shall be implemented for the duration of construction:

- Equipment storage, fueling, and staging areas shall be located on upland sites with minimal risks of direct drainage onto the project site. Necessary precautions shall be taken to prevent the release of cement or other toxic substances into surface waters. Project related spills of hazardous materials shall be reported to appropriate entities including, but not limited to, the applicable jurisdictional city, U.S. Fish and Wildlife Service, California Department of Fish and Wildlife, and RWQCB, and shall be cleaned up immediately and contaminated soils removed to approved disposal areas.
- To avoid attracting predators of the species of concern, the project site shall be kept as clean of debris as possible. All food related trash items shall be enclosed in sealed containers and regularly removed from the site(s).

- Construction employees shall strictly limit their activities, vehicles, equipment, and construction materials to the proposed project footprint and designated staging areas and routes of travel. The construction area(s) shall be the minimal area necessary to complete the project and shall be specified in the construction plans. Construction limits will be fenced with orange snow screen. Exclusion fencing should be maintained until the completion of all construction activities. Employees shall be instructed that their activities are restricted to the construction areas.

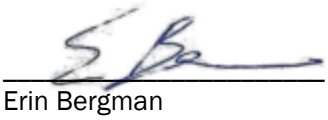
7 Conclusions

The proposed project has the potential to impact three special-status biological resources: burrowing owl, vernal pool, and riverine habitat. Since the project is within the boundary of Stephen's Kangaroo rat, payment of the Stephens' Kangaroo Rat Habitat Conservation Plan Development Mitigation Fee is required. After payment, the proposed project would be consistent with the Stephens' Kangaroo Rat Habitat Conservation Plan.

With implementation of the avoidance, minimization, and mitigation measures described in this report, the project would be consistent with the MSHCP and would result in less-than-significant impacts to biological resources under CEQA.

If you have any questions regarding this biological resources letter report, please feel free to contact me at ebergman@dudek.com or at 760.274.3927.

Sincerely,



Erin Bergman
Biologist

Att.: *Attachment A – Figures*
Attachment B – Jurisdictional Delineation Report
Attachment C – Site Photographs
Attachment D – Vascular Plant Species
Attachment E – Wildlife Species
Attachment F – Special-Status Plant Species Detected or Potentially Occurring in the Study Area
Attachment G – Special-Status Wildlife Species Detected or Potentially Occurring in the Study Area

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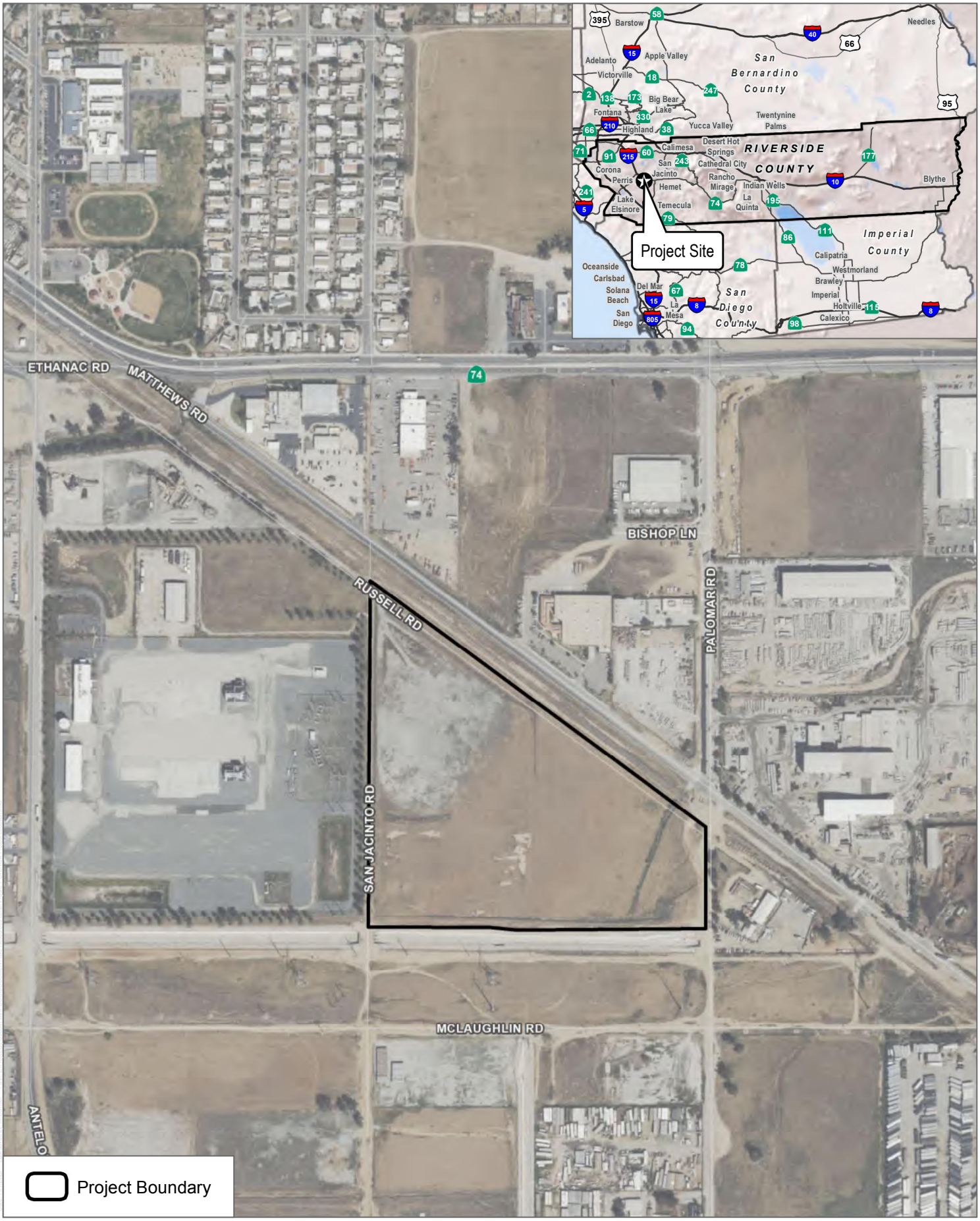
Attachment A

Figures



SOURCE: Bing Maps; County of Riverside 2022

DUDEK

0 250 500 Feet

FIGURE 1

Overview Project Location

Double Butte Project

Project Site

Project Boundary

Proposed Linkages:

- Constrained Linkage
- Linkage
- Existing Channel

Existing Cores & Linkages:

- Constrained Linkage
- Core
- Linkage
- Noncontiguous Habitat Block

Proposed Cores & Habitat Blocks:

- Core
- Proposed Extension of Existing Cores
- Noncontiguous Habitat Block

MSHCP Conserved Lands

- Conserved Lands

SOURCE: Western Riverside County Regional Conservation Authority 2015; County of Riverside 2015

DUDEK

0 12,500 25,000 Feet

FIGURE 2

Western Riverside County MSHCP Plan Area

Double Butte Project

SOURCE: Bing Maps; County of Riverside 2022; USDS SSURGO 2023

DUDEK

0 135 270 Feet

FIGURE 3

Soils

Double Butte Project

SOURCE: Bing Maps; County of Riverside 2022

DUDEK

0 135 270 Feet

FIGURE 4

Biological Resources and Vegetation Mapping

Double Butte Project

SOURCE: Bing Maps; Riverside County 2023

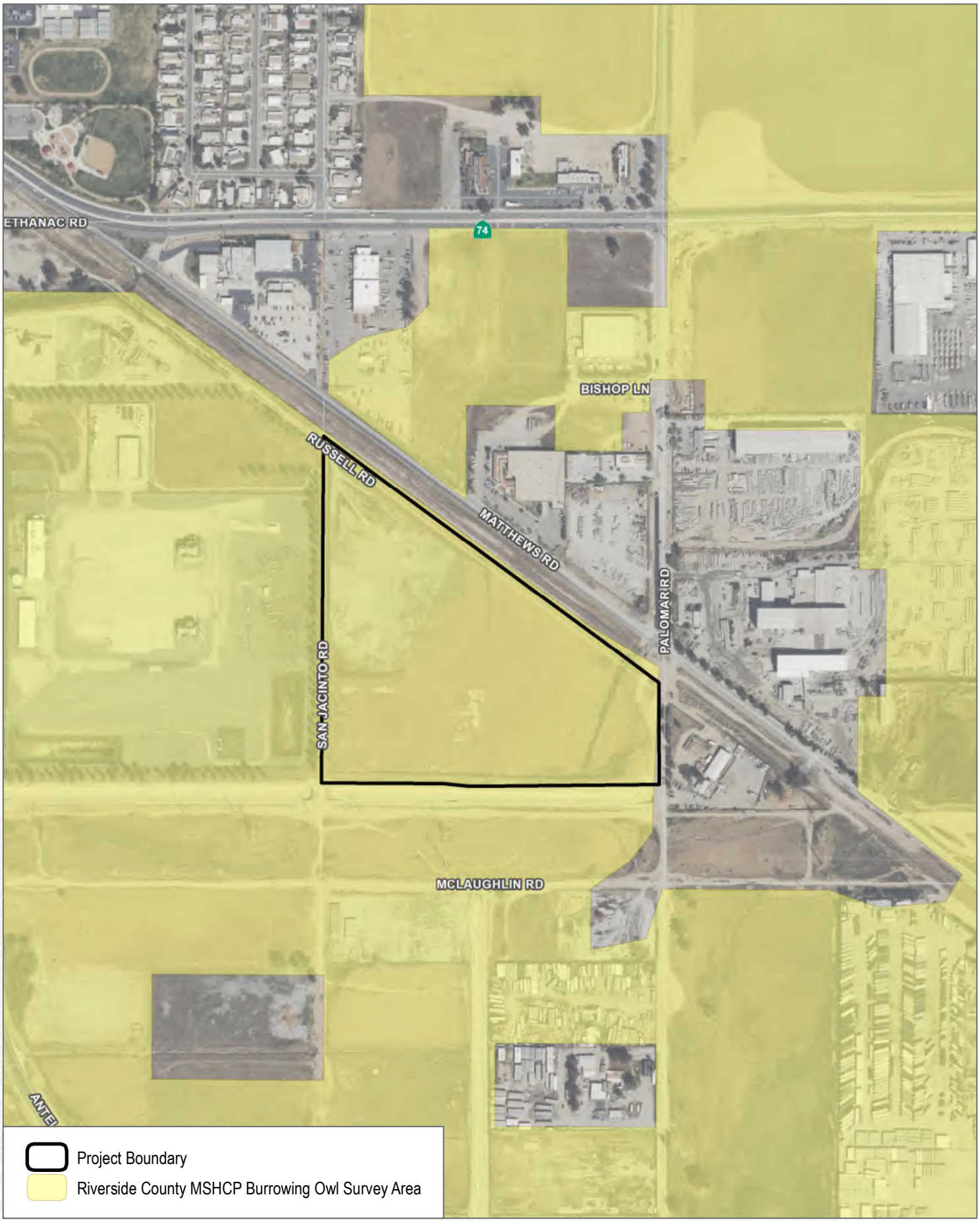
DUDEK

0 135 270 Feet

FIGURE 5

Riverine, Vernal Pool, and Fairy Shrimp Habitat

Double Butte Project



SOURCE: Bing Maps; County of Riverside 2022

DUDEK

0 250 500 Feet

FIGURE 6

Burrowing Owl Survey Area

Double Butte Project

Attachment B

Jurisdictional Delineation Report

DUDEK
2280 HISTORIC DECATUR ROAD, SUITE 200
SAN DIEGO, CALIFORNIA 92106
T 619.591.1370 F 619.591.1399

December 20, 2022

Adam Furman
Senior Manager, Permitting
AES Clean Energy

Subject: Aquatic Resources Jurisdictional Delineation Report for the Double Butte Battery Energy Storage System, Riverside County, California

Dear Adam Furman:

This technical report presents the findings of a jurisdictional delineation of aquatic resources conducted by Dudek for the proposed Double Butte Battery Energy Storage System (BESS) Project (project), located near the City of Menifee in Riverside County, California (all figures are provided in Attachment A). The purpose of this investigation was to evaluate the presence and extent of aquatic resources that may be subject to the jurisdiction of the U.S. Army Corps of Engineers (USACE), Regional Water Quality Control Board (RWQCB), and/or California Department of Fish and Wildlife (CDFW). The investigation included an analysis of aquatic resources within the privately owned 500-megawatt BESS project site totaling approximately 27.1 acres (study area).

This report was prepared in accordance with the Corps Wetlands Delineation Manual (USACE 1987), Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0) (USACE 2008a), and A Field Guide to the Identification of the Ordinary High-Water Mark (OHWM) in the Arid West Region of the United States (USACE 2008b). The information herein is intended to identify and describe aquatic resources potentially regulated by USACE under Section 404 of the federal Clean Water Act, RWQCB under Section 401 of the federal Clean Water Act and the Porter-Cologne Water Quality Control Act, and CDFW per California Fish and Game Code Section 1600.

1 Study Area Location and Description

The study area for the proposed battery storage facility is a disturbed infill lot that has been heavily plowed in many areas. The project area is comprised of bar eground, disturbed areas, and areas where fill was previously discarded. This landcover type is considered disturbed and occurs within Sun City/Menifee, Riverside County, California. The study area is located on Assessor Parcel Numbers 331-119-0017, 331-119-0060, 331-119-0011, 331-119-0047, 331-119-0010, 331-119-0056, and 331-119-0014. The battery storage facility will interconnect to the Southern California Edison Valley Substation.

The study area occurs at an elevation that ranges from 1,440 to 1,456 feet above mean sea level and is located within Section 14 of Township 5 South, Range 3 West of the U.S. Geological Survey (USGS) 7.5-minute Romoland, California topographic quadrangle (Figure 1, Project Location, in Attachment A). The project site is located at 28352–28392 Mathews Road. The project site is south of Mathews Road, east of San Jacinto Road, west of Palomar Road, and north of McLaughlin Road within the city of Sun City/Menifee. The site is accessible from the intersection of Mathews Road and Palomar Road.

2 Methods

Data regarding aquatic resources present within the study area were obtained through a review of pertinent literature and field assessments. Both are described in detail below.

2.1 Literature Review

Prior to conducting field reviews for jurisdictional aquatic resources on site, Dudek reviewed aerial maps depicting the property boundary of the survey area. Dudek conducted an extensive desktop review of the survey area, which included historical land use, local and regional climatic data, and aerial photography (including historical aerials) with topographic configurations and vegetative signatures occurring within the survey area. The information was evaluated by consulting the following available resources:

- USGS 7.5-minute quadrangle map (and surrounding quads) (USGS 1975)
- Historical aerials
- The web-based National Wetlands Inventory Wetlands Mapper (NWI) (USFWS 2022)
- The web-based National Hydrography Dataset (USGS 2022)
- The web-based Web Soil Survey (USDA 2022a)
- The latest and available state and federal regulatory definitions, guidance document, and delineation manuals for state and federally regulated waters (including wetlands)

2.2 Aquatic Resources Field Delineation

Dudek senior biologists and wetland scientists Callie Amoaku and Erin Bergman performed a formal (routine) jurisdictional delineation within the study area on November 11, 2022, to determine potential jurisdictional resources under Section 404/401 of the Clean Water Act and Sections 1600–1616 of the California Fish and Game Code, and the Porter-Cologne Water Quality Control Act. Current USACE delineation procedures and guidance were used to identify and delineate any wetlands and/or waters of the United States potentially subject to USACE and RWQCB jurisdiction (USACE 1987, 2008a, 2008b; 2018; Lichvar and McColley 2008; Curtis and Lichvar 2010). Likewise, current CDFW procedures and guidance were used to identify and delineate any streambeds, rivers, or associated riparian habitat potentially subject to CDFW jurisdiction.

For potential wetland areas, data on vegetation, hydrology, and soils were collected on standardized wetland delineation data forms in representative locations to assess the potential for hydric soils, hydrophytic vegetation, and hydrology (Attachment B, Jurisdictional Delineation Forms). The wetland indicator status was assigned to each plant species using the Wetland Plant List (USACE 2020), as shown in Table 1 below. Dominant plant species encountered within the study area were identified to the lowest taxonomic level needed to determine wetland plant indicator status.

Table 1. Summary of Wetland Indicator Status

Category	Probability
Obligate Wetland (OBL)	Almost always occur in wetlands (estimated probability of >99%)
Facultative Wetland (FACW)	Usually occur in wetlands (estimated probability of 67% to 99%)
Facultative (FAC)	Equally likely to occur in wetlands/non-wetlands (estimated probability of 34% to 66%
Facultative Upland (FACU)	Usually occur in non-wetlands (estimated probability of 67% to 99%
Obligate Upland (UPL)	Almost always occur in non-wetlands (estimated probability of >99%)
No Indicator (NI)	--

Non-wetland waters of the United States are delineated based on the limits of an Ordinary High Water Mark (OHWM). During the jurisdictional delineation, drainage features were examined for evidence of an OHWM, saturation, presence of surface water, wetland vegetation, and nexus to a traditional navigable water of the United States. If any of these criteria were met, transects were run to determine the extent of each regulatory agency's jurisdiction.

Features were mapped in the field based on the extent of their indicators. Sample points were collected in the field using an aerial photograph and topographic map of the study area, a Trimble R1 GNSS Receiver with sub-meter accuracy, and ArcGIS Collector app for iOS. A Dudek geographic information system (GIS) technician digitized the jurisdictional extents and GPS data into a project-specific GIS using ArcGIS software.

3 Results

Dudek used the methods described above to determine the presence or absence of USACE, RWQCB, and CDFW jurisdictions within the study area. A swale and potential for wetlands and vernal areas were investigated within the study area. The determination of aquatic resources within the study area was supported by information obtained from the USGS topographic map, Web Soil Survey, USFWS, NWI, National Hydrography Dataset, and field assessments. Information obtained from each source is described below.

3.1 Landscape Setting

3.1.1 USGS Topographic Watershed Map Review

The USGS 7.5-minute Romoland, California, topographic maps (USGS 2015) were reviewed to identify natural and human-made features occurring within the vicinity of the study area. Information obtained from the maps included contour lines, streets, rivers, creeks, lakes, aqueducts, and reservoirs. The Romoland topographic map was based on National Agriculture Imagery Program imagery from 2012 and National Elevation Dataset contours from 1999.

The study area occurs within the Perris Valley San Jacinto River (Hydrologic Unit Code (HUC) 180702020306) of the Lower San Jacinto River watershed (HUC 1807020203) in the San Jacinto subbasin (HUC 18070202) (Data Basin 2019) (Figure 2, Hydrologic Resources, in Attachment A). Sources of hydrology in the study area include annual precipitation and runoff from surrounding areas.

3.1.2 Soil Survey Review

The U.S. Department of Agriculture, Natural Resources Conservation Service's Web Soil Survey for Riverside, California, was consulted, and four soil types were identified: Exeter sandy loam, 2% to 8% slopes, eroded (EnC2); Greenfield sandy loam, 2% to 8% slopes, eroded (GyC2); Monserate sandy loam, 0% to 5% percent slopes (MmB); and Exeter sandy loam, deep, 2% to 8% slopes, eroded (EpC2) (USDA 2022a). These soil types are listed as non-hydric soils (USDA 2022b).

3.1.3 National Wetlands Inventory Review

A review of the NWI dataset revealed no mapped wetlands within the project site or near the edges of the project site. The NWI dataset is based on coarse aerial mapping and may not capture aquatic resources that are obscured by tree canopy or are otherwise not visible in aerial photography.

3.1.4 Climate and Rainfall Data Review

The study area is located in the South Coast geographic subdivision of the California Floristic Province (Jepson Flora Project 2022). Average annual temperatures in the study area region range from 41°F to 92°F, and the average annual precipitation is 12 inches (NOAA 2022).

3.2 Aquatic Resources Field Delineation

3.2.1 History

A review of historical imagery shows that the proposed project site was historically upland habitat (grassland) from 1985–2002 (Historic Aerials 2022; Google Earth 2002). After 2002, the site became disturbed and actively graded within most of the site. Other areas were more heavily disturbed. For example, in 2007, a large portion of the western side of the site had been developed and utilized as a storage facility with roads. In 2009, this storage facility was abandoned.

Between 2002 and 2016, approximately 25% of the site (the northwestern corner) consisted of fill. Aerial images show sand fill, gravel fill, and large rock fill consistently changing at the site from year to year. Therefore, the site was actively utilized as a fill site. In 2016, fill was removed from the northwestern portion of the site leaving behind heavily compacted fill soils and uneven ground. In 2016, likely due to fill creating uneven ground a very small isolated ponded area formed on this compacted soil. Another potential scenario is that minimal ponding was already occurring that could not be observed through aerial photography. Ponded water is observed within this northwestern section in 2016, 2018, and 2019 on aerial imagery (Google Earth 2022).

On the eastern side of the site is a swale that drains into the site and abates into upland. Historical imagery shows the swale changing in length over time, likely based on water runoff from the road. From 2003–2012, the length of the swale ranged from 0.12 miles to 0.17 miles. From 2012–2016, the length ranged from 0.05 miles to 0.10 miles. From 2016–2022, the length ranged from 0.20 miles to 0.29 miles. Therefore, road runoff changed over time determining the length of the swale.

3.2.2 Aquatic Resources - Results

Wetland Sampling Points -Wetland sampling points were taken at two locations within the proposed site where minimal hydrophytic vegetation was present (see Figure 3, Aquatic Resources, in Attachment A). Both areas are within the northwestern corner of the site. No NWI or National Hydrography Dataset data was identified on site.

Data stations 1a and 1b. The first set of data stations were within a small, ponded area that was within a historical fill site. A data station could only be dug approximately 3 inches into fill before hitting "concrete like" material. No hydrophytic vegetation or hydrophytic soils were present at the edge of the small, ponded area. One caveat is that because the small, ponded area was full of water at the time of the jurisdictional delineation, potential vegetation could not be observed within the small, ponded area. Vegetation can only be observed after the pool is dry during spring. Therefore, a vegetation study when the pool is dry would determine if the small, ponded area could be considered an isolated vernal area or vernal pool feature. An isolated vernal area or vernal pool would be considered a water of the state (RWQCB and CDFW). It has been noted that brachiopods are present within the small, ponded area. Since the area was previously used as a fill site, the likelihood of a potential isolated vernal area or vernal pool is low.

Data stations 2a and 2b. The next set of data stations were dug in another historical fill site near some hydrophytic vegetation containing mulefat (*Baccharis salicifolia*). The soils consisted of fill materials including gravel, and no hydrology was present. This area did not have hydric soils, enough hydric vegetation, or hydrology; therefore, there are no wetlands within this study area. Attachment B contains the wetland data forms completed during the aquatic field delineation, which are also summarized in Section 3.2.3.

Figure 3, Aquatic Resources, in Attachment A illustrates the location and extent of feature 1 within the study area. A description of feature 1 is provided below, and representative photographs of this resource is provided in Attachment C.

Feature 1 Swale. The swale conveys flows from road run-off but does not demonstrate an OHWM or a defined bed and bank. Based upon the field site visit, aerial imagery, and the elevation profile from Google Earth, runoff from the road conveys water into a storm drain and past the storm drain into the swale. The swale eventually abates into upland. The swale totals approximately 0.11 acres on site. No water or soil saturation was present within the swale during the field site visit. The swale does not support any riparian or wetland vegetation. Most of the vegetation within the swale consists of tumbleweed (*Salsola tragus*). This feature is not considered a jurisdictional water of the United States as it does not contain an OHWM. The swale could be considered jurisdictional via the state (RWQCB, CDFW).

3.2.3 Data Summary

Results from observable field indicators from four wetland data stations based upon two potential wetland aquatic resources occur within the study area (see Figure 3 in Attachment A). The data collected at each data point are included in Attachment B and summarized in Table 2 below.

Table 2. Wetland Data Station Summary

Data Point	Wetland Determination Field Indicators			Location		Preliminary Determination
	Vegetation	Soils	Hydrology	Latitude	Longitude	
1a	No	No	Yes	33.7399941	-117.1670104	Non-wetland
1b	No	No	No	33.7407009	-117.1647368	Non-wetland
2a	No	No	No	33.7401640	-117.1668588	Non-wetland
2b	No	No	No	33.7399828	117.1670065	Non-wetland

3.2.4 Preliminary Jurisdictional Determination

As described in Section 3.2.2, one swale feature that doesn't have an OHWM or a defined bed and bank occurs on the eastern side of the site. This swale is considered a water of the state (RWQCB and CDFW) and is not considered a federal water due to the lack of a bed and bank, lack of OHWM, and lack of a nexus to a traditional navigable water.

Based on this information, the feature on site is likely not regulated by USACE (federal). However, the swale on site would likely be regulated by the state (RWQCB and CDFW). It should be noted that the results of the delineation have not been verified by the regulatory agencies. The results of this delineation are considered preliminary until each of these agencies can review the study area.

One potential small, ponded area should be studied during the dry season in spring to determine the status of the small, ponded area. If no vernal pool plant species or wetland indicator species are present, no further studies will be required. If this is the case, a swale would be the only jurisdictional feature on site.

3.3 Sensitive Plants and Wildlife

Incidental sensitive plants were observed during the aquatic resource delineation. San Diego tarplant (*Deinandra paniculata*) (California Native Plant Society sensitive species list 4.2) was observed in a variety of locations within the northwestern corner of the site. A rare plant survey report can further define these findings along with the spring study of the small, ponded area.

4 Conclusion

The purpose of this report is to identify and delineate all jurisdictional aquatic resources regulated by the USACE, RWQCB, and CDFW within the study area. This report represents existing conditions only and does not address any activities proposed within the study area. One swale regulated by the state (RWQCB and CDFW) is present on site. In addition, one small, ponded area should be reviewed during spring to determine if any wetland obligate or vernal pool plant species are present. It should be noted that the results of the delineation have not been verified by the regulatory agencies. The results of this delineation are considered preliminary until each of these agencies can review the study area.

If you have any questions regarding the contents of this report, please contact me by email ebergman@dudek.com or by phone at 760.274.3927.

Sincerely,

Erin Bergman
Biologist

Att.: *A – Figures 1–3*
B –Jurisdictional Delineation Forms
C – Representative Photographs
cc: *Keith Carwana, Dudek*
Callie Ford, Dudek
Brock Ortega, Dudek

5 References

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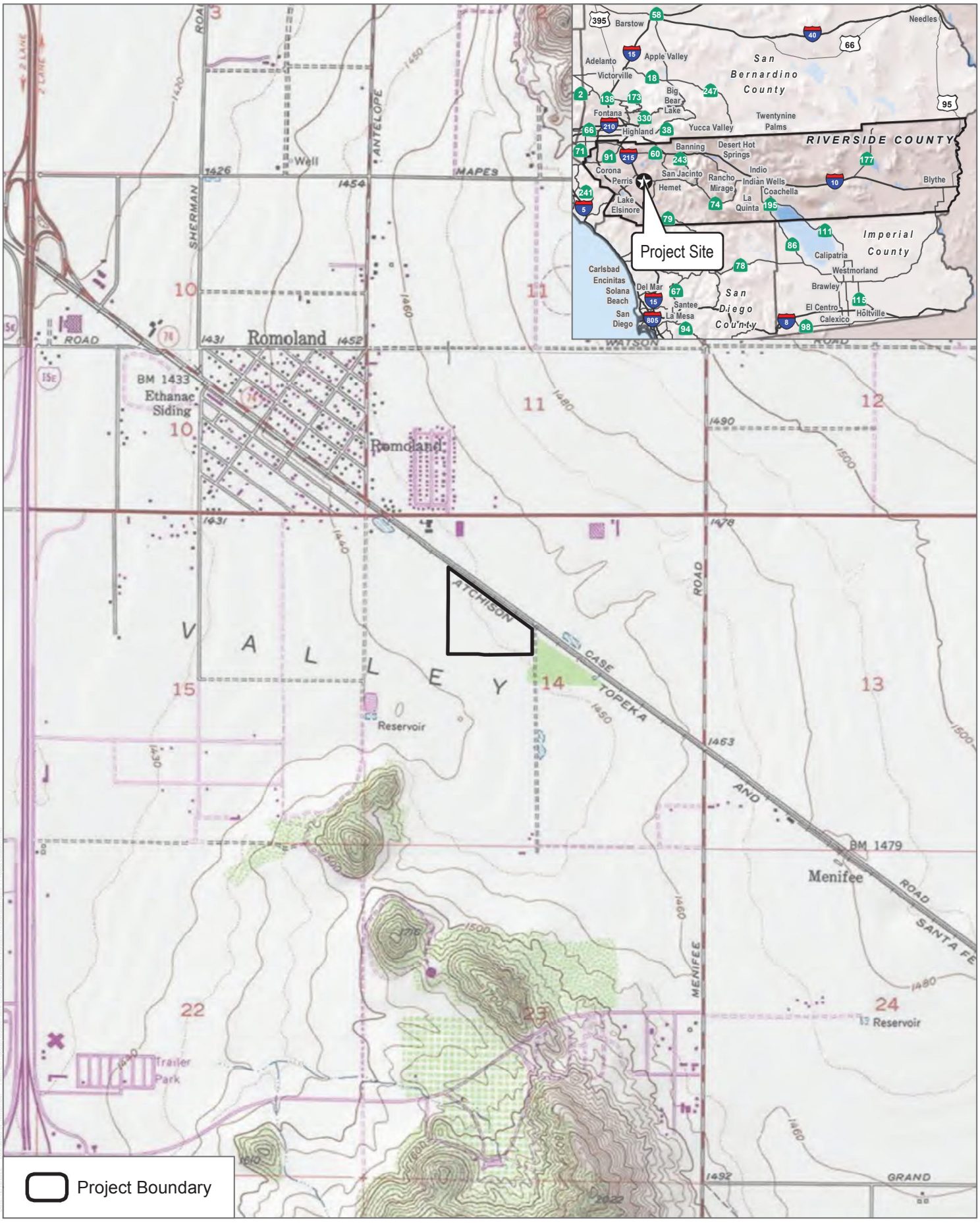
Attachment A

Figures 1–3



SOURCE: USGS 7.5-Minute Series Romoland Quadrangle
Township 5S; Range 3W; Section 14

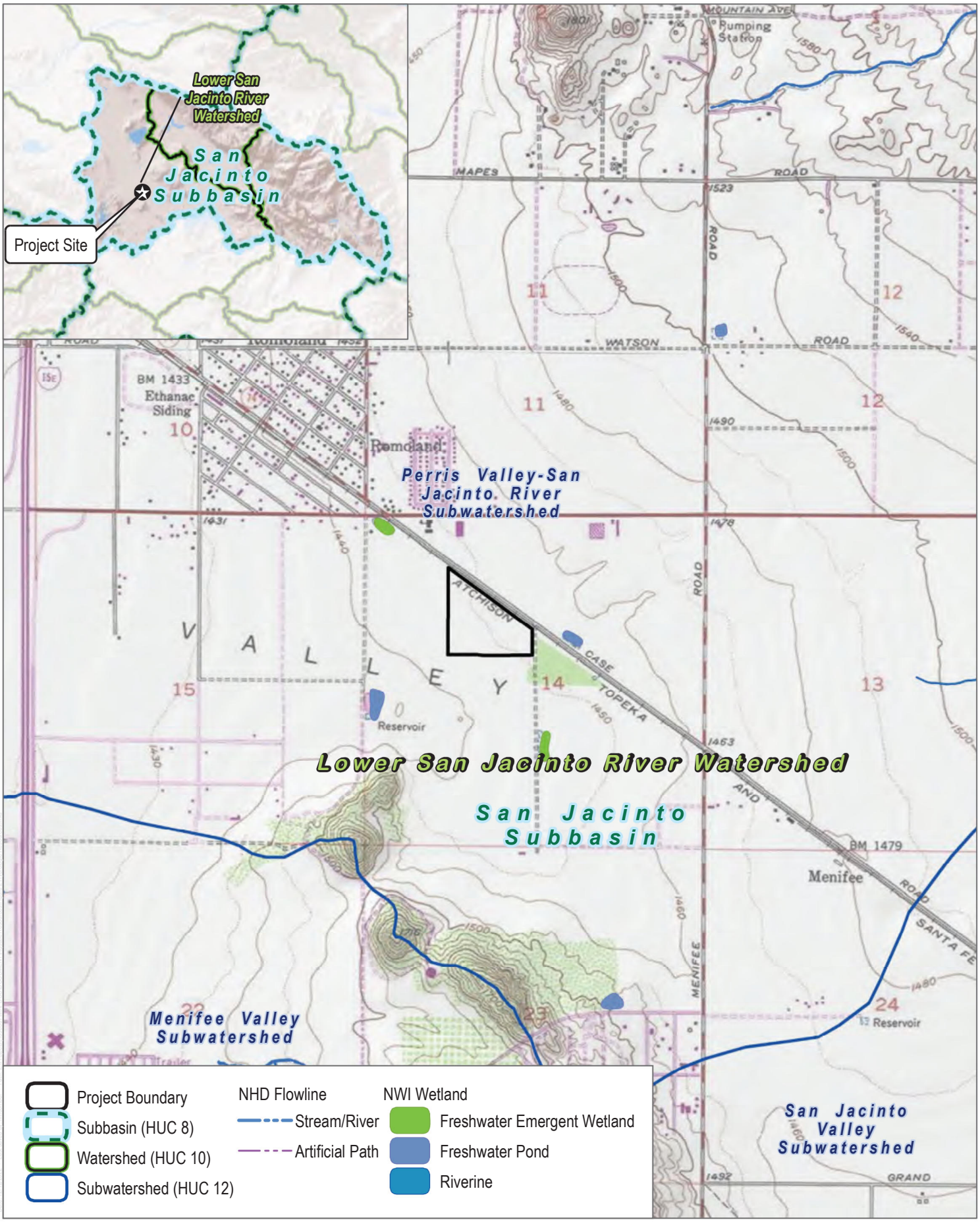
DUDEK

0 1,000 2,000 Feet

FIGURE 1

Project Location

Double Butte Project



SOURCE: USA Topo; NWI 2022; NHD 2022; USGS WBD 2022

DUDEK

0 1,000 2,000 Feet

FIGURE 2

Hydrologic Resouces

Double Butte Project

SOURCE: Bing Maps; Riverside County 202

DUDEK

0 100 200 Feet

FIGURE 3

Aquatic Resources

Double Butte Project

Attachment B

Jurisdictional Delineation Forms

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Double Butte City/County: Menifee/Riverside Sampling Date: 2022-11-11

Applicant/Owner: State: California Sampling Point: WSP 01a

Investigator(s): Callie Amoaku, Erin Bergman Section, Township, Range:

Landform (hillslope, terrace, etc.): Upland, Depression Local relief (concave, convex, none): Slope (%): 2

Subregion (LRR): C 19 Lat: 33.7399941 Long: -117.1670104 Datum: WGS 84

Soil Map Unit Name: Exeter sandy loam, 2 to 8 percent slopes, eroded (EnC2) NWI classification: None

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

Are Vegetation ✓, Soil ✓, or Hydrology ✓ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ✓

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

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

Hydrophytic Vegetation Present?	Yes ____	No ✓	**Is the Sampled Area within a Wetland?** Yes ____ No ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks:

The soil is fill material and the depression is in an area regularly graded and maintained. Rains occurred on 11/8/22.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 5 ft r)			
1. Tamarix sp.	5	✓	FAC
2.			
3.			
4.			
5.			
	5% = Total Cover		
Herb Stratum (Plot size: 5 ft r)			
1. Ambrosia acanthocarpa	5	✓	UPL
2. Heliotropium curassavicum	5	✓	FACU
3. Deinandra paniculata	1		FACU
4.			
5.			
6.			
7.			
8.			
	11% = Total Cover		
Woody Vine Stratum (Plot size: 30 ft r)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

Dominance Test worksheet:

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

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	5	x 3 =	15
FACU species	6	x 4 =	24
UPL species	5	x 5 =	25
Column Totals:	16 (A)		64 (B)

Prevalence Index = B/A = 4.0

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes ____ No ✓

Remarks:

SOIL

Sampling Point: WSP 01a

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 3	5Y 4/2	100					Sandy Loam	Fill
-								
-								
-								
-								
-								
-								
-								

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

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

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

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

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

Restrictive Layer (if present):

Type: Fill material

Depth (inches): 3

Hydric Soil Present? Yes _____ No ✓

Remarks:

Unable to dig due to hard fill/rocky material

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (2 or more required)

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

Field Observations:

Surface Water Present? Yes ✓ No _____ Depth (inches): 1

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ✓ No _____ Depth (inches): 0

Wetland Hydrology Present? Yes ✓ No _____

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

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Double Butte City/County: Menifee/Riverside Sampling Date: 2022-11-11

Applicant/Owner: State: California Sampling Point: WSP 01b

Investigator(s): Callie Amoaku, Erin Bergman Section, Township, Range:

Landform (hillslope, terrace, etc.): Upland, Depression Local relief (concave, convex, none): Slope (%): 1

Subregion (LRR): C 19 Lat: 33.7407009 Long: -117.1647368 Datum: WGS 84

Soil Map Unit Name: Exeter sandy loam, 2 to 8 percent slopes, eroded (EnC2) NWI classification: None

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

Are Vegetation ✓, Soil ✓, or Hydrology ✓ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ✓

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

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

Hydrophytic Vegetation Present?	Yes ____	No ✓	**Is the Sampled Area within a Wetland?** Yes ____ No ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ____	No ✓	

Remarks:

Fill material

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 5 ft r)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 5 ft r)			
1. Ambrosia acanthocarpa	5	✓	UPL
2. Bromus rubens	5	✓	UPL
3. Heliotropium curassavicum	5	✓	FACU
4. Salsola tragus	1		FACU
5.			
6.			
7.			
8.			
	16% = Total Cover		
Woody Vine Stratum (Plot size: 30 ft r)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	6	x 4 =	24
UPL species	10	x 5 =	50
Column Totals:	16 (A)		74 (B)

Prevalence Index = B/A = 4.6

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes ____ No ✓

Remarks:

SOIL

Sampling Point: WSP 01b

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 4	5YR 2.5/2	100					Loamy Sand	Fill
-								
-								
-								
-								
-								
-								

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

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

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

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

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

Restrictive Layer (if present):

Type: _____
Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (2 or more required)

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

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____
Water Table Present? Yes _____ No ✓ Depth (inches): _____
Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✓

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

Remarks:

None

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Double Butte City/County: Menifee/Riverside Sampling Date: 2022-11-11

Applicant/Owner: State: California Sampling Point: WSP 02a

Investigator(s): Callie Amoaku, Erin Bergman Section, Township, Range:

Landform (hillslope, terrace, etc.): Upland, Depression Local relief (concave, convex, none): Slope (%): 1

Subregion (LRR): C 19 Lat: 33.7401640 Long: -117.1668588 Datum: WGS 84

Soil Map Unit Name: Exeter sandy loam, 2 to 8 percent slopes, eroded (EnC2) NWI classification: None

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

Are Vegetation ✓, Soil ✓, or Hydrology ✓ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ✓

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

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

Hydrophytic Vegetation Present?	Yes ____	No ✓	**Is the Sampled Area within a Wetland?** Yes ____ No ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ____	No ✓	

Remarks:

The soil is fill material and the depression is in an area regularly graded and maintained. Rains occurred on 11/8/22. No water at sample point.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 5 ft r)			
1. Baccharis salicifolia	7	✓	FAC
2.			
3.			
4.			
5.			
	7% = Total Cover		
Herb Stratum (Plot size: 5 ft r)			
1. Ambrosia acanthocarpa	2	✓	UPL
2. Erigeron bonariensis	1	✓	FACU
3. Helianthus annuus	1	✓	FACU
4.			
5.			
6.			
7.			
8.			
	4% = Total Cover		
Woody Vine Stratum (Plot size: 30 ft r)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

Dominance Test worksheet:

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

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 25 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	7	x 3 =	21
FACU species	2	x 4 =	8
UPL species	2	x 5 =	10
Column Totals:	11 (A)		39 (B)

Prevalence Index = B/A = 3.5

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes ____ No ✓

Remarks:

SOIL

Sampling Point: WSP 02a

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 5	7.5YR 4/4	100					Sandy Loam	
-								
-								
-								
-								
-								
-								
-								

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

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

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

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

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

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (2 or more required)

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

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✓

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

Remarks:

None

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Double Butte City/County: Menifee/Riverside Sampling Date: 2022-11-11

Applicant/Owner: State: California Sampling Point: WSP 02b

Investigator(s): Callie Amoaku, Erin Bergman Section, Township, Range:

Landform (hillslope, terrace, etc.): Upland, Depression Local relief (concave, convex, none): Slope (%): 1

Subregion (LRR): C 19 Lat: 33.7399828 Long: -117.1670065 Datum: WGS 84

Soil Map Unit Name: Exeter sandy loam, 2 to 8 percent slopes, eroded (EnC2) NWI classification: None

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

Are Vegetation ✓, Soil ✓, or Hydrology ✓ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ✓

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

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

Hydrophytic Vegetation Present?	Yes ____	No ✓	**Is the Sampled Area within a Wetland?** Yes ____ No ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ____	No ✓	

Remarks:

The soil is fill material and the depression is in an area regularly graded and maintained. Rains occurred on 11/8/22. No water at sample point.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 5 ft r)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 5 ft r)			
1. Helianthus annuus	20	✓	FACU
2. Ambrosia acanthocarpa	2		
3. Deinandra paniculata	2		FACU
4.			
5.			
6.			
7.			
8.			
	24% = Total Cover		
Woody Vine Stratum (Plot size: 30 ft r)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	22	x 4 =	88
UPL species	0	x 5 =	0
Column Totals:	22 (A)		88 (B)

Prevalence Index = B/A = 4.0

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes ____ No ✓

Remarks:

SOIL

Sampling Point: WSP 02b

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 4	7.5YR 4/4	100						Gravel
-								
-								
-								
-								
-								
-								
-								

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

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

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

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

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

Restrictive Layer (if present):

Type: Gravel

Depth (inches): 4

Hydric Soil Present? Yes _____ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (2 or more required)

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

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✓

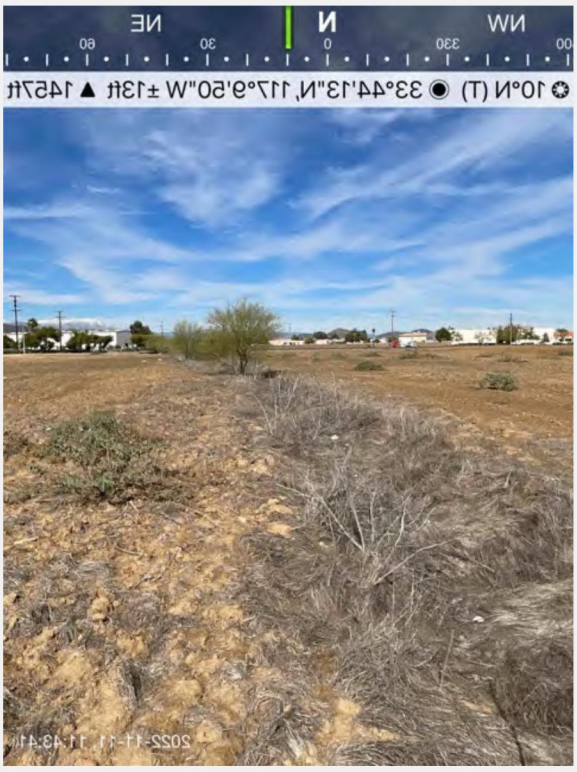
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

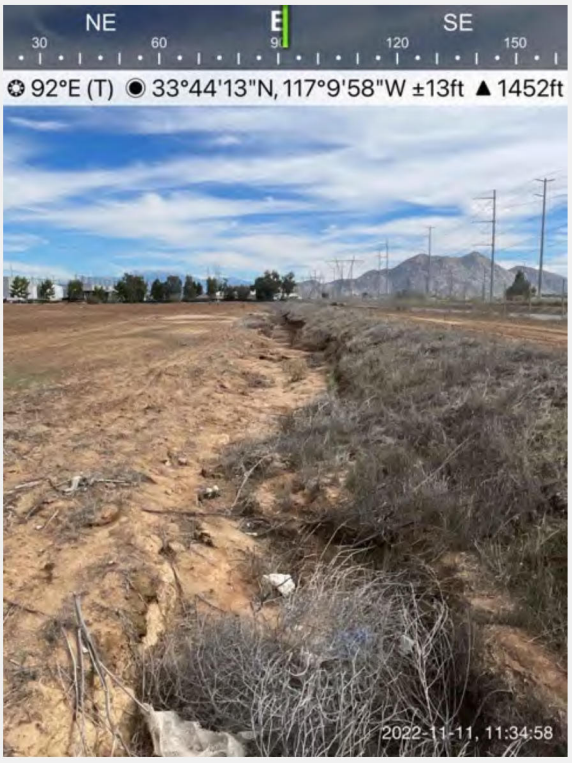
None

Attachment C

Representative Photographs



Swale on site facing north within central portion of the swale. Photo taken November 11, 2022.



Swale facing east at the lower portion of the swale. Photo taken November 11, 2022.

Area to be reviewed in spring. Photo taken November 11, 2022.

Data station 1a: Area holding water to be surveyed in spring. Photo taken November 11, 2022.

Data Station 2a: Soils consist of fill. Photo taken November 11, 2022.

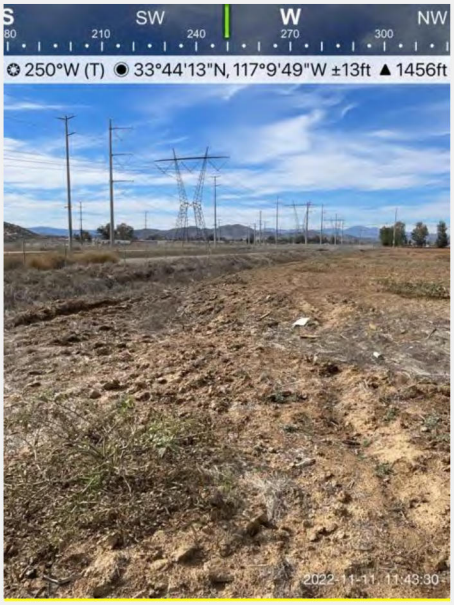
Data Station 2b: Soils consist of fill. Photo taken November 11, 2022.

Attachment C

Site Photographs

Location 1. View of developed area in the northwest portion of the project site, facing south. Photo taken November 11, 2022.

Location 2. View of swale from the southwestern portion of the project site, facing west. Photo taken November 11, 2022.



Location 3. Additional view of swale with the disturbed vegetation community in the foreground, facing west-southwest. Photo taken November 11, 2022.

Location 4. View of disturbed habitat (i.e., plowed/razed land), facing north. Photo taken November 11, 2022.

Location 5. View of disturbed vegetation from the eastern portion of the project site, facing west. Photo taken November 11, 2022.

Location 6. Additional view of disturbed vegetation from the eastern portion of the project site, facing northwest. Photo taken November 11, 2022.

Location 7. View of vernal pool in the northwestern portion of the project site, facing west. Photo taken May 29, 2023.

Location 8. View of the developed portion of the property in the northwestern portion of the project site. Photo taken May 29, 2023.

Location 9. Additional view of developed area in northwestern portion of the project site. Photo taken May 29, 2023.

Location 10. Additional view of developed area in northwestern portion of the project site. Photo taken May 29, 2023.

Location 11. Close view of vernal pool in northwestern portion of the project site. Photo taken May 29, 2023.

Location 12. Additional view of vernal pool in the northwestern portion of the study area. Photo taken May 29, 2023.

Attachment D

Vascular Plant Species

Angiosperms: Eudicots

AMARANTHACEAE – AMARANTH FAMILY

* *Amaranthus albus* – white tumbleweed

ASTERACEAE – SUNFLOWER FAMILY

Ambrosia acanthicarpa – annual bur-sage
Ambrosia psilostachya – western ragweed
Baccharis salicifolia ssp. *salicifolia* – mulefat, seep-willow
Deinandra paniculata – San Diego tarplant
Erigeron canadensis – horseweed
Helianthus annuus – western sunflower
Psilocarphus tenellus – slender woolly-marbles
Xanthium strumarium – cocklebur

* *Centaurea melitensis* – tocalote
* *Dittrichia graveolens* – stinkwort
* *Lactuca serriola* – prickly lettuce
* *Oncosiphon piluliferum* – stinknet

BORAGINACEAE – BORAGE FAMILY

Amsinckia intermedia – rancher's fiddleneck
Heliotropium curassavicum var. *oculatum* – salt heliotrope

BRASSICACEAE – MUSTARD FAMILY

* *Hirschfeldia incana* – short-pod mustard

CHENOPODIACEAE – GOOSEFOOT FAMILY

* *Chenopodium album* – lamb's quarters
* *Salsola tragus* – prickly russian-thistle, tumbleweed

EUPHORBIACEAE – SPURGE FAMILY

Croton setiger – doveweed

FABACEAE – LEGUME FAMILY

* *Parkinsonia aculeata* – Mexican palo verde

GERANIACEAE – GERANIUM FAMILY

* *Erodium cicutarium* – red-stem filaree/storksbill

MALVACEAE – MALLOW FAMILY

* *Malva parviflora* – cheeseweed

POLYGONACEAE – BUCKWHEAT FAMILY

* *Polygonum aviculare* – common knotweed, doorweed

SOLANACEAE – NIGHTSHADE FAMILY

Datura wrightii – western jimson weed

TAMARICACEAE – TAMARISK FAMILY

* *Tamarix ramosissima* – saltcedar

Angiosperms: Monocots

POACEAE – GRASS FAMILY

* *Br*omus diandrus – ripgut grass
* *Bromus hordeaceus* – soft chess
* *Polypogon monspeliensis* – annual beard grass
* *Bromus rubens* – foxtail chess, red brome
* *Hordeum murinum* – barley

* signifies introduced (non-native) species

Attachment E
Wildlife Species

Amphibians

Toads

PELOBATIDAE – SPADEFOOTS

Spea hammondii – western spadefoot

Birds

Blackbirds, Orioles and Allies

ICTERIDAE – BLACKBIRDS

Agelaius phoeniceus – red-winged blackbird

Sturnella neglecta – western meadowlark

Finches

FRINGILLIDAE – FRINGILLINE AND CARDUELINE FINCHES AND ALLIES

Haemorhous mexicanus – house finch

Flycatchers

TYRANNIDAE – TYRANT FLYCATCHERS

Sayornis saya – Say's phoebe

Tyrannus verticalis – western kingbird

Hummingbirds

TROCHILIDAE – HUMMINGBIRDS

Calypte anna – Anna's hummingbird

Jays, Magpies and Crows

CORVIDAE – CROWS AND JAYS

Corvus corax – common raven

Mockingbirds and Thrashers

MIMIDAE – MOCKINGBIRDS AND THRASHERS

Mimus polyglottos – northern mockingbird

Shorebirds

CHARADRIIDAE – LAPWINGS AND PLOVERS

Charadrius vociferus – killdeer

Waterfowl

ANATIDAE – DUCKS, GEESE, AND SWANS

Anas platyrhynchos – mallard

Wood Warblers and Allies

PARULIDAE – WOOD-WARBLERS

Setophaga coronata – yellow-rumped warbler

New World Sparrows

PASSERELLIDAE – NEW WORLD SPARROWS

Zonotrichia leucophrys – white-crowned sparrow

Invertebrates

Fairy Shrimp

BRANCHINECTIDAE – FAIRY SHRIMP

Branchinecta lindahli – versatile fairy shrimp

Mammals

Canids

CANIDAE – WOLVES AND FOXES

Canis latrans – coyote

Hares and Rabbits

LEPORIDAE – HARES AND RABBITS

Lepus californicus – black-tailed jackrabbit

Reptiles

Lizards

PHRYNOSOMATIDAE – IGUANID LIZARDS

Sceloporus occidentalis – western fence lizard

Attachment F

Special-Status Plant Species Detected or Potentially Occurring in the Study Area

Scientific Name	Common Name	Status (Federal/ State/CRPR)	Primary Habitat Associations/ Life Form/ Blooming Period/ Elevation Range (feet)	Potential to Occur
Abronia villosa var. *aurita*	chaparral sand-verbena	None/None/1B.1	Chaparral, coastal scrub, desert dunes; Sandy/annual herb/(Jan.) Mar.–Sep./245–5,245	Not expected to occur. No suitable vegetation present. No chaparral sand verbena was observed during rare plant surveys. The site is highly disturbed. The closest collection is near Hemet, California (Calflora 2023; CCH 2023).
Allium marvinii	Yucaipa onion	None/None/1B.2	Chaparral (clay, openings)/ perennial bulbiferous herb/ Apr.–May/2,490–3,490	Not expected to occur. The site is outside of the species' known elevation range, and there is no suitable vegetation present. Yucaipa onion was not observed during rare plant surveys. The site is highly disturbed. The closest collection is near Wildomar in the mountain habitat (Calflora 2023; CCH 2023).
Allium munzii	Munz's onion	FE/ST/1B.1	Chaparral, cismontane woodland, Coastal scrub, pinyon and juniper woodland, valley and foothill grassland; clay, mesic/perennial bulbiferous herb/Mar.–May/ 975–3,510	Not expected to occur. Munz's onion was not observed during rare plant survey or the vernal pool habitat assessment. The site is highly disturbed. The closest collection is near Diamond Valley Lake (Calflora 2023; CCH 2023).
Almutaster pauciflorus	alkali marsh aster	None/None/2B.2	Meadows and seeps; alkaline/ perennial herb/June–Oct./ 785–2,620	Not expected to occur. No suitable vegetation present. Alkali marsh aster was not observed during rare plant surveys or vernal pool assessment. One alkali marsh aster has been documented in Riverside County in 1937 near Temecula, California (Calflora 2023; CCH 2023).
Ambrosia pumila	San Diego ambrosia	FE/None/1B.1	Chaparral, coastal scrub, valley and foothill grassland, Vernal pools; alkaline (sometimes), clay (sometimes), disturbed areas (often), loam (sometimes), sandy (sometimes)/perennial rhizomatous herb/Apr.–Oct./ 65–1,360	Not expected to occur. San Diego ambrosia was not observed during rare plant surveys or the vernal pool habitat assessment. The closest collection is north of Lake Elsinore, California (Calflora 2023; CCH 2023).

Scientific Name	Common Name	Status (Federal/ State/CRPR)	Primary Habitat Associations/ Life Form/ Blooming Period/ Elevation Range (feet)	Potential to Occur
Amsinckia douglasiana	Douglas' fiddleneck	None/None/4.2	Cismontane woodland, valley and foothill grassland; dry/annual herb/Mar.–May/0–6,395	Not expected to occur. Douglas' fiddleneck was not observed during rare plant surveys or the vernal pool assessment. No collections have been documented near the project site. The closest documented collection is near Wildomar, California (Calflora 2023; CCH 2023). In addition, the site is highly disturbed.
Arctostaphylos rainbowensis	rainbow manzanita	None/None/1B.1	Chaparral/perennial evergreen shrub/Dec.–March/675–2,195	Not expected to occur. No suitable vegetation present. The closest collection is near Temecula, California (Calflora 2023; CCH 2023).
Astragalus pachypus var. *jaegeri*	Jaeger's milk-vetch	None/None/1B.1	Chaparral, cismontane woodland, coastal scrub, valley and foothill grassland; rocky (sometimes), sandy (sometimes)/perennial shrub/Dec.–June/1,195–3,195	Not expected to occur. Jaeger's milk vetch was not observed during rare plant surveys or the vernal pool assessment. No Astragalus species were observed on site. The closest documented collection is east of Hemet, California (Calflora 2023; CCH 2023)
Atriplex coronata var. *notatior*	San Jacinto Valley crownscale	FE/None/1B.1	Playas, valley and foothill grassland (mesic), vernal pools; alkaline/annual herb/Apr.–Aug./ 455–1,640	Not expected to occur. San Jacinto Valley crownscale was not observed during rare plant surveys or the vernal pool assessment. The site is highly disturbed. The site is not highly alkaline. Documented collections occur closer to Nuevo in alkaline habitat (Calflora 2023; CCH 2023).
Atriplex parishii	Parish's brittlescale	None/None/1B.1	Chenopod scrub, playas, vernal pools; alkaline/annual herb/ June–Oct./80–6,230	Not expected to occur. Parish's brittlescale was not observed during rare plant surveys. The site is highly disturbed. The site is not alkaline. The closest collection is northeast of Double Butte Mountain (Calflora 2023; CCH 2023).
Atriplex serenana var. *davidsonii*	Davidson's saltscale	None/None/1B.2	Coastal bluff scrub, coastal scrub; alkaline/annual herb/Apr.–Oct./ 35–655	Not expected to occur. The site is outside of the species' known elevation range, and there is no suitable vegetation present. The site is not alkaline. The closest collection is near Winchester, California (Calflora 2023; CCH 2023).

Scientific Name	Common Name	Status (Federal/ State/CRPR)	Primary Habitat Associations/ Life Form/ Blooming Period/ Elevation Range (feet)	Potential to Occur
Ayenia compacta	California ayenia	None/None/2B.3	Mojavean desert scrub, Sonoran desert scrub; rocky/perennial herb/Mar.–Apr./490–3,590	Not expected to occur. No suitable vegetation present. The closest collection is north of Lake Elsinore and was collected in 1929 (Calflora 2023; CCH 2023).
Berberis nevinii	Nevin's barberry	FE/SE/1B.1	Chaparral, cismontane woodland, coastal scrub, riparian scrub; gravelly (sometimes), sandy (sometimes)/perennial evergreen shrub/(Feb.) Mar.–June/ 230–2,705	Not expected to occur. No suitable vegetation present. The site is too disturbed. The closest collection is near Vail Lake (Calflora 2023; CCH 2023).
Brodiaea filifolia	thread-leaved brodiaea	FT/SE/1B.1	Chaparral (openings), cismontane woodland, coastal scrub, playas, valley and foothill grassland, vernal pools; clay (often)/perennial bulbiferous herb/Mar.–June/80–3,670	Not expected to occur. Thread-leaved brodiaea was not observed during rare plant surveys or the vernal pool assessment. A rare plant reference check was performed on May 10 and May 17, 2023, and on both dates thread-leaved brodiaea was in full bloom (Socalrare_plants 2022).
Brodiaea santarosae	Santa Rosa Basalt brodiaea	None/None/1B.2	Valley and foothill grassland/ perennial bulbiferous herb/ May–June/1,850–3,425	Not expected to occur. The site is outside of the species' known elevation range. The closest collection is near Wildomar Campground (Calflora 2023; CCH 2023).
Calochortus catalinae	Catalina mariposa lily	None/None/4.2	Chaparral, cismontane woodland, coastal scrub, valley and foothill grassland/perennial bulbiferous herb/(Feb.) Mar.–June/50–2,295	Not expected to occur. The habitat is highly disturbed onsite. Catalina mariposa lily requires minimally disturbed habitat.
Calochortus plummerae	Plummer's mariposa-lily	None/None/4.2	Chaparral, cismontane woodland, coastal scrub, lower montane coniferous forest, valley and foothill grassland; granitic, rocky/ perennial bulbiferous herb/ May–July/330–5,575	Not expected to occur. The habitat is highly disturbed on site. Plummer's mariposa lily requires minimally disturbed habitat.
Calochortus weedii var. *intermedius*	intermediate mariposa-lily	None/None/1B.2	Chaparral, coastal scrub, valley and foothill grassland; rocky/ perennial bulbiferous herb/ May–July/345–2,805	Not expected to occur. The habitat is highly disturbed on site. Intermediate mariposa lily requires minimally disturbed habitat.

Scientific Name	Common Name	Status (Federal/ State/CRPR)	Primary Habitat Associations/ Life Form/ Blooming Period/ Elevation Range (feet)	Potential to Occur
Carex buxbaumii	Buxbaum's sedge	None/None/4.2	Bogs and fens, marshes and swamps, meadows and seeps (mesic)/perennial rhizomatous herb/Mar.–Aug./10–10,825	Not expected to occur. No suitable vegetation present. No Carex species were observed onsite.
Caulanthus simulans	Payson's jewelflower	None/None/4.2	Chaparral, coastal scrub; granitic, sandy/annual herb/ (Feb.) Mar.–May (June)/ 295–7,215	Not expected to occur. No suitable vegetation present. The site is highly disturbed.
Centromadia pungens ssp. *laevis*	smooth tarplant	None/None/1B.1	Chenopod scrub, meadows and seeps, playas, riparian woodland, valley and foothill grassland; alkaline/annual herb/Apr.–Sep./ 0–2,095	Not expected to occur. Smooth tarplant survives well in disturbance. However, smooth tarplant was not observed during rare plant surveys or the vernal pool assessment. Smooth tarplant can easily be observed year-round. The closest documented collection is in Winchester, California (Calflora 2023; CCH 2023).
Chorizanthe leptotheca	Peninsular spineflower	None/None/4.2	Chaparral, coastal scrub, lower montane coniferous forest; granitic/annual herb/May–Aug./ 985–6,230	Not expected to occur. No suitable vegetation present. The site is highly disturbed. Peninsular spine flower was not observed during rare plant surveys.
Chorizanthe parryi var. *parryi*	Parry's spineflower	None/None/1B.1	Chaparral, cismontane woodland, coastal scrub, valley and foothill grassland; openings, rocky (sometimes), sandy (sometimes)/ annual herb/Apr.–June/ 900–4,000	Not expected to occur. The site is highly disturbed. Parry's spineflower was not observed during rare plant surveys.
Chorizanthe polygonoides var. *longispina*	long-spined spineflower	None/None/1B.2	Chaparral, coastal scrub, meadows and seeps, valley and foothill grassland, vernal pools; clay (often)/annual herb/ Apr.–July/100–5,015	Not expected to occur. The site is too highly disturbed. The site consists of sandy soils, and long-spined spineflower is more likely associated with clay soils. Long-spined spineflower was not observed during rare plant surveys. The closest collection is on Double Butte Mountain (Calflora 2023; CCH 2023).

Scientific Name	Common Name	Status (Federal/ State/CRPR)	Primary Habitat Associations/ Life Form/ Blooming Period/ Elevation Range (feet)	Potential to Occur
Clinopodium chandleri	San Miguel savory	None/None/1B.2	Chaparral, cismontane woodland, coastal scrub, riparian woodland, valley and foothill grassland; gabbroic (sometimes), rocky (sometimes)/perennial shrub/ Mar.–July/395–3,525	Not expected to occur. The site is too highly disturbed. San Miguel savory occurs in pristine habitat. The closest collection is west of Interstate 15 (Calflora 2023; CCH 2023). Gabbronic soils do not occur on site.
Convolvulus simulans	small-flowered morning-glory	None/None/4.2	Chaparral (openings), coastal scrub, valley and foothill grassland; clay, seeps, serpentinite/annual herb/ Mar.–July/100–2,425	Not expected to occur. The site is too highly disturbed. Small-flowered morning glory is often associated with clay soils. The site consists of sandy soils. The closest locations are west of Interstate 215 (Calflora 2023; CCH 2023).
Cryptantha wigginsii	Wiggins' cryptantha	None/None/1B.2	Coastal scrub; clay (often)/annual herb/Feb.–June/65–900	Not expected to occur. The site is outside of the species' known elevation range, and there is no suitable vegetation present. The site consists of sandy soils. No clay soils are present. The closest collection and only collection in Riverside County is south of Skinner Reservoir (Calflora 2023; CCH 2023).
Deinandra paniculata	paniculate tarplant	None/None/4.2	Coastal scrub, valley and foothill grassland, vernal pools; sandy (sometimes), vernally mesic (usually)/annual herb/ (Mar.) Apr.–Nov./80–3,080	Observed throughout the site and mapped. Observed on both rare plant surveys November 11, 2022, and May 29, 2023. More were blooming in November when documented.
Dodecahema leptoceras	slender-horned spineflower	FE/SE/1B.1	Chaparral, cismontane woodland, coastal scrub (alluvial fans); sandy/annual herb/Apr.–June/ 655–2,490	Not expected to occur. No suitable vegetation present. The site is too highly disturbed. Slender-horned spineflower occurs in alluvial fans, which are not present on site. The closest collection occurs near Lake Elsinore (Calflora 2023; CCH 2023).
Dudleya multicaulis	many-stemmed dudleya	None/None/1B.2	Chaparral, coastal scrub, valley and foothill grassland; clay (often)/ perennial herb/Apr.–July/ 50–2,590	Not expected to occur. The site is too disturbed. Many-stemmed Dudleya requires pristine habitat. The closest collection is north of Lake Elsinore (Calflora 2023; CCH 2023).

Scientific Name	Common Name	Status (Federal/ State/CRPR)	Primary Habitat Associations/ Life Form/ Blooming Period/ Elevation Range (feet)	Potential to Occur
Eryngium aristulatum var. *parishii*	San Diego button-celery	FE/SE/1B.1	Coastal scrub, valley and foothill grassland, vernal pools; mesic/ annual/perennial herb/Apr.–June/ 65–2,030	Not expected to occur. San Diego button celery was not observed during rare plant surveys or during the vernal pool assessment.
Erythranthe diffusa	Palomar monkeyflower	None/None/4.3	Chaparral, lower montane coniferous forest; gravelly (sometimes), sandy (sometimes)/ annual herb/Apr.–June/ 4,000–6,000	Not expected to occur. The site is outside of the species' known elevation range, and there is no suitable vegetation present.
Geothallus tuberosus	Campbell's liverwort	None/None/1B.1	Coastal scrub (mesic), vernal pools/ephemeral liverwort/ no bloom period/35–1,965	Not expected to occur. The site is disturbed. A rare plant survey was performed, and no liverworts were observed.
Harpagonella palmeri	Palmer's grapplinghook	None/None/4.2	Chaparral, coastal scrub, valley and foothill grassland; clay, openings/annual herb/ Mar.–May/65–3,130	Not expected to occur. The site is too highly disturbed. The site consists of sandy soils, and Palmer's grapplinghook requires clay soils.
Hesperocyparis forbesii	Tecate cypress	None/None/1B.1	Chaparral, closed-cone coniferous forest; clay, gabbroic (sometimes)/ perennial evergreen tree/ no bloom period/260–4,920	Not expected to occur. No suitable vegetation present. Tecate cypress requires clay soils. The site consists of sandy soils. The closest collection is near San Mateo Peak (Calflora 2023; CCH 2023).
Holocarpha virgata ssp. *elongata*	graceful tarplant	None/None/4.2	Chaparral, cismontane woodland, coastal scrub, valley and foothill grassland/annual herb/ May–Nov./195–3,605	Not expected to occur. Graceful tarplant was not observed during rare plant surveys. Graceful tarplant can tolerate some disturbance. However, no collections have been made near the site. Collections are west of Murrieta, California (Calflora 2023; CCH 2023).
Hordeum intercedens	vernal barley	None/None/3.2	Coastal dunes, coastal scrub, valley and foothill grassland (depressions, saline flats), vernal pools/annual herb/Mar.–June/ 15–3,280	Not expected to occur. Vernal barley was not observed during rare plant surveys. Most collections of vernal barley occur near Hemet, California. The closest collection is near Perris, California (Calflora 2023; CCH 2023).

Scientific Name	Common Name	Status (Federal/ State/CRPR)	Primary Habitat Associations/ Life Form/ Blooming Period/ Elevation Range (feet)	Potential to Occur
Juglans californica	Southern California black walnut	None/None/4.2	Chaparral, cismontane woodland, coastal scrub, riparian woodland/ perennial deciduous tree/ Mar.–Aug./165–2,950	Not expected to occur. No suitable vegetation present. Southern California black walnut was not observed during rare plant surveys.
Juncus acutus ssp. *leopoldii*	southwestern spiny rush	None/None/4.2	Coastal dunes (mesic), coastal scrub, marshes and swamps (coastal salt), meadows and seeps (alkaline seeps)/perennial rhizomatous herb/ (Mar.) May–June/10–2,950	Not expected to occur. No suitable vegetation present. Southwestern spiny rush was not observed during rare plant surveys.
Juncus luciensis	Santa Lucia dwarf rush	None/None/1B.2	Chaparral, Great Basin scrub, Lower montane coniferous forest, meadows and seeps, Vernal pools/annual herb/Apr–July/ 985–6,690	Not expected to occur. No Juncus species were observed during rare plant surveys or vernal pool checks. The closest collection is near Monument Hill west of Interstate 15 (Calflora 2023; CCH 2023).
Lasthenia glabrata ssp. *coulteri*	Coulter's goldfields	None/None/1B.1	Marshes and swamps (coastal salt), playas, vernal pools/annual herb/Feb.–June/5–4,000	Not expected to occur. Coulter's goldfields were not observed during rare plant surveys. The closest collection is near Egan, California (Calflora 2023; CCH 2023)
Lathyrus splendens	pride-of-California	None/None/4.3	Chaparral/perennial herb/ Mar.–June/655–5,000	Not expected to occur. No suitable vegetation present. No chaparral is present on site.
Lepidium virginicum var. *robinsonii*	Robinson's pepper-grass	None/None/4.3	Chaparral, coastal scrub/annual herb/Jan.–July/5–2,900	Not expected to occur. No suitable vegetation present.
Lilium humboldtii ssp. *ocellatum*	ocellated Humboldt lily	None/None/4.2	Chaparral, cismontane woodland, coastal scrub, Lower montane coniferous forest, riparian woodland; openings/perennial bulbiferous herb/ Mar.–July (Aug.)/100–5,905	Not expected to occur. No suitable vegetation present. The site is too highly disturbed. The closest documented collection is northwest of Lake Elsinore close to Santiago Peak (Calfora 2023; CCH 2023).

Scientific Name	Common Name	Status (Federal/ State/CRPR)	Primary Habitat Associations/ Life Form/ Blooming Period/ Elevation Range (feet)	Potential to Occur
Lilium parryi	lemon lily	None/None/1B.2	Lower montane coniferous forest, meadows and seeps, riparian forest, upper montane coniferous forest; mesic/perennial bulbiferous herb/July–Aug./ 4,000–9,005	Not expected to occur. The site is outside of the species' known elevation range, and there is no suitable vegetation present. The closest collection is near Mt. San Jacinto State Park (Calflora 2023; CCH2023).
Limnanthes alba ssp. *parishii*	Parish's meadowfoam	None/SE/1B.2	Lower montane coniferous forest, meadows and seeps, vernal pools; vernally mesic/annual herb/Apr.–June/1,965–6,560	Not expected to occur. The site is outside of the species' known elevation range. The closest collection is near Mt. San Jacinto State Park (Calflora 2023; CCH2023).
Microseris douglasii ssp. *platycarpha*	small-flowered microseris	None/None/4.2	Cismontane woodland, coastal scrub, valley and foothill grassland, vernal pools; clay/ annual herb/Mar.–May/50–3,510	Not expected to occur. The site is too disturbed. The soils on site are sandy. Small-flowered microseris requires clay soils. The closest collection is near the Perris airport (Calflora 2023; CCH 2023).
Monardella hypoleuca ssp. *intermedia*	intermediate monardella	None/None/1B.3	Chaparral, cismontane woodland, Lower montane coniferous forest (sometimes)/perennial rhizomatous herb/Apr.–Sep/ 1,310–4,100	Not expected to occur. No suitable vegetation present. The closest collection is northwest of Lake Elsinore, California, in the Cleveland National Forest (Calflora 2023; CCH2023).
Myosurus minimus ssp. *apus*	little mousetail	None/None/3.1	Valley and foothill grassland, vernal pools (alkaline)/annual herb/Mar.–June/65–2,095	Not expected to occur. The site is not alkaline. Little mousetail was not observed during vernal pool surveys or rare plant surveys. Little mousetail is typically found within vernal pools. The closest collections are near Menifee Lakes (Calflora 2023; CCH 2023).
Nama stenocarpa	mud nama	None/None/2B.2	Marshes and swamps (lake margins, riverbanks)/annual/ perennial herb/Jan.–July/ 15–1,640	Not expected to occur. No suitable vegetation present. Mud nama was not observed during rare plant surveys or vernal pool surveys. The closest collection of mud name is east of Mystic Lake (Calflora 2023; CCH2023).

Scientific Name	Common Name	Status (Federal/ State/CRPR)	Primary Habitat Associations/ Life Form/ Blooming Period/ Elevation Range (feet)	Potential to Occur
Navarretia fossalis	spreading navarretia	FT/None/1B.1	Chenopod scrub, marshes and swamps (shallow freshwater), playas, vernal pools/annual herb/Apr.–June/100–2,145	Not expected to occur. Spreading navarretia was not observed during vernal pool surveys. The closest collection is historical from 1998 near Menifee Lakes (Calflora 2023; CCH 2023).
Navarretia prostrata	prostrate vernal pool navarretia	None/None/1B.2	Coastal scrub, meadows and seeps, valley and foothill grassland (alkaline), vernal pools; mesic/ annual herb/Apr.–July/10–3,965	Not expected to occur. The project site is not alkaline. Prostrate vernal pool navarretia was not observed during rare plant surveys or the vernal pool studies. The closest collection is near the Santa Rosa Plateau South Trailhead (Calflora 2023; CCH 2023).
Orcuttia californica	California Orcutt grass	FE/SE/1B.1	Vernal pools/annual herb/ Apr.–Aug./50–2,165	Not expected to occur. California Orcutt grass was not observed during rare plant surveys, vernal pool studies or vernal pool habitat assessment. The closest collections are near Menifee Lakes (Calflora 2023; CCH 2023).
Pseudognaphalium leucocephalum	white rabbit-tobacco	None/None/2B.2	Chaparral, cismontane woodland, coastal scrub, riparian woodland; gravelly, sandy/perennial herb/ (July) Aug.–Nov. (Dec.)/0–6,885	Not expected to occur. No suitable vegetation present. White rabbit tobacco was not observed during rare plant surveys. The closest collections are near Alberhill and Temescal Valley, California (Calflora 2023; CCH 2023).
Quercus engelmannii	Engelmann oak	None/None/4.2	Chaparral, cismontane woodland, riparian woodland, valley and foothill grassland/perennial deciduous tree/Mar.–June/ 165–4,265	Not expected to occur. Engelmann oak was not observed during rare plant surveys. Engelman oak can be observed year-round. No oak trees are present on site.
Romneya coulteri	Coulter's matilija poppy	None/None/4.2	Chaparral, coastal scrub; burned areas (often)/perennial rhizomatous herb/ Mar.–July (Aug.)/65–3,935	Not expected to occur. No suitable vegetation present. The closest collection is north of Lake Elsinore, California (Calflora 2023; CCH 2023).
Scutellaria bolanderi ssp. *austromontana*	southern mountains skullcap	None/None/1B.2	Chaparral, cismontane woodland, lower montane coniferous forest; mesic/perennial rhizomatous herb/June–Aug./1,390–6,560	Not expected to occur. No suitable vegetation present. The closest collection is west of Lake Elsinore, California (Calflora 2023; CCH 2023).

Scientific Name	Common Name	Status (Federal/ State/CRPR)	Primary Habitat Associations/ Life Form/ Blooming Period/ Elevation Range (feet)	Potential to Occur
Sibaropsis hammittii	Hammitt's clay-cress	None/None/1B.2	Chaparral (openings), valley and foothill grassland; clay/annual herb/Mar.–Apr./2,360–3,490	Not expected to occur. The site is outside of the species' known elevation range. Hammitt's clay cress occurs only in clay soils which are not found onsite. The site is too disturbed. Hammitt's clay cress requires pristine habitat.
Sidalcea neomexicana	salt spring checkerbloom	None/None/2B.2	Chaparral, coastal scrub, lower montane coniferous forest, Mojavean desert scrub, playas; alkaline, mesic/perennial herb/Mar.–June/50–5,015	Not expected to occur. No suitable vegetation present.
Sphaerocarpos drewiae	bottle liverwort	None/None/1B.1	Chaparral, coastal scrub; openings/ephemeral liverwort/ no bloom period/295–1,965	Not expected to occur. No suitable vegetation present.
Symphyotrichum defoliatum	San Bernardino aster	None/None/1B.2	Cismontane woodland, coastal scrub, lower montane coniferous forest, marshes and swamps, meadows and seeps, valley and foothill grassland (vernally mesic); streambanks/perennial rhizomatous herb/July–Nov./ 5–6,690	Not expected to occur. San Bernardino aster was not observed during rare plant surveys. The site is too disturbed. Collections occur west of Interstate 215 (Calflora 2023; CCH 2023).
Texosporium sancti-jacobi	woven-spored lichen	None/None/3	Chaparral (openings)/crustose lichen (terricolous)/no bloom period/195–2,165	Not expected to occur. No suitable vegetation present. No lichen species were observed onsite. The site is too disturbed. Cryptogamic crusts were not present.
Tortula californica	California screw moss	None/None/1B.2	Chenopod scrub, valley and foothill grassland; sandy/moss// 35–4,790	Not expected to occur. No cryptogamic crusts were present during rare plant surveys. The site is too disturbed. The closest collection is near Ortega Falls (Calflora 2023; CCH 2023).
Trichocoronis wrightii var. *wrightii*	Wright's trichocoronis	None/None/2B.1	Marshes and swamps, meadows and seeps, riparian forest, vernal pools; alkaline/annual herb/ May–Sep./15–1,425	Not expected to occur. Wright's trichocoronis was not observed during rare plant surveys or the vernal pool assessment. The closest collections of this species are near Perris Reservoir (Calflora 2023; CCH 2023).

Scientific Name	Common Name	Status (Federal/ State/CRPR)	Primary Habitat Associations/ Life Form/ Blooming Period/ Elevation Range (feet)	Potential to Occur
Viguiera laciniata	San Diego County viguiera	None/None/4.3	Chaparral, coastal scrub/perennial shrub/Feb.–June (Aug.)/ 195–2,460	Not expected to occur. No suitable vegetation present. San Diego county viguiera is rare in Riverside County. The only observation is west of Lake Elsinore, California. No collections have been made in Riverside County (Calflora 2023; CCH 2023).

Status Legend
Federal
FE: Federally listed as endangered
FT: Federally listed as threatened
State
SE: State listed as endangered
ST: State listed as threatened
CRPR: California Rare Plant Rank
1B: Plants rare, threatened, or endangered in California and elsewhere
2B: Plants rare, threatened, or endangered in California, but more common elsewhere
3: Plants about which more information is needed – A Review List
4: Plants of Limited Distribution – A Watch List
Threat Rank
0.1 – Seriously threatened in California (over 80% of occurrences threatened/high degree and immediacy of threat)
0.2 – Moderately threatened in California (20%–80% occurrences threatened/moderate degree and immediacy of threat)
0.3 – Not very threatened in California (less than 20% of occurrences threatened/low degree and immediacy of threat or no current threats known)

References

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Attachment G

Special-Status Wildlife Species Detected or Potentially Occurring in the Study Area

Scientific Name	Common Name	Status (Federal/State)	Habitat	Potential to Occur
Amphibians				
Ambystoma californiense pop. 1	California tiger salamander - central California DPS	FT/ST, WL	Annual grassland, valley–foothill hardwood, and valley–foothill riparian habitats; vernal pools, other ephemeral pools, and (uncommonly) along stream courses and human-made pools if predatory fishes are absent	Not expected to occur. The site is approximately 200 miles south of the edge of this species' range in Central California.
Anaxyrus californicus	arroyo toad	FE/SSC	Semi-arid areas near washes, sandy riverbanks, riparian areas, palm oasis, Joshua tree, mixed chaparral and sagebrush; stream channels for breeding (typically third order); adjacent stream terraces and uplands for foraging and wintering	Not expected to occur. No suitable vegetation present.
Rana draytonii	California red-legged frog	FT/SSC	Lowland streams, wetlands, riparian woodlands, livestock ponds; dense, shrubby or emergent vegetation associated with deep, still or slow-moving water; uses adjacent uplands	Not expected to occur. No suitable vegetation present.
Spea hammondii	western spadefoot	None/SSC	Primarily grassland and vernal pools, but also in ephemeral wetlands that persist at least 3 weeks in chaparral, coastal scrub, valley–foothill woodlands, pastures, and other agriculture	**Observed on site.**
Taricha torosa (Monterey Co. south only)	California newt	None/SSC	Wet forests, oak forests, chaparral, and rolling grassland	Not expected to occur. No suitable vegetation present.
Reptiles				
Anniella stebbinsi	southern California legless lizard	None/SSC	Coastal dunes, stabilized dunes, beaches, dry washes, valley–foothill, chaparral, and scrubs; pine, oak, and riparian woodlands; associated with sparse vegetation and moist sandy or loose, loamy soils	Not expected to occur. No suitable vegetation present.

Scientific Name	Common Name	Status (Federal/State)	Habitat	Potential to Occur
Arizona elegans occidentalis	California glossy snake	None/SSC	Arid scrub, rocky washes, grasslands, chaparral, open areas with loose soil	Not expected to occur. No suitable vegetation present.
Aspidoscelis hyperythra	orange-throated whiptail	None/WL	Low-elevation coastal scrub, chaparral, and valley–foothill hardwood	Not expected to occur. No suitable vegetation present.
Aspidoscelis tigris stejnegeri	San Diegan tiger whiptail	None/SSC	Hot and dry areas with sparse foliage, including chaparral, woodland, and riparian areas.	Not expected to occur. No suitable vegetation present.
Coleonyx variegatus abbotti	San Diego banded gecko	None/SSC	Rocky areas within coastal scrub and chaparral	Not expected to occur. No suitable vegetation present.
Crotalus ruber	red diamondback rattlesnake	None/SSC	Coastal scrub, chaparral, oak and pine woodlands, rocky grasslands, cultivated areas, and desert flats	Not expected to occur. No suitable vegetation present.
Diadophis punctatus modestus	San Bernardino ring-necked snake	None/None	Moist habitats including wet meadows, rocky hillsides, gardens, farmland grassland, chaparral, mixed-conifer forest, and woodland	Not expected to occur. No suitable vegetation present.
Diadophis punctatus similis	San Diego ringneck snake	None/None	Moist habitats including wet meadows, rocky hillsides, gardens, farmland grassland, chaparral, mixed-conifer forest, and woodland habitats	Not expected to occur. No suitable vegetation present.
Phrynosoma blainvillii	Blainville's horned lizard	None/SSC	Open areas of sandy soil in valleys, foothills, and semi-arid mountains including coastal scrub, chaparral, valley–foothill hardwood, conifer, riparian, pine–cypress, juniper, and annual grassland habitats	Not expected to occur. No suitable vegetation present.
Salvadora hexalepis virgultea	coast patch-nosed snake	None/SSC	Brushy or shrubby vegetation; requires small mammal burrows for refuge and overwintering sites	Not expected to occur. No suitable vegetation present.
Thamnophis hammondii	two-striped gartersnake	None/SSC	Streams, creeks, pools, streams with rocky beds, ponds, lakes, vernal pools	Low potential to occur. There is 1 occurrence within the nine 7.5-minute quadrangle search area, which is from 2001 and lies 12 miles south of the study area (CDFW 2023). The site is within this species' range, and it is a

Scientific Name	Common Name	Status (Federal/State)	Habitat	Potential to Occur
				fairly common species (CaliforniaHerps.com 2023). The fragmented and disturbed habitat makes their presence less likely.
Birds				
Accipiter cooperii (nesting)	Cooper's hawk	None/WL	Nests and forages in dense stands of live oak, riparian woodlands, or other woodland habitats often near water	Not expected to occur. No suitable vegetation present.
Accipiter striatus (nesting)	sharp-shinned hawk	None/WL	Nests in coniferous forests, ponderosa pine, black oak, riparian deciduous, mixed conifer, Jeffrey pine; winters in lowland woodlands and other habitats	Not expected to occur. No suitable vegetation present.
Agelaius tricolor (nesting colony)	tricolored blackbird	BCC/SSC, ST	Nests near freshwater, emergent wetland with cattails or tules, but also in Himalayan blackberry; forages in grasslands, woodland, and agriculture	Not expected to occur. No suitable vegetation present.
Aimophila ruficeps canescens	Southern California rufous-crowned sparrow	None/WL	Nests and forages in open coastal scrub and chaparral with low cover of scattered scrub interspersed with rocky and grassy patches	Not expected to occur. No suitable vegetation present.
Ammodramus savannarum (nesting)	grasshopper sparrow	None/SSC	Nests and forages in moderately open grassland with tall forbs or scattered shrubs used for perches	Not expected to occur. No suitable vegetation present.
Aquila chrysaetos (nesting and wintering)	golden eagle	None/FP, WL	Nests and winters in hilly, open/semi-open areas, including shrublands, grasslands, pastures, riparian areas, mountainous canyon land, open desert rimrock terrain; nests in large trees and on cliffs in open areas and forages in open habitats	Not expected to occur. No suitable vegetation present.
Ardea alba (nesting colony)	great egret	None/None	Nests and roosts in large trees over water or on islands, both in freshwater and marine estuarine habitats; forages in wetlands, including marshes, streams, ditches, and fish-rearing ponds, but also in irrigated pastures and croplands	Not expected to occur. No suitable vegetation present.

Scientific Name	Common Name	Status (Federal/State)	Habitat	Potential to Occur
Ardea herodias (nesting colony)	great blue heron	None/None	Nests in large trees or snags; forages in wetlands, water bodies, watercourses, and opportunistically in uplands, including pasture and croplands	Low potential to occur. Habitat on site is fragmented and surrounded by urban development.
Artemisiospiza belli belli	Bell's sage sparrow	None/WL	Nests and forages in coastal scrub and dry chaparral; typically, in large, unfragmented patches dominated by chamise; nests in more dense patches but uses more open habitat in winter	Low potential to occur. The nearest mapped occurrence is 3.3 miles west of the study area and is from 1999. Occurrences that are nearly as close are from approximately the same time. The habitat within the study area is a fragmented patch of disturbed land, and scrub and dry chaparral are not present.
Asio flammeus (nesting)	short-eared owl	BCC/SSC	Grassland, prairies, dunes, meadows, irrigated lands, and saline and freshwater emergent wetlands	Not expected to occur. No suitable vegetation present.
Asio otus (nesting)	long-eared owl	None/SSC	Nests in riparian habitat, live oak thickets, other dense stands of trees, edges of coniferous forest; forages in nearby open habitats	Not expected to occur. No suitable vegetation present.
Athene cunicularia (burrow sites and some wintering sites)	burrowing owl	BCC/SSC	Nests and forages in grassland, open scrub, and agriculture, particularly with ground squirrel burrows	Not expected to occur. No suitable vegetation present.
Aythya americana (nesting)	redhead	None/SSC	Nests in deep (>3 feet) permanent or semi-permanent wetlands of at least 1 acre; 75% open water; emergent tules, *Scirpus* spp., and *Typha* spp. 3 feet in height; winters in coastal estuaries and large, deep ponds, lakes, and reservoirs of the interior	Not expected to occur. No suitable vegetation present.
Aythya valisineria (nesting)	canvasback	None/None	Breeds in small lakes, deep-water marshes, alkali lake sheltered bays, permanent and semi-permanent ponds, sloughs, potholes, river impoundments; migrates in coastal marine and freshwater; winters in deep freshwater lakes, estuaries, and shallow bays	Not expected to occur. Suitably large habitat is not present on site.

Scientific Name	Common Name	Status (Federal/State)	Habitat	Potential to Occur
Botaurus lentiginosus	American bittern	None/None	Nests in marshes with fairly tall freshwater vegetation (3–4 feet) and shallow water (less than 1 foot) near rivers, ponds, and lakes	Not expected to occur. No suitable vegetation present.
Branta bernicla (wintering and staging)	brant	None/SSC	Nesting habitat includes the edges of saltmarshes in the low Arctic region; migratory habitats include shallow marine lakes; winter range includes intertidal mudflats in shallow marine waters with abundant eelgrass and/or green algae	Not expected to occur. No suitable vegetation present.
Buteo regalis (wintering)	ferruginous hawk	None/WL	Winters and forages in open, dry country, grasslands, open fields, agriculture	Not expected to occur. No suitable vegetation present.
Buteo swainsoni (nesting)	Swainson's hawk	None/ST	Nests in open woodland and savanna, riparian, and in isolated large trees; forages in nearby grasslands and agricultural areas such as wheat and alfalfa fields and pasture	Not expected to occur. No suitable vegetation present.
Calypte costae (nesting)	Costa's hummingbird	BCC/None	Nests and forages in desert wash, edges of riparian and valley–foothill riparian, coastal scrub, desert scrub, desert succulent scrub, lower-elevation chaparral, and palm oasis	Low potential to occur. CNDDB returned no occurrences of this species. However, eBird shows observations within the vicinity of this site (eBird 2023a). On-site vegetation is disturbed and provides poor habitat.
Campylorhynchus brunneicapillus sandiegensis (San Diego and Orange Counties only)	coastal cactus wren	None/SSC	Southern cactus scrub patches	Not expected to occur. No suitable vegetation present.
Chaetura vauxi (nesting)	Vaux's swift	None/SSC	Late-stage conifer forest and mixed-conifer/deciduous forest; nests in redwood (*Sequoia sempervirens*), Douglas fir (*Pseudotsuga* spp.), and other conifers, and occasionally buildings and chimneys	Not expected to occur. No suitable vegetation present.
Charadrius montanus (wintering)	mountain plover	BCC/SSC	Winters in shortgrass prairies, plowed fields, open sagebrush, and sandy deserts	Not expected to occur. No suitable vegetation present.

Scientific Name	Common Name	Status (Federal/State)	Habitat	Potential to Occur
Charadrius nivosus nivosus (nesting)	western snowy plover	FT, BCC/SSC	On coasts nests on sandy marine and estuarine shores; in the interior nests on sandy, barren, or sparsely vegetated flats near saline or alkaline lakes, reservoirs, and ponds	Not expected to occur. No suitable vegetation present.
Chlidonias niger (nesting colony)	black tern	BCC/SSC	Freshwater marsh with emergent vegetation; in the Central Valley primarily nests and forages in rice fields and other flooded agricultural fields with weeds and other residual aquatic vegetation	Not expected to occur. No suitable vegetation present.
Circus hudsonius (nesting)	northern harrier	BCC/SSC	Nests in open wetlands (marshy meadows, wet lightly grazed pastures, old fields, freshwater and brackish marshes); also in drier habitats (grassland and grain fields); forages in grassland, scrubs, rangelands, emergent wetlands, and other open habitats	Not expected to occur. No suitable vegetation present.
Cistothorus palustris clarkae	Clark's marsh wren	None/SSC	Nests and forages in freshwater and brackish marsh dominated by bulrushes and cattails	Not expected to occur. No suitable vegetation present.
Coccyzus americanus occidentalis (nesting)	western yellow-billed cuckoo	FT/SE	Nests in dense, wide riparian woodlands and forest with well-developed understories	Not expected to occur. No suitable vegetation present.
Contopus cooperi (nesting)	olive-sided flycatcher	BCC/SSC	Nests in mixed-conifer, montane hardwood–conifer, Douglas-fir, redwood, red fir, and lodgepole pine habitats; usually close to water	Not expected to occur. No suitable vegetation present.
Cypseloides niger (nesting)	black swift	BCC/SSC	Nests in moist crevices, caves, and cliffs behind or adjacent to waterfalls in deep canyons; forages over a wide range of habitats	Not expected to occur. No suitable vegetation present.
Egretta thula (nesting colony)	snowy egret	None/None	Nests in dense marshes and trees; forages in wetlands or aquatic habitats, including estuaries, emergent wetlands, slow-moving rivers, irrigation ditches, and wet fields	Low potential to occur. One occurrence is mapped by CNDDB approximately 65 miles away at the north end of the Salton Sea. However, eBird shows the site to be within the range of this common species, though the on-site

Scientific Name	Common Name	Status (Federal/State)	Habitat	Potential to Occur
				nesting conditions are disturbed and of poor quality (eBird 2023b).
Elanus leucurus (nesting)	white-tailed kite	None/FP	Nests in woodland, riparian, and individual trees near open lands; forages opportunistically in grassland, meadows, scrubs, agriculture, emergent wetland, savanna, and disturbed lands	Not expected to occur. No suitable vegetation present.
Empidonax traillii (nesting)	willow flycatcher	None/SE	Nests in wet meadow and montane willow riparian	Not expected to occur. No suitable vegetation present.
Empidonax traillii extimus (nesting)	southwestern willow flycatcher	FE/SE	Nests in dense riparian habitats along streams, reservoirs, or wetlands; uses variety of riparian and shrubland habitats during migration	Not expected to occur. No suitable vegetation present.
Eremophila alpestris actia	California horned lark	None/WL	This subspecies of horned lark occurs on the state's southern and central coastal slope and in the San Joaquin Valley. Nests and forages in grasslands, disturbed lands, agriculture, and beaches.	Not expected to occur. No suitable vegetation present.
Falco columbarius (wintering)	merlin	None/WL	Forages in semi-open areas, including coastline, grassland, agriculture, savanna, woodland, lakes, and wetlands	Not expected to occur. No suitable vegetation present.
Falco mexicanus (nesting)	prairie falcon	None/WL	Forages in grassland, savanna, rangeland, agriculture, desert scrub, alpine meadows; nest on cliffs or bluffs	Not expected to occur. No suitable vegetation present.
Falco peregrinus anatum (nesting)	American peregrine falcon	FPD/SCD	Nests on cliffs, buildings, and bridges; forages in wetlands, riparian, meadows, croplands, especially where waterfowl are present	Low potential to occur. CNDDB returned no occurrences within 20 miles of the site (CDFW 2023). One observation is noted within 5 miles of the site: an individual in 2020 approximately 2.6 miles southeast of the study area (iNaturalist 2023). Site conditions are disturbed and poor for nesting.

Scientific Name	Common Name	Status (Federal/State)	Habitat	Potential to Occur
Haliaeetus leucocephalus (nesting and wintering)	bald eagle	FPD/FP, SE	Nests in forested areas adjacent to large bodies of water, including seacoasts, rivers, swamps, large lakes; winters near large bodies of water in lowlands and mountains	Not expected to occur. No suitable vegetation present.
Hydroprogne caspia (nesting colony)	Caspian tern	None/None	Coastal estuarine, saltmarsh, and barrier islands; nests on islands in rivers and salt lakes	Not expected to occur. No suitable vegetation present.
Icteria virens (nesting)	yellow-breasted chat	None/SSC	Nests and forages in dense, relatively wide riparian woodlands and thickets of willows, vine tangles, and dense brush	Not expected to occur. No suitable vegetation present.
Lanius ludovicianus (nesting)	loggerhead shrike	None/SSC	Nests and forages in open habitats with scattered shrubs, trees, or other perches	Not expected to occur. No suitable vegetation present.
Larus californicus (nesting colony)	California gull	BCC/WL	Nests in alkali and freshwater lacustrine habitats; abundant in coastal and interior lowlands during non-nesting period	Not expected to occur. No suitable vegetation present.
Numenius americanus (nesting)	long-billed curlew	None/WL	Nests in grazed, mixed grass, and short-grass prairies; localized nesting along the California coast; winters and forages in coastal estuaries, mudflats, open grassland, and cropland	Not expected to occur. No suitable vegetation present.
Nycticorax nycticorax (nesting colony)	black-crowned night-heron	None/None	Nests in dense-foliaged trees and dense fresh or brackish emergent wetlands associated with marshes, ponds, reservoirs, and estuaries	Not expected to occur. No suitable vegetation present.
Pandion haliaetus (nesting)	osprey	BCC/WL	Large waters (lakes, reservoirs, rivers) supporting fish; usually near forest habitats, but widely observed along the coast	Not expected to occur. No suitable vegetation or bodies of water present.
Parabuteo unicinctus (nesting)	Harris' hawk	None/WL	Semi-open desert scrub, savanna, grassland, and wetland	Low potential to occur. Nesting habitat is poor on-site. No CNDDB occurrences were returned, but eBird shows the site to be within the species' range (CDFW 2023; eBird 2023c).

Scientific Name	Common Name	Status (Federal/State)	Habitat	Potential to Occur
Pelecanus erythrorhynchos (nesting colony)	American white pelican	BCC/SSC	Nests colonially on sandy, earthen, or rocky substrates on isolated islands in freshwater lakes; minimal disturbance from predators; access to foraging areas on inland marshes, lakes, or rivers; winters on shallow coastal bays, inlets, and estuaries	Not expected to occur. Two CNDDB occurrences are mapped in the state, both near the Oregon/California border (CDFW 2023). Habitat within the study area is too small and fragmented for inland nesting.
Pelecanus occidentalis californicus (nesting colonies and communal roosts)	California brown pelican	FPD/SCD	Forages in warm coastal marine and estuarine environments; in California, nests on dry, rocky offshore islands	Not expected to occur. No coastal habitat present.
Piranga rubra (nesting)	summer tanager	None/SSC	Nests and forages in mature desert riparian habitats dominated by cottonwoods and willows	Not expected to occur. No suitable vegetation present.
Plegadis chihi (nesting colony)	white-faced ibis	None/WL	Nests in shallow marshes with areas of emergent vegetation; winter foraging in shallow lacustrine waters, flooded agricultural fields, muddy ground of wet meadows, marshes, ponds, lakes, rivers, flooded fields, and estuaries	Not expected to occur. No suitable vegetation present.
Polioptila californica californica	coastal California gnatcatcher	FT/SSC	Nests and forages in various sage scrub communities, often dominated by California sagebrush and buckwheat; generally avoids nesting in areas with a slope of greater than 40%; majority of nesting at less than 1,000 feet above mean sea level	Not expected to occur. No suitable vegetation present.
Polioptila melanura	black-tailed gnatcatcher	None/WL	Nests and forages in wooded desert wash and desert scrub	Not expected to occur. No suitable vegetation present.
Pooecetes gramineus affinis (wintering)	Oregon vesper sparrow	BCC/SSC	Nests in sagebrush and other sparse shrub vegetation; winters in grassland and cropland	Not expected to occur. No suitable vegetation present.
Progne subis (nesting)	purple martin	None/SSC	Nests and forages in woodland habitats including riparian, coniferous, and valley foothill and montane woodlands; in the	Not expected to occur. No suitable vegetation present.

Scientific Name	Common Name	Status (Federal/State)	Habitat	Potential to Occur
			Sacramento region often nests in weep holes under elevated freeways	
Pyrocephalus rubinus (nesting)	vermilion flycatcher	None/SSC	Nests in riparian woodlands, riparian scrub, and freshwater marshes; typical desert riparian with cottonwood, willow, mesquite adjacent to irrigated fields, ditches, or pastures	Not expected to occur. No suitable vegetation present.
Selasphorus rufus (nesting)	rufous hummingbird	BCC/None	Does not nest in California; migrates through a wide variety of habitats including coastal scrub, valley–foothill hardwood, and valley–foothill riparian habitats, and residential areas with feeders	Not expected to occur. No suitable vegetation present.
Setophaga petechia (nesting)	yellow warbler	None/SSC	Nests and forages in riparian and oak woodlands, montane chaparral, open ponderosa pine, and mixed-conifer habitats	Not expected to occur. No suitable vegetation present.
Sphyrapicus ruber (nesting)	red-breasted sapsucker	None/None	Nests in montane riparian, aspen, montane hardwood–conifer, red fir; winters in woodlands, orchards, shade trees such as pepper (Schinus spp.) and poplar (Populus spp.)	Not expected to occur. No suitable vegetation present.
Spinus lawrencei (nesting)	Lawrence's goldfinch	BCC/None	Nests and forages in open oak, arid woodlands, and chaparral near water	Not expected to occur. No suitable vegetation present.
Spizella breweri (nesting)	Brewer's sparrow	None/None	Nests in treeless shrub habitat with moderate canopy, especially sagebrush; winters in open desert scrub and croplands in southern Mojave and Colorado Deserts	Not expected to occur. No suitable shrub or open desert scrub habitat present.
Vireo bellii pusillus (nesting)	least Bell's vireo	FE/SE	Nests and forages in low, dense riparian thickets along water or along dry parts of intermittent streams; forages in riparian and adjacent shrubland late in nesting season	Not expected to occur. No suitable vegetation present.
Xanthocephalus xanthocephalus (nesting)	yellow-headed blackbird	None/SSC	Nests in marshes with tall emergent vegetation, often along borders of lakes and ponds; forages in emergent wetlands, open	Not expected to occur. No suitable vegetation present.

Scientific Name	Common Name	Status (Federal/State)	Habitat	Potential to Occur
			areas, croplands, and muddy shores of lacustrine habitat	
Nannopterum auritum (nesting colony)	double-crested cormorant	None/WL	Nests in riparian trees near ponds, lakes, artificial impoundments, slow-moving rivers, lagoons, estuaries, and open coastlines; winter habitat includes lakes, rivers, and coastal areas	Not expected to occur. No suitable vegetation present.
Fish				
Gila orcuttii	arroyo chub	None/SSC	Warm, fluctuating streams with slow-moving or backwater sections of warm to cool streams at depths >40 centimeters (16 inches); substrates of sand or mud	Not expected to occur. The study area does not contain suitable accessible aquatic habitat. One CNDDB occurrence is mapped from 1998, 15 miles south of the study area Temecula (CDFW 2023).
Mammals				
Chaetodipus californicus femoralis	Dulzura pocket mouse	None/None	Open habitat, coastal scrub, chaparral, oak woodland, chamise chaparral, mixed-conifer habitats; disturbance specialist; 0 to 3,000 feet above mean sea level	Not expected to occur. No suitable vegetation present.
Chaetodipus fallax fallax	northwestern San Diego pocket mouse	None/None	Coastal scrub, mixed chaparral, sagebrush, desert wash, desert scrub, desert succulent shrub, pinyon–juniper, and annual grassland	Not expected to occur. No suitable vegetation present.
Dasypterus xanthinus	western yellow bat	None/SSC	Valley–foothill riparian, desert riparian, desert wash, and palm oasis habitats; below 2,000 feet above mean sea level; roosts in riparian and palms	Not expected to occur. No suitable vegetation present.
Dipodomys merriami parvus	San Bernardino kangaroo rat	FE/SSC, SCE	Sparse scrub habitat, alluvial scrub/coastal scrub habitats on gravelly and sandy soils near river and stream terraces	Not expected to occur. No suitable vegetation present.
Dipodomys simulans	Dulzura kangaroo rat	None/None	Coastal scrub, chaparral, grassland at elevation <4,500 feet above mean sea level	Not expected to occur. No suitable vegetation present.
Dipodomys stephensi	Stephens' kangaroo rat	FT/ST	Annual and perennial grassland habitats, coastal scrub or sagebrush with sparse canopy cover, or in disturbed areas	Not expected to occur. No suitable vegetation present.

Scientific Name	Common Name	Status (Federal/State)	Habitat	Potential to Occur
Eumops perotis californicus	western mastiff bat	None/SSC	Chaparral, coastal and desert scrub, coniferous and deciduous forest and woodland; roosts in crevices in rocky canyons and cliffs where the canyon or cliff is vertical or nearly vertical, trees, and tunnels	Not expected to occur. No suitable vegetation present.
Lepus californicus bennettii	San Diego black-tailed jackrabbit	None/None	Arid habitats with open ground; grasslands, coastal scrub, agriculture, disturbed areas, and rangelands	**Observed on site.**
Lynx rufus pallescens	pallid bobcat	None/None	Wide range of habitats; areas with broken, rocky terrain and/or dense brush	**Moderate potential to occur.** Rocky terrain and dense brush are not present on site, and CNDDB returned no occurrences, but this species can hold a large home range and variety of habitats (CDFW 2023).
Myotis yumanensis	Yuma myotis	None/None	Riparian, arid scrublands and deserts, and forests associated with water (streams, rivers, tinajas); roosts in bridges, buildings, cliff crevices, caves, mines, and trees	Not expected to occur. The nearest CNDDB occurrence is from 1997 and is approximately 19 miles west of the site. Suitable roosting habitat is not present, and foraging habitat on-site is poor due to surrounding urbanization and site disturbance (CDFW 2023).
Neotoma lepida intermedia	San Diego desert woodrat	None/SSC	Coastal scrub, desert scrub, chaparral, cacti, rocky areas	Not expected to occur. No suitable vegetation present.
Nyctinomops femorosaccus	pocketed free-tailed bat	None/SSC	Pinyon–juniper woodlands, desert scrub, desert succulent shrub, desert riparian, desert wash, alkali desert scrub, Joshua tree, and palm oases; roosts in high cliffs or rock outcrops with drop-offs, caverns, and buildings	Not expected to occur. No suitable vegetation present.
Onychomys torridus ramona	southern grasshopper mouse	None/SSC	Grassland and sparse coastal scrub	Not expected to occur. No suitable vegetation present.

Scientific Name	Common Name	Status (Federal/State)	Habitat	Potential to Occur
Perognathus longimembris brevinasus	Los Angeles pocket mouse	None/SSC	Lower-elevation grassland, alluvial sage scrub, and coastal scrub	Not expected to occur. No suitable vegetation present.
Perognathus longimembris internationalis	Jacumba pocket mouse	None/SSC	Desert scrub and sparse sage scrub in areas with fine sandy soils	Not expected to occur. No suitable vegetation present.
Taxidea taxus	American badger	None/SSC	Dry, open, treeless areas; grasslands, coastal scrub, agriculture, and pastures, especially with friable soils	Not expected to occur. No suitable vegetation present.
Insects and Arachnids				
Bombus crotchii	Crotch bumble bee	None/SCE	Open grassland and scrub communities supporting suitable floral resources.	Low potential to occur. One CNDDB occurrence is from 2020 and mapped approximately 3 miles to the northwest of the site. Another is from 2001 and mapped approximately 5.5 miles southwest of the site. All other occurrences within 10 miles are over 40 years old (CDFW 2023).
Branchinecta lynchi	vernal pool fairy shrimp	FT/None	Vernal pools, seasonally ponded areas within vernal swales, and ephemeral freshwater habitats	Low potential to occur. The study area contains suitable vernal pool habitat. However, the nearest mapped CNDDB occurrence is 6.3 miles east of the study area and was observed in 2005. Other occurrences are 12 miles or more from the study area (CDFW 2023). Targeted fairy shrimp surveys were conducted, and this species was not observed.
Branchinecta sandiegonensis	San Diego fairy shrimp	FE/None	Vernal pools, non-vegetated ephemeral pools	Low potential to occur. One mapped CNDDB occurrence lies within the nine 7.5-minute quadrangle area. This is from 2017 and is 9.5 miles south of the study area. This occurrence is noted as a transplant outside of its native habitat/range (CDFW 2023). Targeted

Scientific Name	Common Name	Status (Federal/State)	Habitat	Potential to Occur
				fairy shrimp surveys were conducted, and this species was not observed.
Cicindela senilis frosti	senile tiger beetle	None/None	Inhabits marine shoreline, from central California coast south to saltmarshes of San Diego; also found at Lake Elsinore	Not expected to occur. No suitable vegetation present.
Euphydryas editha quino	quino checkerspot butterfly	FE/None	Annual forblands, grassland, open coastal scrub and chaparral; often soils with cryptogamic crusts and fine-textured clay; host plants include *Plantago erecta*, *P. patagonica*, and *Antirrhinum coulterianum*, among others	Not expected to occur. No suitable vegetation present.
Linderiella occidentalis	California linderiella	None/None	Cool soft-water vernal pools in grasslands below 1,000 feet above mean sea level	Low potential to occur. The CNDDB search returned two occurrences from 1988, which are 14 and 17 miles south of the study area (CDFW 2023).
Linderiella santarosae	Santa Rosa Plateau fairy shrimp	None/None	Seasonal basalt vernal pools with clear to milky waters	Low potential to occur. The CNDDB search returned two occurrences from 2008 and 2009, 14 miles and 17 miles south of the project site (CDFW 2023). Targeted fairy shrimp surveys were conducted, and this species was not observed.
Neolarra alba	white cuckoo bee	None/None	Known only from 6 historical localities in Southern California; has not been collected since 1946	Not expected to occur. This only recorded observation of this species within the search area was at one site in 1938. This occurrence was 5 miles northwest of the study area (CDFW 2023).
Socalchemmis icenoglei	Icenogle's socalchemmis spider	None/None	Known only from the type locality in the vicinity of Winchester, Riverside County	Not expected to occur. No suitable vegetation present.

Scientific Name	Common Name	Status (Federal/State)	Habitat	Potential to Occur
Streptocephalus woottoni	Riverside fairy shrimp	FE/None	Vernal pools, non-vegetated ephemeral pools	Low potential to occur. The nearest CNDDB occurrence is 4 miles south of the study area, recorded in 2004 (CDFW 2023).

Notes: CNDDB = California Natural Diversity Database.
Status Legend
Federal
FE: Federally listed as endangered
FT: Federally listed as threatened
FPD: Federally proposed for delisting
BCC: U.S. Fish and Wildlife Service Bird of Conservation Concern
State
SSC: California Species of Special Concern
FP: California Fully Protected Species
WL: California Watch List Species
SE: State listed as endangered
ST: State listed as threatened
SCE: State candidate for listing as endangered
SCD: State candidate for delisting

References

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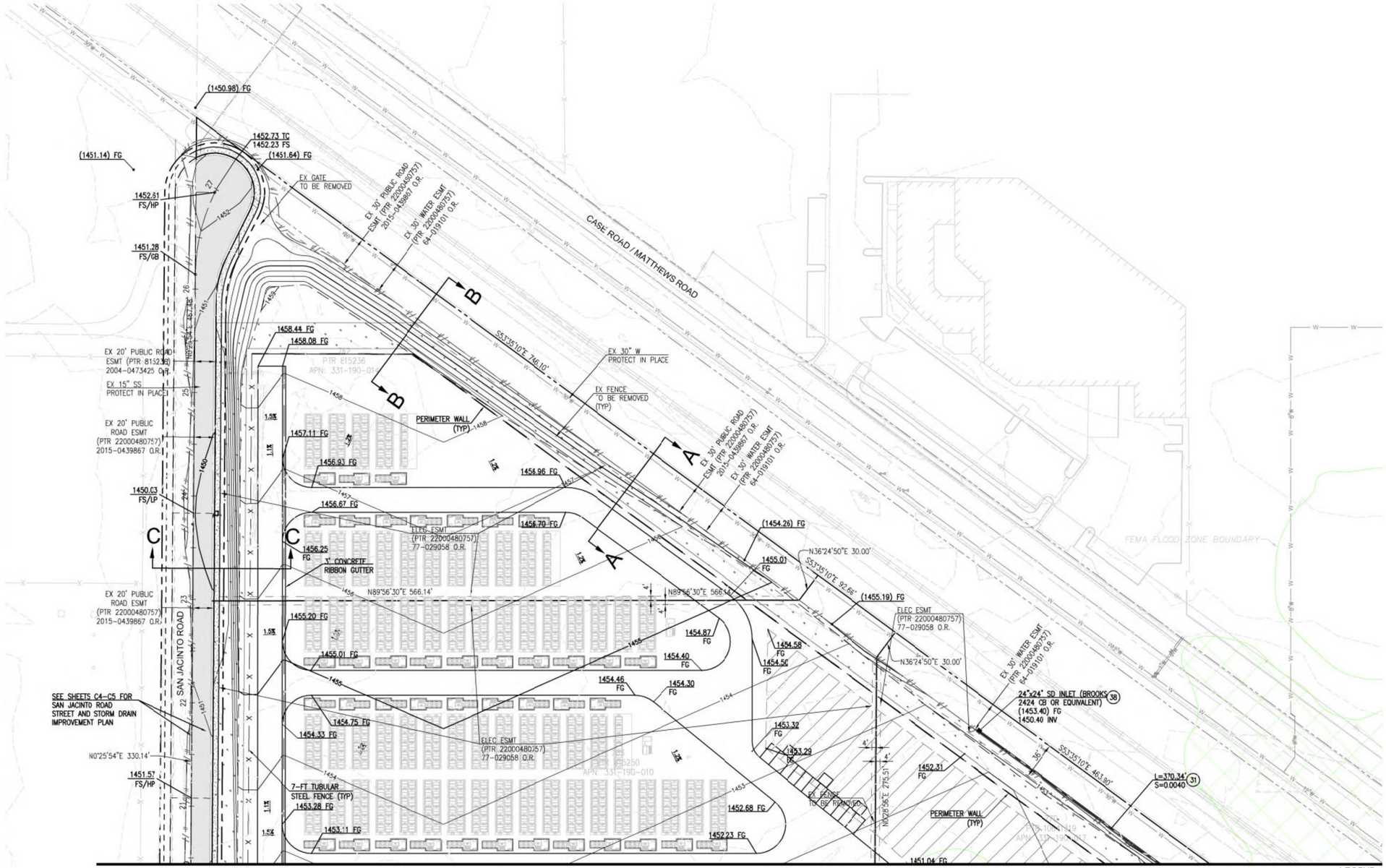
eBird. 2023c. "Species Profile: Harris's Hawk." Accessed November 2023b. https://ebird.org/species/hrshaw/.

iNaturalist. 2023. *Species Observations: Peregrine Falcon (*Falco peregrinus*)*. Accessed November 2023. https://www.inaturalist.org/observations?place_id=anyandsubview=mapandtaxon_id=4647.

Appendix C

Preliminary Grading and Off-Site Street Plan



MATCHLINE - SEE SHEET C2

GENERAL NOTES

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PRELIMINARY
NOT FOR CONSTRUCTION

0 25' 50' 75' 100'
1" = 50'

EARTHWORK SUMMARY

CUT	37,743 C.Y.	
FILL	38,336 C.Y.	
NET	593 C.Y.	(EXPORT)

STORM DRAIN IMPROVEMENT CONSTRUCTION NOTES

(31) INSTALL 12" PVC PIPE
(38) INSTALL 24"X24" SD INLET (BROOKS 2424 CB OR EQUIVALENT)

LEGEND

EXISTING
- PROJECT BOUNDARY
- EASEMENT
- SEWER
- WATER
- STORM DRAIN
- EXISTING CONTOUR
- RAILROAD

PROPOSED
- WALL / SOUND BARRER
- STORM DRAIN
- FENCING
- 500 kV GEN TIE
- 24' INTERIOR ROADS - EARTHEN
- LAYDOWN AREA
- VEGETATIVE BUFFER
- FEMA FLOOD ZONE
- PROPOSED CONTOUR

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PE STAMP:

KEY PLAN:

REVISIONS:

NO.	DATE	DESCRIPTION
0	11/18/22	PRELIM GRADING DESIGN
1	05/01/23	PRELIM GRADING DESIGN
2	06/21/23	PREIM GRADING DESIGN
3	09/20/23	PRELIM GRADING DESIGN
4	10/19/23	PRELIM GRADING DESIGN

PROJECT TITLE:

DOUBLE BUTTE STORAGE

PROJECT LOCATION:

CITY OF MENIFEE, CA
33.7412, -117.1563

SHEET TITLE & DESCRIPTION:

PRELIMINARY GRADING PLAN

500 MW / 2,000 MWh BESS

PROJ NUM:	ES19.0004
DES:	V. ITO
DWN:	V. ITO
CHK:	D. WATSON
APV:	
DATE:	10/19/2023

SCALE AT 24" x 36":

AS NOTED

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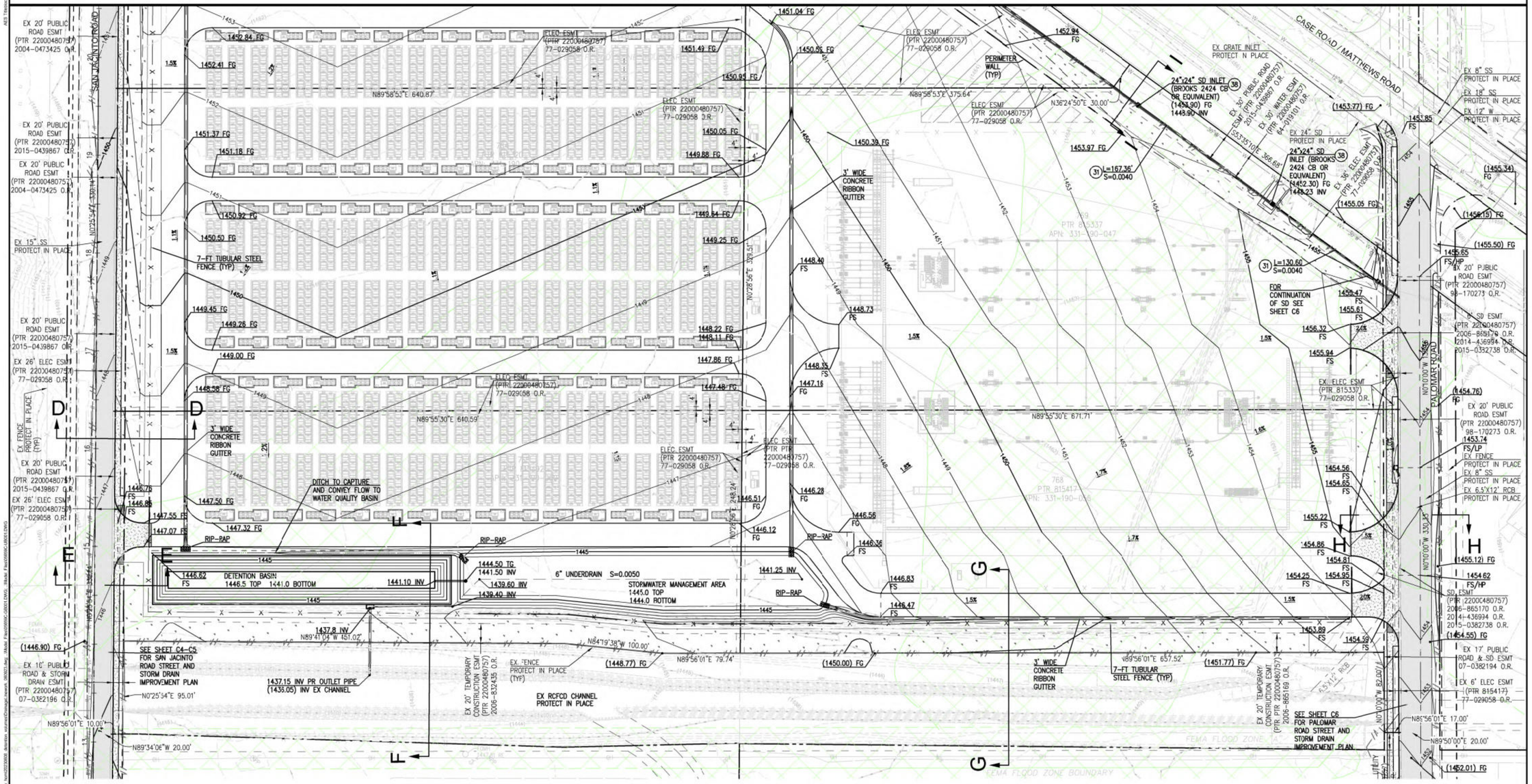

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PRELIMINARY
NOT FOR CONSTRUCTION

0 25' 50' 75' 100'
1" = 50'

STORM DRAIN IMPROVEMENT CONSTRUCTION NOTES

(31)– INSTALL 12" PVC PIPE
(38)– INSTALL 24"X24" SD INLET (BROOKS 2424 CB OR EQUIVALENT)

LEGEND

EXISTING
- PROJECT BOUNDARY
- EASEMENT
- SEWER
- WATER
- STORM DRAIN
- EXISTING CONTOUR
- RAILROAD

PROPOSED
- WALL / SOUND BARRER
- STORM DRAIN
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- 500 kV GEN TIE
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- LAYDOWN AREA
- VEGETATIVE BUFFER
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REVISIONS:

NO.	DATE	DESCRIPTION
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2	06/21/23	PRELIM GRADING DESIGN
3	09/20/23	PRELIM GRADING DESIGN
4	10/19/23	PRELIM GRADING DESIGN

PROJECT TITLE:

DOUBLE BUTTE STORAGE

PROJECT LOCATION:

CITY OF MENIFEE, CA
33.7412, -117.1563

SHEET TITLE & DESCRIPTION:

PRELIMINARY GRADING PLAN

500 MW / 2,000 MWh BESS

PROJ NUM:	ES19.0004
DES:	V. ITO
DWN:	V. ITO
CHK:	D. WATSON
APV:	
DATE:	10/19/2023

SCALE AT 24" x 36":

AS NOTED

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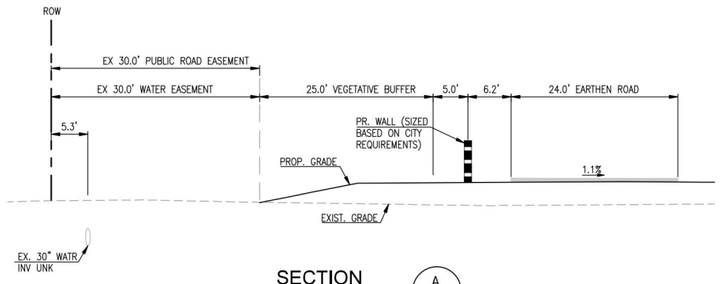

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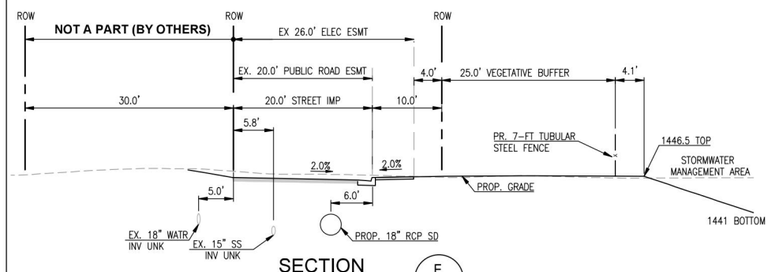

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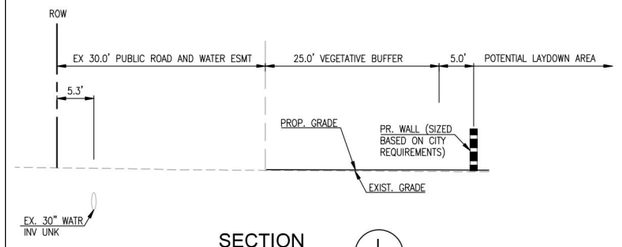

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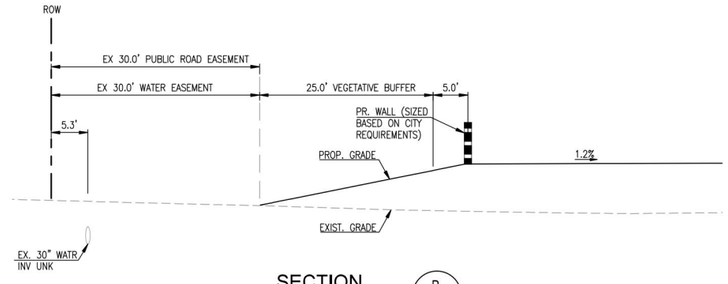

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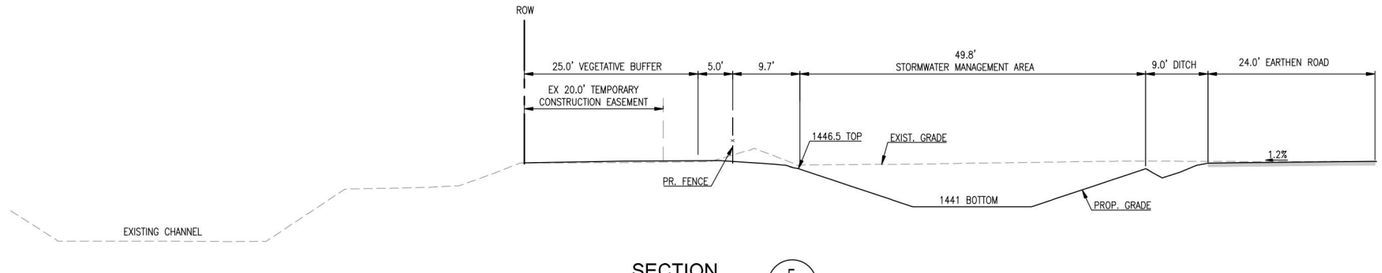

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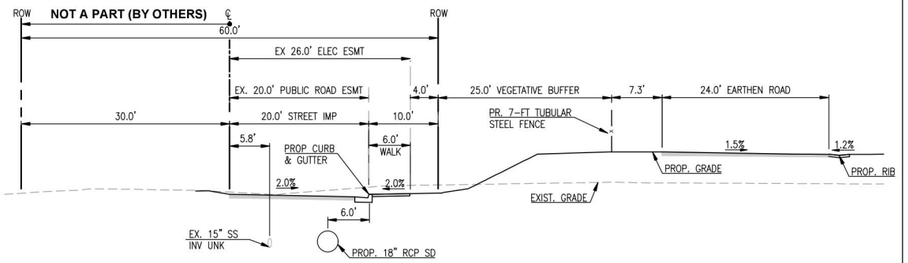

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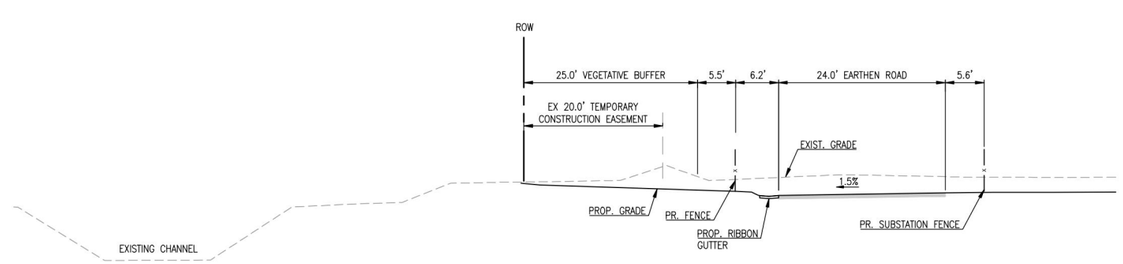

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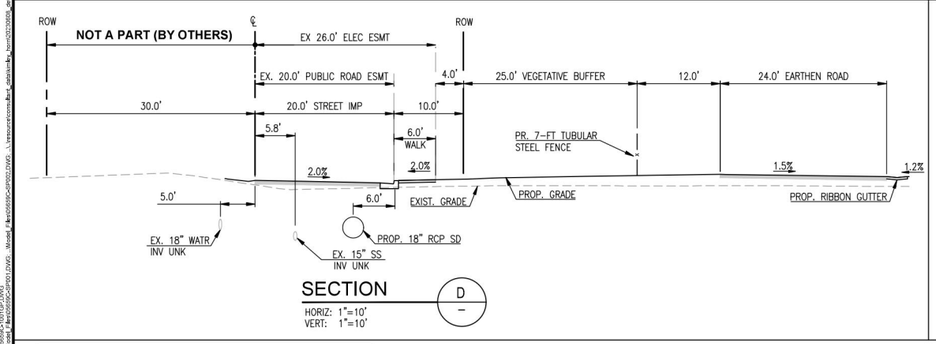

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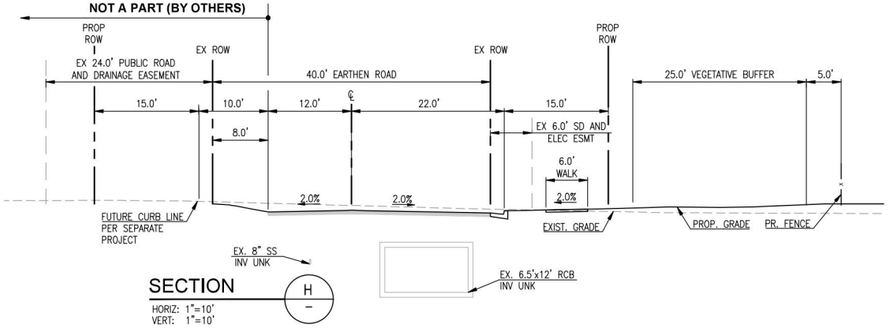

SECTION H
HORIZ: 1"=10'
VERT: 1"=10'

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PE STAMP:

KEY PLAN:

REVISIONS:

NO.	DATE	DESCRIPTION
0	11/18/22	PRELIM GRADING DESIGN
1	05/01/23	PRELIM GRADING DESIGN
2	06/21/23	PRELIM GRADING DESIGN
3	09/20/23	PRELIM GRADING DESIGN
4	10/19/23	PRELIM GRADING DESIGN

PROJECT TITLE:

DOUBLE BUTTE STORAGE

PROJECT LOCATION:

CITY OF MENIFEE, CA
33.7412, -117.1563

SHEET TITLE & DESCRIPTION:

CROSS SECTIONS

500 MW / 2,000 MWh BESS

PROJ NUM:	ES19.0004
DES:	V. ITO
DWN:	V. ITO
CHK:	D. WATSON
APV:	
DATE:	10/19/2023

SCALE AT 24" x 36":

AS NOTED

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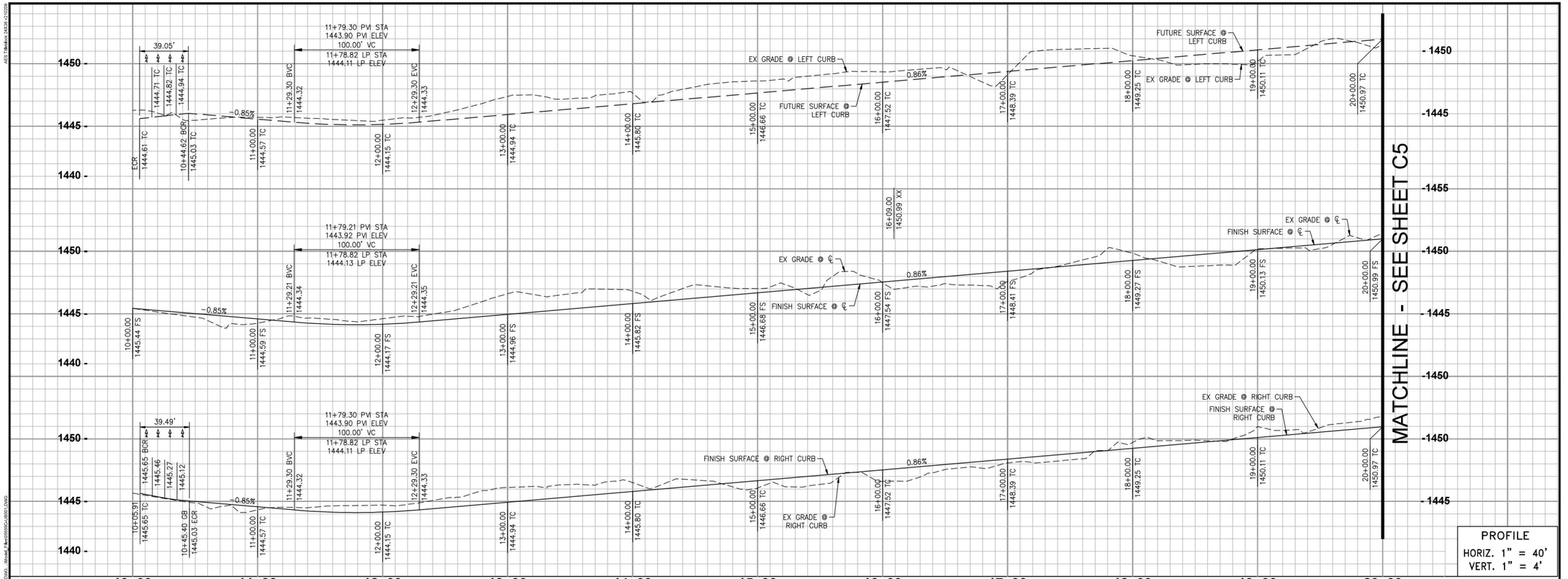


PROFILE
HORIZ. 1" = 40'
VERT. 1" = 4'

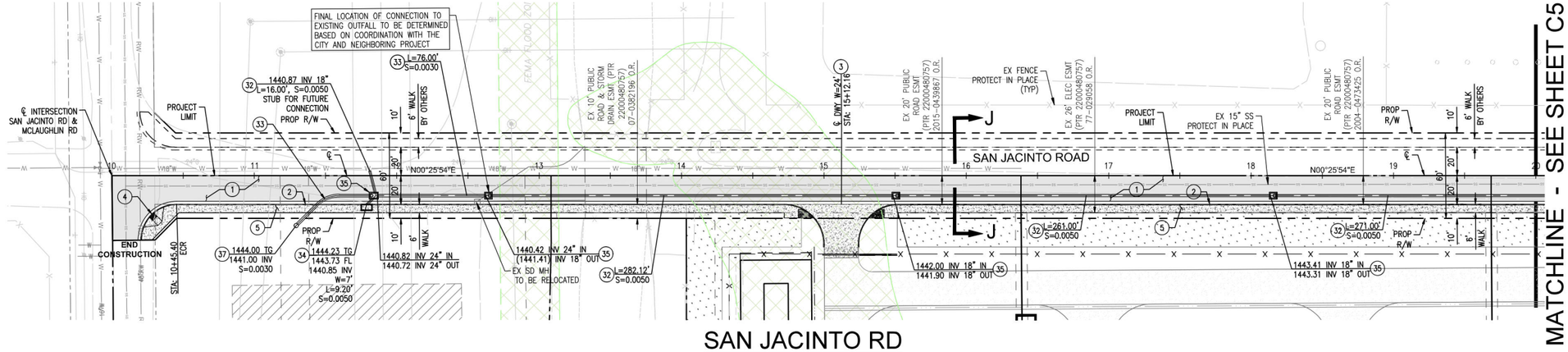
SAN JACINTO RD
PROFILE

STREET IMPROVEMENT CONSTRUCTION NOTES

1. CONSTRUCT 0.x' AC PAVEMENT OVER 0.x' CAB CLASS II
2. CONSTRUCT TYPE 6 CONCRETE CURB AND GUTTER PER CITY OF MENIFEE STD PLAN 200
3. CONSTRUCT COMMERCIAL DRIVEWAY PER CITY OF MENIFEE STD PLAN 208
4. CONSTRUCT PEDESTRIAN RAMP TYPE I PER CITY OF MENIFEE STD PLAN 405
5. CONSTRUCT CONCRETE WALK PER PER CITY OF MENIFEE STD PLAN 400

STORM DRAIN IMPROVEMENT CONSTRUCTION NOTES

32. INSTALL 18" RCP PIPE
33. INSTALL 24" RCP PIPE
34. CONSTRUCT CURB INLET (WIDTH PER PLAN)
35. CONSTRUCT JUNCTION STRUCTURE
37. INSTALL GRATED INLET



SAN JACINTO RD
PLAN VIEW

LEGEND

EXISTING	PROPOSED
PROJECT BOUNDARY	WALL / SOUND BARRIER
EASEMENT	STORM DRAIN
SEWER	FENCING
WATER	500 kV GEN TIE
STORM DRAIN	LAYDOWN AREA
RAILROAD	VEGETATIVE BUFFER
	FEMA FLOOD ZONE
	AC PAVEMENT

PRELIMINARY
NOT FOR CONSTRUCTION

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N
0 20' 40' 60' 80'
1" = 40'

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PE STAMP:

KEY PLAN:

REVISIONS:

NO.	DATE	DESCRIPTION
0	09/20/23	PRELIM STREET DESIGN
1	10/19/23	PRELIM STREET DESIGN

PROJECT TITLE:

DOUBLE BUTTE STORAGE

PROJECT LOCATION:

CITY OF MENIFEE, CA
33.7412, -117.1563

SHEET TITLE & DESCRIPTION:

PRELIMINARY SAN JACINTO ROAD PLAN

500 MW / 2,000 MWh BESS

PROJ NUM:	ES19.0004
DES:	V. ITO
DWN:	V. ITO
CHK:	D. WATSON
APV:	
DATE:	10/19/2023

SCALE AT 24" x 36":

AS NOTED

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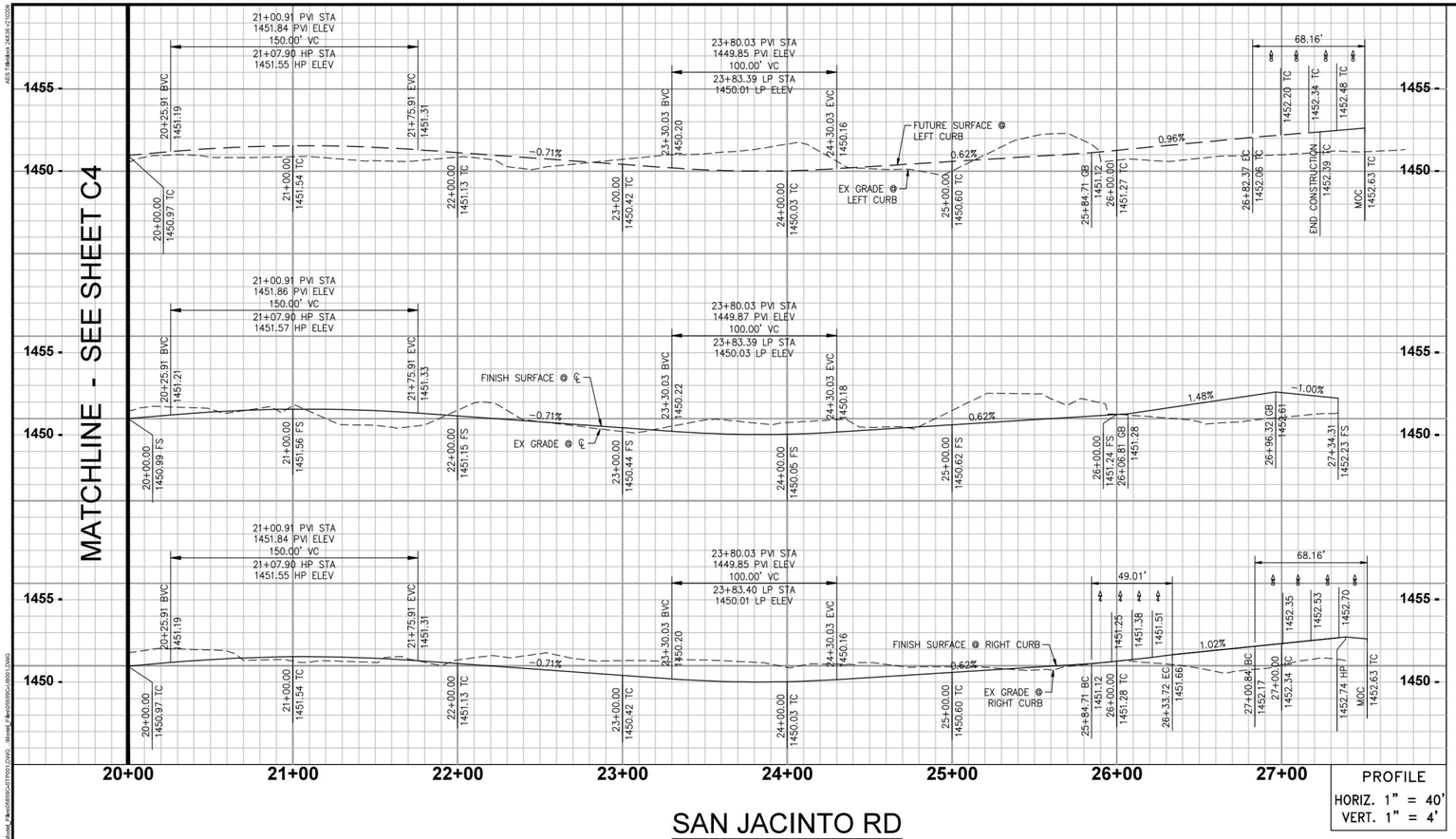

STREET IMPROVEMENT CONSTRUCTION NOTES

1. CONSTRUCT 0.x' AC PAVEMENT OVER 0.x' CAB CLASS II
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3. CONSTRUCT COMMERCIAL DRIVEWAY PER CITY OF MENIFEE STD PLAN 208
4. CONSTRUCT PEDESTRIAN RAMP TYPE I PER CITY OF MENIFEE STD PLAN 405
5. CONSTRUCT CONCRETE WALK PER PER CITY OF MENIFEE STD PLAN 400

STORM DRAIN IMPROVEMENT CONSTRUCTION NOTES

32. INSTALL 18" RCP PIPE
34. CONSTRUCT CURB INLET (WIDTH PER PLAN)
35. CONSTRUCT JUNCTION STRUCTURE

LEGEND

EXISTING

- PROJECT BOUNDARY
- EASEMENT
- SEWER
- WATER
- STORM DRAIN
- RAILROAD

PROPOSED

- WALL / SOUND BARRIER
- STORM DRAIN
- FENCING
- 500 kV GEN TIE
- LAYDOWN AREA
- VEGETATIVE BUFFER
- FEMA FLOOD ZONE
- AC PAVEMENT

PRELIMINARY
NOT FOR CONSTRUCTION

GENERAL NOTES

1. THIS DRAWING IS PRELIMINARY, AND NOT FOR CONSTRUCTION. IT IS FOR ESTIMATING PURPOSES ONLY.
2. LOCATION OF ALL EXISTING ITEMS ARE APPROXIMATE AND MUST BE VERIFIED IN THE FIELD PRIOR TO CONSTRUCTION.
3. ALL SPECIFIED EQUIPMENT IS PRELIMINARY. FINAL EQUIPMENT SELECTION SHALL BE APPROVED BY OWNER.

0 20' 40' 60' 80'
1" = 40'

aes
2180 South 1300 East, Suite 600
Salt Lake City, UT 84106-2749
(801) 679 - 3500

Stantec
38 TECHNOLOGY DRIVE, SUITE 200
IRVINE, CA 92618
949.923.6000 stantec.com

PE STAMP:

KEY PLAN:

REVISIONS:

NO.	DATE	DESCRIPTION
0	09/20/23	PRELIM STREET DESIGN
1	10/19/23	PRELIM STREET DESIGN

PROJECT TITLE:

DOUBLE BUTTE STORAGE

PROJECT LOCATION:

CITY OF MENIFEE, CA
33.7412, -117.1563

SHEET TITLE & DESCRIPTION:

PRELIMINARY SAN JACINTO ROAD PLAN

500 MW / 2,000 MWh BESS

PROJ NUM:	ES19.0004
DES:	V. ITO
DWN:	V. ITO
CHK:	D. WATSON
APV:	
DATE:	10/19/2023

SCALE AT 24" x 36":

AS NOTED

SHEET NO: C5 REV: 0

PLOTTED: 10/19/2023 10:49 AM
BY: Vincent Ito
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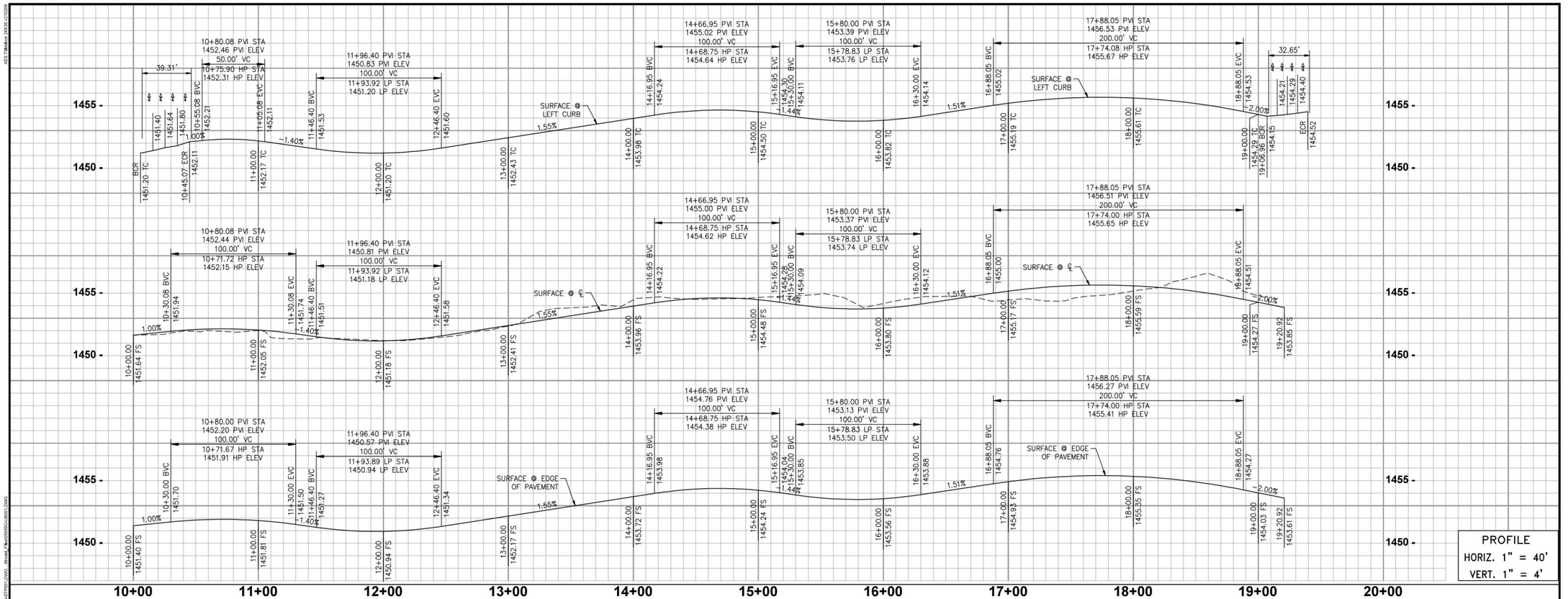


PROFILE
HORIZ. 1" = 40'
VERT. 1" = 4'

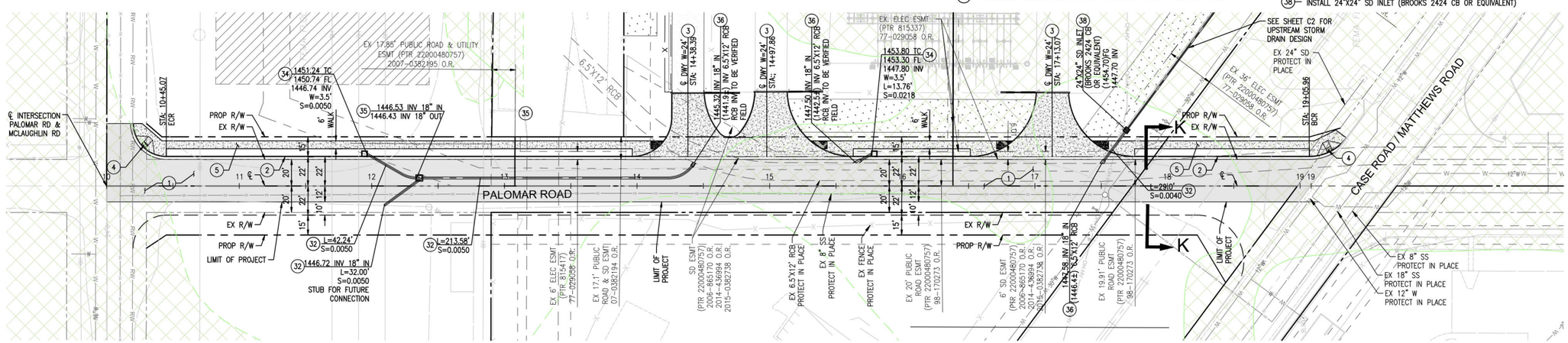
PALOMAR ROAD
PROFILE

STREET IMPROVEMENT CONSTRUCTION NOTES

1. CONSTRUCT 0.x' AC PAVEMENT OVER 0.x' CAB CLASS II
2. CONSTRUCT TYPE 6 CONCRETE CURB AND GUTTER PER CITY OF MENIFEE STD PLAN 200
3. CONSTRUCT COMMERCIAL DRIVEWAY PER CITY OF MENIFEE STD PLAN 208
4. CONSTRUCT PEDESTRIAN RAMP TYPE I PER CITY OF MENIFEE STD PLAN 405
5. CONSTRUCT CONCRETE WALK PER PER CITY OF MENIFEE STD PLAN 400

STORM DRAIN IMPROVEMENT CONSTRUCTION NOTES

31. INSTALL 12" PVC PIPE
32. INSTALL 18" RCP PIPE
34. CONSTRUCT CURB INLET (WIDTH PER PLAN)
35. CONSTRUCT JUNCTION STRUCTURE
36. CONSTRUCT PIPE TO RCB CONNECTION
38. INSTALL 24"X24" SD INLET (BROOKS 2424 CB OR EQUIVALENT)



PALOMAR ROAD
PLAN VIEW

GENERAL NOTES

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0 20' 40' 60' 80'
1" = 40'

LEGEND

EXISTING	PROPOSED
PROJECT BOUNDARY	WALL / SOUND BARRIER
EASEMENT	STORM DRAIN
SEWER	FENCING
WATER	500 kV GEN TIE
STORM DRAIN	LAYDOWN AREA
RAILROAD	VEGETATIVE BUFFER
	FEMA FLOOD ZONE
	AC PAVEMENT

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REVISIONS:

NO.	DATE	DESCRIPTION
0	09/20/23	PRELIM STREET DESIGN
1	10/19/23	PRELIM STREET DESIGN

PROJECT TITLE:

DOUBLE BUTTE STORAGE

PROJECT LOCATION:

CITY OF MENIFEE, CA
33.7412, -117.1563

SHEET TITLE & DESCRIPTION:

PRELIMINARY PALOMAR ROAD PLAN

500 MW / 2,000 MWh BESS

PROJ NUM:	ES19.0004
DES:	V. ITO
DWN:	V. ITO
CHK:	D. WATSON
APV:	
DATE:	10/19/2023

SCALE AT 24" x 36":
AS NOTED

SHEET NO: C6
REV: 0

PLOTTED: 10/19/2023 10:21 AM
By: VITO
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Appendix D

Preliminary Water Quality Management Plan

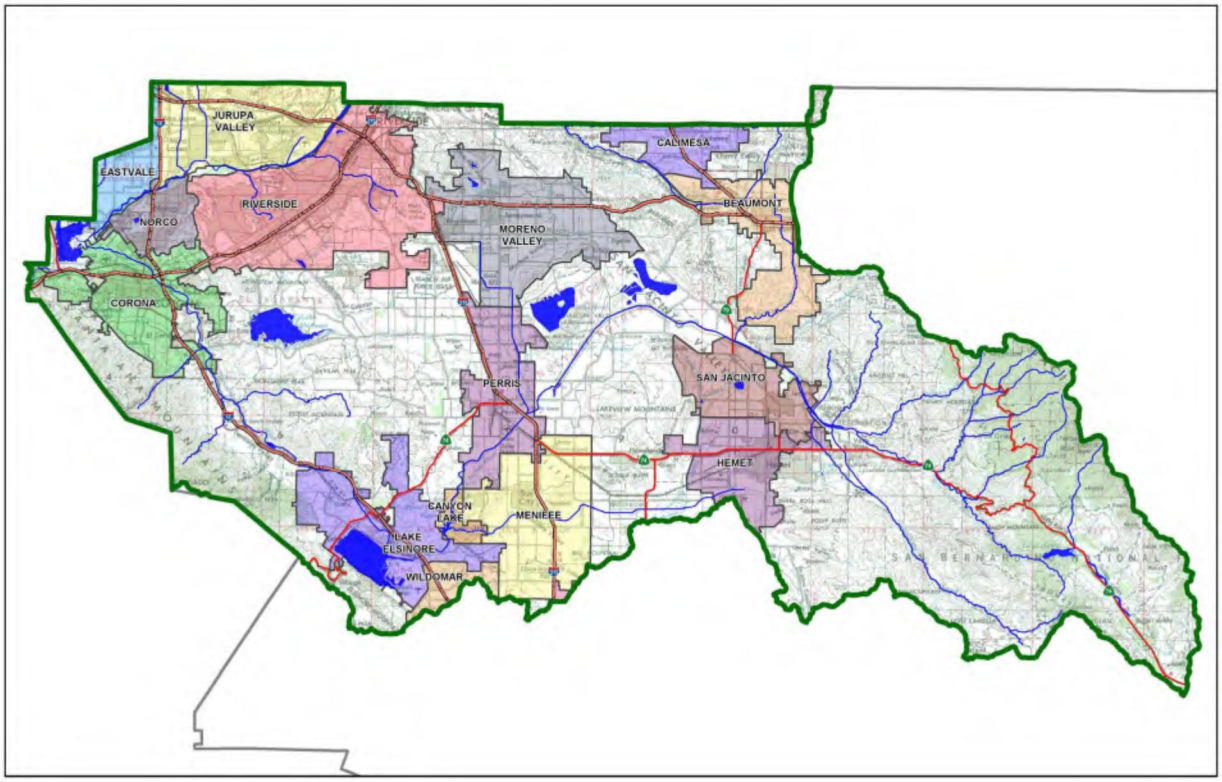
Project Specific Water Quality Management Plan

*A Template for Projects located within the **Santa Ana Watershed** Region of Riverside County*

Project Title: Double Butte Battery Storage Project

Development No: DEV2022-026

Design Review/Case No: PLN22-0281-Double Butte Battery Storage



☒ **Preliminary**
☐ **Final**

Original Date Prepared: 12/02/2022

Revision Date(s): 11/07/2023

Prepared for Compliance with
Regional Board Order No. **R8-2010-0033**
Template revised June 30, 2016

Contact Information:

Prepared for:
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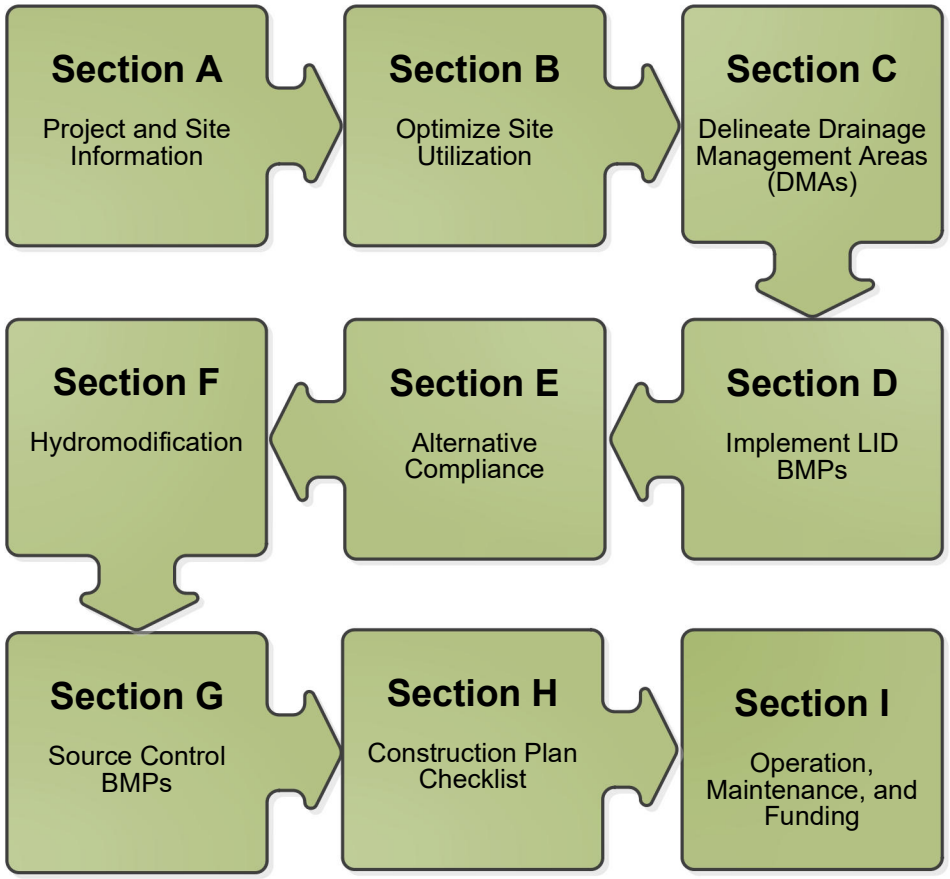
Prepared by:
Kimley-Horn and Associates
(714) 939-1030

A Brief Introduction

This Project-Specific WQMP Template for the **Santa Ana Region** has been prepared to help guide you in documenting compliance for your project. Because this document has been designed to specifically document compliance, you will need to utilize the WQMP Guidance Document as your "how-to" manual to help guide you through this process. Both the Template and Guidance Document go hand-in-hand, and will help facilitate a well prepared Project-Specific WQMP. Below is a flowchart for the layout of this Template that will provide the steps required to document compliance.



OWNER'S CERTIFICATION

This Project-Specific Water Quality Management Plan (WQMP) has been prepared for AES by Kimley-Horn for the Double Butte project.

This WQMP is intended to comply with the requirements of the City of Menifee for Order No. R8-2010-033 which includes the requirement for the preparation and implementation of a Project-Specific WQMP.

The undersigned, while owning the property/project described in the preceding paragraph, shall be responsible for the implementation and funding of this WQMP and will ensure that this WQMP is amended as appropriate to reflect up-to-date conditions on the site. In addition, the property owner accepts responsibility for interim operation and maintenance of Stormwater BMPs until such time as this responsibility is formally transferred to a subsequent owner. This WQMP will be reviewed with the facility operator, facility supervisors, employees, tenants, maintenance and service contractors, or any other party (or parties) having responsibility for implementing portions of this WQMP. At least one copy of this WQMP will be maintained at the project site or project office in perpetuity. The undersigned is authorized to certify and to approve implementation of this WQMP. The undersigned is aware that implementation of this WQMP is enforceable under the City of Menifee Water Quality Ordinance (Municipal Code Section 15.01).

"I, the undersigned, certify under penalty of law that the provisions of this WQMP have been reviewed and accepted and that the WQMP will be transferred to future successors in interest."

Owner's Signature	Date
Owner's Printed Name	Owner's Title/Position

PREPARER'S CERTIFICATION

"The selection, sizing and design of stormwater treatment and other stormwater quality and quantity control measures in this plan meet the requirements of Regional Water Quality Control Board Order No. **R8-2010-0033** and any subsequent amendments thereto."

Preparer's Signature	07/03/2023 Date
Ashley Teani Preparer's Printed Name	P.E. Preparer's Title/Position

Preparer's Licensure:

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Section A: Project and Site Information

PROJECT INFORMATION	
Type of Project:	Industrial
Planning Area:	3
Community Name:	Menifee North
Development Name:	Double Butte Battery Storage
PROJECT LOCATION	
Latitude & Longitude (DMS): 33.738, -117.165	
Project Watershed and Sub-Watershed: Santa Ana Watershed and San Jacinto Valley Subwatershed	
Gross Acres: 27.11	
APN(s): 331-190-014, 331-190-010, 331-190-017, 331-190-011, 331-190-047, 331-190-060, 331-190-056	
Map Book and Page No.: Riverside County Book 331 Page 19	
PROJECT CHARACTERISTICS	
Proposed or Potential Land Use(s)	Industrial
Proposed or Potential SIC Code(s)	221114
Area of Impervious Project Footprint (SF)	1,260,617
Total Area of proposed Impervious Surfaces within the Project Footprint (SF)/or Replacement	326,748
Does the project consist of offsite road improvements?	☒ Y ☐ N
Does the project propose to construct unpaved roads?	☒ Y ☐ N
Is the project part of a larger common plan of development (phased project)?	☐ Y ☒ N
EXISTING SITE CHARACTERISTICS	
Total area of existing Impervious Surfaces within the Project limits Footprint (SF)	0
Is the project located within any MSHCP Criteria Cell?	☐ Y ☒ N
If so, identify the Cell number:	N/A
Are there any natural hydrologic features on the project site?	☐ Y ☒ N
Is a Geotechnical Report attached?	☒ Y ☐ N
If no Geotech. Report, list the NRCS soils type(s) present on the site (A, B, C and/or D)	N/A
What is the Water Quality Design Storm Depth for the project?	0.61 inches

A.1 Maps and Site Plans

When completing your Project-Specific WQMP, include a map of the local vicinity and existing site. In addition, include all grading, drainage, landscape/plant palette and other pertinent construction plans in Appendix 2. At a **minimum**, your WQMP Site Plan should include the following:

- Drainage Management Areas
- Proposed Structural BMPs
- Drainage Path
- Drainage Infrastructure, Inlets, Overflows
- Source Control BMPs
- Buildings, Roof Lines, Downspouts
- Impervious Surfaces
- Standard Labeling
- BMP Locations (Lat/Long)

Use your discretion on whether or not you may need to create multiple sheets or can appropriately accommodate these features on one or two sheets. Keep in mind that the Co-Permittee plan reviewer must be able to easily analyze your project utilizing this template and its associated site plans and maps.

A.2 Identify Receiving Waters

Using Table A.1 below, list in order of upstream to downstream, the receiving waters that the project site is tributary to. Continue to fill each row with the Receiving Water's 303(d) listed impairments (if any), designated beneficial uses, and proximity, if any, to a RARE beneficial use. Include a map of the receiving waters in Appendix 1.

Table A.1 Identification of Receiving Waters

Receiving Waters	EPA Approved 303(d) List Impairments	Designated Beneficial Uses	Proximity to RARE Beneficial Use
San Jacinto River	N/A	MUN, AGR, IND,PROC,GWR,NAV, POW, REC1, REC2, COMM, WARM, LWRM, COLD, BIOL, WILD, RARE, SPWN, EST	~4 Miles
Canyon Lake	Nutrients	MUN, AGR, GWR, REC1, REC2, COMM, WARM, WILD	N/A
Lake Elsinore	DDT, Nutrients, Organic Enrichment/Low Dissolved Oxygen, PCBs, Toxicity	REC1, REC2, COMM, WARM, WILD, RARE	~17 Miles

A.3 Additional Permits/Approvals required for the Project:

Table A.2 Other Applicable Permits

Agency	Permit Required	
State Department of Fish and Game, 1602 Streambed Alteration Agreement	☐ Y	☒ N
State Water Resources Control Board, Clean Water Act (CWA) Section 401 Water Quality Cert.	☐ Y	☒ N
US Army Corps of Engineers, CWA Section 404 Permit	☐ Y	☒ N
US Fish and Wildlife, Endangered Species Act Section 7 Biological Opinion	☐ Y	☒ N
Statewide Construction General Permit Coverage	☒ Y	☐ N
Statewide Industrial General Permit Coverage	☐ Y	☒ N
Western Riverside MSHCP Consistency Approval (e.g., JPR, DBESP)	☐ Y	☒ N
Other *(please list in the space below as required)* RCFCD Encroachment Permit	☒ Y	☐ N

If yes is answered to any of the questions above, the Co-Permittee may require proof of approval/coverage from those agencies as applicable including documentation of any associated requirements that may affect this Project-Specific WQMP.

Section B: Optimize Site Utilization (LID Principles)

Review of the information collected in Section 'A' will aid in identifying the principal constraints on site design and selection of LID BMPs as well as opportunities to reduce imperviousness and incorporate LID Principles into the site and landscape design. For example, **constraints** might include impermeable soils, high groundwater, groundwater pollution or contaminated soils, steep slopes, geotechnical instability, high-intensity land use, heavy pedestrian or vehicular traffic, utility locations or safety concerns. **Opportunities** might include existing natural areas, low areas, oddly configured or otherwise unbuildable parcels, easements and landscape amenities including open space and buffers (which can double as locations for bioretention BMPs), and differences in elevation (which can provide hydraulic head). Prepare a brief narrative for each of the site optimization strategies described below. This narrative will help you as you proceed with your LID design and explain your design decisions to others.

The 2010 Santa Ana MS4 Permit further requires that LID Retention BMPs (Infiltration Only or Harvest and Use) be used unless it can be shown that those BMPs are infeasible. Therefore, it is important that your narrative identify and justify if there are any constraints that would prevent the use of those categories of LID BMPs. Similarly, you should also note opportunities that exist which will be utilized during project design. Upon completion of identifying Constraints and Opportunities, include these on your WQMP Site plan in Appendix 1.

Consideration of "highest and best use" of the discharge should also be considered. For example, Lake Elsinore is evaporating faster than runoff from natural precipitation can recharge it. Requiring infiltration of 85% of runoff events for projects tributary to Lake Elsinore would only exacerbate current water quality problems associated with Pollutant concentration due to lake water evaporation. In cases where rainfall events have low potential to recharge Lake Elsinore (i.e. no hydraulic connection between groundwater to Lake Elsinore, or other factors), requiring infiltration of Urban Runoff from projects is counterproductive to the overall watershed goals. Project proponents, in these cases, would be allowed to discharge Urban Runoff, provided they used equally effective filtration-based BMPs.

Site Optimization

The following questions are based upon Section 3.2 of the WQMP Guidance Document. Review of the WQMP Guidance Document will help you determine how best to optimize your site and subsequently identify opportunities and/or constraints, and document compliance.

Did you identify and preserve existing drainage patterns? If so, how? If not, why?

The project will largely preserve existing drainage patterns.

Did you identify and protect existing vegetation? If so, how? If not, why?

Existing vegetative cover includes non-native seasonal grasses with fair to poor cover. Vegetation is non-native and will not be preserved. Proposed native landscaping will be used for vegetative buffers.

Did you identify and preserve natural infiltration capacity? If so, how? If not, why?

The underlying infiltration rates are insufficient for infiltration BMPs.

Did you identify and minimize impervious area? If so, how? If not, why?

Impervious areas were minimized wherever practical.

Did you identify and disperse runoff to adjacent pervious areas? If so, how? If not, why?

Runoff from impervious surfaces will discharge into Biotreatment BMPs located onsite before discharging into the existing storm drain system.

Section C: Delineate Drainage Management Areas (DMAs)

Utilizing the procedure in Section 3.3 of the WQMP Guidance Document which discusses the methods of delineating and mapping your project site into individual DMAs, complete Table C.1 below to appropriately categorize the types of classification (e.g., Type A, Type B, etc.) per DMA for your project site. Upon completion of this table, this information will then be used to populate and tabulate the corresponding tables for their respective DMA classifications.

Table C.1 DMA Classifications

DMA Name or ID	Surface Type(s)[1][2]	Area (Sq. Ft.)	DMA Type
A-1	Concrete or Asphalt	193	D
A-1	Natural (C Soil)	31,894	D
A-2	Concrete or Asphalt	230,457	D
A-2	Compacted Soil (Unpaved Parking)	173,874	D
A-2	Natural (C Soil)	523,322	D
A-2	Ornamental Landscaping	35,840	D
B-1	Concrete or Asphalt	19,427	D
B-2	Concrete or Asphalt	15,887	D
B-3	Ornamental Landscaping	21,000	D
B-3	Natural (C Soil)	11,280	D
B-4	Concrete or Asphalt	14,243	D
C-1	Concrete or Asphalt	17,978	D
C-2	Concrete or Asphalt	20,819	D
D-1	Ornamental Landscaping	100,230	D
D-1	Natural (C Soil)	36,429	D
D-1	Concrete or Asphalt	7,744	D

[1]Reference Table 2-1 in the WQMP Guidance Document to populate this column
[2]If multi-surface provide back-up

Table C.2 Type 'A', Self-Treating Areas

DMA Name or ID	Area (Sq. Ft.)	Stabilization Type	Irrigation Type (if any)

Table C.3 Type 'B', Self-Retaining Areas

Self-Retaining Area				**Type 'C' DMAs that are draining to the Self-Retaining Area**		
DMA Name/ ID	Post-project surface type	Area (square feet) [A]	Storm Depth (inches) [B]	DMA Name / ID	[C] from Table C.4 = [C]	Required Retention Depth (inches) [D]

$$[D] = [B] + \frac{[B] \cdot [C]}{[A]}$$

Table C.4 Type 'C', Areas that Drain to Self-Retaining Areas

DMA					**Receiving Self-Retaining DMA**		
DMA Name/ ID	Area (square feet) [A]	Post-project surface type	Impervious fraction [B]	Product [C] = [A] x [B]	DMA name /ID	Area (square feet) [D]	Ratio [C]/[D]

Table C.5 Type 'D', Areas Draining to BMPs

DMA Name or ID	BMP Name or ID
A-1, A-2	Biofiltration Basin (BIO-1)
B-4	Modular Wetland System (MWS-1)
C-2	Modular Wetland System (MWS-1)
B-1 ,B-2, B-3	Filterra System (FIL 1)
C-1	Filterra System (FIL 2)
D-1, D-2	Filterra System (FIL 3)

Note: More than one drainage management area can drain to a single LID BMP, however, one drainage management area may not drain to more than one BMP.

Section D: Implement LID BMPs

D.1 Infiltration Applicability

Is there an approved downstream 'Highest and Best Use' for stormwater runoff (see discussion in Chapter 2.4.4 of the WQMP Guidance Document for further details)? ☐ Y ☒ N

If yes has been checked, Infiltration BMPs shall not be used for the site; proceed to section D.3

If no, continue working through this section to implement your LID BMPs. It is recommended that you contact your Co-Permittee to verify whether or not your project discharges to an approved downstream 'Highest and Best Use' feature.

Geotechnical Report

A Geotechnical Report or Phase I Environmental Site Assessment may be required by the Copermittee to confirm present and past site characteristics that may affect the use of Infiltration BMPs. In addition, the Co-Permittee, at their discretion, may not require a geotechnical report for small projects as described in Chapter 2 of the WQMP Guidance Document. If a geotechnical report has been prepared, include it in Appendix 3. In addition, if a Phase I Environmental Site Assessment has been prepared, include it in Appendix 4.

Is this project classified as a small project consistent with the requirements of Chapter 2 of the WQMP Guidance Document? ☐ Y ☒ N

Infiltration Feasibility

Table D.1 below is meant to provide a simple means of assessing which DMAs on your site support Infiltration BMPs and is discussed in the WQMP Guidance Document in Chapter 2.4.5. Check the appropriate box for each question and then list affected DMAs as applicable. If additional space is needed, add a row below the corresponding answer.

Table D.1 Infiltration Feasibility

Does the project site…	YES	NO
…have any DMAs with a seasonal high groundwater mark shallower than 10 feet?		X
If Yes, list affected DMAs:		
…have any DMAs located within 100 feet of a water supply well?		X
If Yes, list affected DMAs:		
…have any areas identified by the geotechnical report as posing a public safety risk where infiltration of stormwater could have a negative impact?		X
If Yes, list affected DMAs:		
…have measured in-situ infiltration rates of less than 1.6 inches / hour?	X	
If Yes, list affected DMAs:	all	
…have significant cut and/or fill conditions that would preclude in-situ testing of infiltration rates at the final infiltration surface?		X
If Yes, list affected DMAs:		
…geotechnical report identify other site-specific factors that would preclude effective and safe infiltration?	X	
Describe here: Low infiltration rates		

If you answered "Yes" to any of the questions above for any DMA, Infiltration BMPs should not be used for those DMAs and you should proceed to the assessment for Harvest and Use below.

D.2 Harvest and Use Assessment

Please check what applies*:*

☐ Reclaimed water will be used for the non-potable water demands for the project.

☐Downstream water rights may be impacted by Harvest and Use as approved by the Regional Board (verify with the Copermittee).

☐The Design Capture Volume will be addressed using Infiltration Only BMPs. In such a case, Harvest and Use BMPs are still encouraged, but it would not be required if the Design Capture Volume will be infiltrated or evapotranspired.

If any of the above boxes have been checked, Harvest and Use BMPs need not be assessed for the site. If none of the above criteria applies, follow the steps below to assess the feasibility of irrigation use, toilet use and other non-potable uses (e.g., industrial use).

Irrigation Use Feasibility

Complete the following steps to determine the feasibility of harvesting stormwater runoff for Irrigation Use BMPs on your site:

Step 1: Identify the total area of irrigated landscape on the site, and the type of landscaping used.

Total Area of Irrigated Landscape: 3.60

Type of Landscaping (Conservation Design or Active Turf): Conservation

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for irrigation use. Depending on the configuration of buildings and other impervious areas on the site, you may consider the site as a whole, or parts of the site, to evaluate reasonable scenarios for capturing and storing runoff and directing the stored runoff to the potential use(s) identified in Step 1 above.

Total Area of Impervious Surfaces: 7.50

Step 3: Cross reference the Design Storm depth for the project site (see Exhibit A of the WQMP Guidance Document) with the left column of Table 2-3 in Chapter 2 to determine the minimum area of Effective Irrigated Area per Tributary Impervious Area (EIATIA).

Enter your EIATIA factor: .855

Step 4: Multiply the unit value obtained from Step 3 by the total of impervious areas from Step 2 to develop the minimum irrigated area that would be required.

Minimum required irrigated area: 6.41

Step 5: Determine if harvesting stormwater runoff for irrigation use is feasible for the project by comparing the total area of irrigated landscape (Step 1) to the minimum required irrigated area (Step 4).

Minimum required irrigated area (Step 4)	Available Irrigated Landscape (Step 1)
6.41	3.6

Toilet Use Feasibility

Complete the following steps to determine the feasibility of harvesting stormwater runoff for toilet flushing uses on your site:

Step 1: Identify the projected total number of daily toilet users during the wet season, and account for any periodic shut downs or other lapses in occupancy:

Projected Number of Daily Toilet Users: N/A

Project Type: N/A

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for toilet use. Depending on the configuration of buildings and other impervious areas on the site, you may consider the site as a whole, or parts of the site, to evaluate reasonable scenarios for capturing and storing runoff and directing the stored runoff to the potential use(s) identified in Step 1 above.

Total Area of Impervious Surfaces: Insert Area (Acres)

Step 3: Enter the Design Storm depth for the project site (see Exhibit A) into the left column of Table 2-2 in Chapter 2 to determine the minimum number or toilet users per tributary impervious acre (TUTIA).

Enter your TUTIA factor: TUTIA Factor

Step 4: Multiply the unit value obtained from Step 3 by the total of impervious areas from Step 2 to develop the minimum number of toilet users that would be required.

Minimum number of toilet users: Required number of toilet users

Step 5: Determine if harvesting stormwater runoff for toilet flushing use is feasible for the project by comparing the Number of Daily Toilet Users (Step 1) to the minimum required number of toilet users (Step 4).

Minimum required Toilet Users (Step 4)	**Projected number of toilet users (Step 1)**
Insert Area (Acres)	Insert Area (Acres)

Other Non-Potable Use Feasibility

Are there other non-potable uses for stormwater runoff on the site (e.g. industrial use)? See Chapter 2 of the Guidance for further information. If yes, describe below. If no, write N/A.

N/A

Step 1: Identify the projected average daily non-potable demand, in gallons per day, during the wet season and accounting for any periodic shut downs or other lapses in occupancy or operation.

Average Daily Demand: Projected Average Daily Use (gpd)

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for the identified non-potable use. Depending on the configuration of buildings and other impervious areas on the site, you may consider the site as a whole, or parts of the site, to evaluate reasonable scenarios for capturing and storing runoff and directing the stored runoff to the potential use(s) identified in Step 1 above.

Total Area of Impervious Surfaces: Insert Area (Acres)

Step 3: Enter the Design Storm depth for the project site (see Exhibit A) into the left column of Table 2-4 in Chapter 2 to determine the minimum demand for non-potable uses per tributary impervious acre.

Enter the factor from Table 2-4: Enter Value

Step 4: Multiply the unit value obtained from Step 3 by the total of impervious areas from Step 2 to develop the minimum number of gallons per day of non-potable use that would be required.

Minimum required use: Minimum use required (gpd)

Step 5: Determine if harvesting stormwater runoff for other non-potable use is feasible for the project by comparing the projected average daily use (Step 1) to the minimum required non-potable use (Step 4).

Minimum required non-potable use (Step 4)	**Projected average daily use (Step 1)**
Minimum use required (gpd)	Projected Average Daily Use (gpd)

If Irrigation, Toilet and Other Use feasibility anticipated demands are less than the applicable minimum values, Harvest and Use BMPs are not required and you should proceed to utilize LID Bioretention and Biotreatment per Section 3.4.2 of the WQMP Guidance Document.

D.3 Bioretention and Biotreatment Assessment

Other LID Bioretention and Biotreatment BMPs as described in Chapter 2.4.7 of the WQMP Guidance Document are feasible on nearly all development sites with sufficient advance planning.

Select one of the following:

☒ LID Bioretention/Biotreatment BMPs will be used for some or all DMAs of the project as noted below in Section D.4 (note the requirements of Section 3.4.2 in the WQMP Guidance Document).

☐ A site-specific analysis demonstrating the technical infeasibility of all LID BMPs has been performed and is included in Appendix 5. If you plan to submit an analysis demonstrating the technical infeasibility of LID BMPs, request a pre-submittal meeting with the Copermittee to discuss this option. Proceed to Section E to document your alternative compliance measures.

D.4 Feasibility Assessment Summaries

From the Infiltration, Harvest and Use, Bioretention and Biotreatment Sections above, complete Table D.2 below to summarize which LID BMPs are technically feasible, and which are not, based upon the established hierarchy.

Table D.2 LID Prioritization Summary Matrix

DMA Name/ID	LID BMP Hierarchy				No LID (Alternative Compliance)
	1. Infiltration	2. Harvest and use	3. Bioretention	4. Biotreatment	
A-1	☐	☐	☐	☒	☐
A-2	☐	☐	☐	☒	☐
B-1	☐	☐	☐	☒	☐
B-2	☐	☐	☐	☒	☐
B-3	☐	☐	☐	☒	☐
B-4	☐	☐	☐	☒	☐
C-1	☐	☐	☐	☒	☐
C-2	☐	☐	☐	☒	☐
D-1	☐	☐	☐	☒	☐
D-2	☐	☐	☐	☒	☐

For those DMAs where LID BMPs are not feasible, provide a brief narrative below summarizing why they are not feasible, include your technical infeasibility criteria in Appendix 5, and proceed to Section E below to document Alternative Compliance measures for those DMAs. Recall that each proposed DMA must pass through the LID BMP hierarchy before alternative compliance measures may be considered.

Biofiltration is used throughout the site for all DMAs.

D.5 LID BMP Sizing

Each LID BMP must be designed to ensure that the Design Capture Volume will be addressed by the selected BMPs. First**,** calculate the Design Capture Volume for each LID BMP using the V_{BMP} worksheet in Appendix F of the LID BMP Design Handbook. Second**,** design the LID BMP to meet the required V_{BMP} using a method approved by the Copermittee. Utilize the worksheets found in the LID BMP Design Handbook or consult with your Copermittee to assist you in correctly sizing your LID BMPs. Complete Table D.3 below to document the Design Capture Volume and the Proposed Volume for each LID BMP. Provide the completed design procedure sheets for each LID BMP in Appendix 6. You may add additional rows to the table below as needed.

Table D.3-1 DCV Calculations for LID BMPs BIO-1

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Biotreatment Basin A*		
	[A]		[B]	[C]	[A] x [C]			
A-1	*193*	*Concrete or Asphalt*	*1*	*0.89*	*172.2*	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
A-1	*31894*	*Natural (C Soil)*	*0.3*	*0..23*	*7181.4*			
A-2	*230457*	*Concrete or Asphalt*	*1*	*0.89*	*205567.6*			
A-2	*173874*	*Compacted Soil (unpaved parking)*	*0.4*	*0.28*	*48634.6*			
A-2	*523322*	*Natural (C Soil)*	*0.3*	*0.23*	*117834.3*			
A-2	*35840*	*Ornamental Landscaping*	*0.1*	*0.11*	*3958.8*			
	Σ= 995,580				Σ= 383,349	0.61	19,487	***24,284***

[B], [C] is obtained as described in Section 2.3.1 of the WQMP Guidance Document
[E] is obtained from Exhibit A in the WQMP Guidance Document
[G] is obtained from a design procedure sheet, such as in LID BMP Design Handbook and placed in Appendix 6

Table D.4-1 DCV Calculations for LID BMPs MWS-1

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Modular Wetland System 1*		
	[A]		[B]	[C]	[A] x [C]			
B-4	*14243*	*Concrete or Asphalt*	*1*	*0.89*	*12704.8*	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
	Σ= 14,243				Σ= 12,705	0.61	645.8	> 646

[B], [C] is obtained as described in Section 2.3.1 of the WQMP Guidance Document
[E] is obtained from Exhibit A in the WQMP Guidance Document
[G] is obtained from a design procedure sheet, such as in LID BMP Design Handbook and placed in Appendix 6

Table D.5-1 DCV Calculations for LID BMPs MWS-2

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Modular Wetland System 2*		
	[A]		[B]	[C]	[A] x [C]			
C-2	*20819*	*Concrete or Asphalt*	*1*	*0.89*	*18570.5*	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
	Σ= 20,819				Σ= 18,571	0.61	944	> 944

[B], [C] is obtained as described in Section 2.3.1 of the WQMP Guidance Document
[E] is obtained from Exhibit A in the WQMP Guidance Document
[G] is obtained from a design procedure sheet, such as in LID BMP Design Handbook and placed in Appendix 6

Table D.6-1 DCV Calculations for LID BMPs FIL-1

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Filterra System 1*		
	[A]		[B]	[C]	[A] x [C]			
B-1	*19427*	*Concrete or Asphalt*	*1*	*0.89*	*17328.9*	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
B-2	*15887*	*Concrete or Asphalt*	*1*	*0.89*	*14171.2*			
B-3	*21000*	*Ornamental Landscaping*	*0.1*	*0.11*	*2319.6*			
B-3	*11280*	*Natural (C Soil)*	*0.3*	*0.22*	*2539.9*			
	Σ= 67,594				Σ= 36,360	0.61	1,848.3	> 1,849

[B], [C] is obtained as described in Section 2.3.1 of the WQMP Guidance Document
[E] is obtained from Exhibit A in the WQMP Guidance Document
[G] is obtained from a design procedure sheet, such as in LID BMP Design Handbook and placed in Appendix 6

Table D.7-1 DCV Calculations for LID BMPs FIL-2

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Filterra System 2*		
	[A]		[B]	[C]	[A] x [C]			
C-1	*17978*	*Concrete or Asphalt*	*0.1*	*0.89*	*16036.4*	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
	Σ= 17,978				Σ= 16,036	0.61	815.2	> 816

[B], [C] is obtained as described in Section 2.3.1 of the WQMP Guidance Document
[E] is obtained from Exhibit A in the WQMP Guidance Document
[G] is obtained from a design procedure sheet, such as in LID BMP Design Handbook and placed in Appendix 6

Table D.8-1 DCV Calculations for LID BMPs FIL-3

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Filterra System 3*		
	[A]		[B]	[C]	[A] x [C]			
D-1	*32428*	*Ornamental Landscaping*	*0.1*	*0.11*	*4023.8*	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
D-1	*63802*	*Natural (C Soil)*	*0.3*	*0.23*	*14366*			
D-2	*7744*	*Concrete or Asphalt*	*1*	*0.89*	*6907.6*			
	Σ= 107,974				Σ= 25,297.4	0.61	1,286	> 1,286

[B], [C] is obtained as described in Section 2.3.1 of the WQMP Guidance Document
[E] is obtained from Exhibit A in the WQMP Guidance Document
[G] is obtained from a design procedure sheet, such as in LID BMP Design Handbook and placed in Appendix 6

Section E: Alternative Compliance (LID Waiver Program)

LID BMPs are expected to be feasible on virtually all projects. Where LID BMPs have been demonstrated to be infeasible as documented in Section D, other Treatment Control BMPs must be used (subject to LID waiver approval by the Copermittee). Check one of the following Boxes:

☒ LID Principles and LID BMPs have been incorporated into the site design to fully address all Drainage Management Areas. No alternative compliance measures are required for this project and thus this Section is not required to be completed.

- *Or* -

☐ The following Drainage Management Areas are unable to be addressed using LID BMPs. A site-specific analysis demonstrating technical infeasibility of LID BMPs has been approved by the Co-Permittee and included in Appendix 5. Additionally, no downstream regional and/or sub-regional LID BMPs exist or are available for use by the project. The following alternative compliance measures on the following pages are being implemented to ensure that any pollutant loads expected to be discharged by not incorporating LID BMPs, are fully mitigated.

N/A

E.1 Identify Pollutants of Concern

Utilizing Table A.1 from Section A above which noted your project's receiving waters and their associated EPA approved 303(d) listed impairments, cross reference this information with that of your selected Priority Development Project Category in Table E.1 below. If the identified General Pollutant Categories are the same as those listed for your receiving waters, then these will be your Pollutants of Concern and the appropriate box or boxes will be checked on the last row. The purpose of this is to document compliance and to help you appropriately plan for mitigating your Pollutants of Concern in lieu of implementing LID BMPs.

Table E.1 Potential Pollutants by Land Use Type

Priority Development Project Categories and/or Project Features (check those that apply)	General Pollutant Categories							
	Bacterial Indicators	Metals	Nutrients	Pesticides	Toxic Organic Compounds	Sediments	Trash & Debris	Oil & Grease
☐ Detached Residential Development	P	N	P	P	N	P	P	P
☐ Attached Residential Development	P	N	P	P	N	P	P	P[(2)]
☒ Commercial/Industrial Development	P[(3)]	P	P[(1)]	P[(1)]	P[(5)]	P[(1)]	P	P
☐ Automotive Repair Shops	N	P	N	N	P[(4, 5)]	N	P	P
☐ Restaurants (>5,000 ft^2)	P	N	N	N	N	N	P	P
☐ Hillside Development (>5,000 ft^2)	P	N	P	P	N	P	P	P
☐ Parking Lots (>5,000 ft^2)	P[(6)]	P	P[(1)]	P[(1)]	P[(4)]	P[(1)]	P	P
☐ Retail Gasoline Outlets	N	P	N	N	P	N	P	P
Project Priority Pollutant(s) of Concern	☐	☒	☐	☐	☐	☐	☒	☒

P = Potential

N = Not Potential

(1) A potential Pollutant if non-native landscaping exists or is proposed onsite; otherwise not expected

(2) A potential Pollutant if the project includes uncovered parking areas; otherwise not expected

(3) A potential Pollutant is land use involving animal waste

(4) Specifically petroleum hydrocarbons

(5) Specifically solvents

(6) Bacterial indicators are routinely detected in pavement runoff

E.2 Stormwater Credits

Projects that cannot implement LID BMPs but nevertheless implement smart growth principles are potentially eligible for Stormwater Credits. Utilize Table 3-8 within the WQMP Guidance Document to identify your Project Category and its associated Water Quality Credit. If not applicable, write N/A.

Table E.2 Water Quality Credits

Qualifying Project Categories	Credit Percentage[2]
N/A	
Total Credit Percentage[1]	

[1]Cannot Exceed 50%

[2]Obtain corresponding data from Table 3-8 in the WQMP Guidance Document

E.3 SIzing Criteria

After you appropriately considered Stormwater Credits for your project, utilize Table E.3 below to appropriately size them to the DCV, or Design Flow Rate, as applicable. Please reference Chapter 3.5.2 of the WQMP Guidance Document for further information.

Table E.3 Treatment Control BMP Sizing BIO-1

DMA Type/ ID	**DMA Area (square feet)**	**Post-Project Surface Type**	**Effective Impervious Fraction, I_f**	**DMA Runoff Factor**	**DMA Area x Runoff Factor**		***Biotreatment Basin A***		
	[A]		[B]	[C]	[A] x [C]				
A-1	***193***	***Concrete or Asphalt***	***1***	***0.89***	***172.2***	*Design Storm Depth (in)*	*Minimum Design Capture Volume or Design Flow Rate (cubic feet or cfs)*	*Total Storm Water Credit % Reduction*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
A-1	*31894*	*Natural (C Soil)*	*0.3*	*0.23*	*7181.4*				
A-2	*230457*	*Concrete or Asphalt*	*1*	*0.89*	*205567.6*				
A-2	*173874*	*Compacted Soil (e.g. unpaved parking)*	*0.4*	*0.28*	*48634.6*				
A-2	*523322*	*Natural (C Soil)*	*0.3*	*0.23*	*117834.3*				
A-2	*35840*	*Ornamental Landscaping*	*0.1*	*0.11*	*3958.8*				
	Σ= 995,580				Σ= 383,349	0.61	5.4	N/A	> 5.4

[B], [C] is obtained as described in Section 2.3.1 from the WQMP Guidance Document

[E] is for Flow-Based Treatment Control BMPs [E] = .2, for Volume-Based Control Treatment BMPs, [E] obtained from Exhibit A in the WQMP Guidance Document

[G] is for Flow-Based Treatment Control BMPs [G] = 43,560, for Volume-Based Control Treatment BMPs, [G] = 12

[H] is from the Total Credit Percentage as Calculated from Table E.2 above

[I] as obtained from a design procedure sheet from the BMP manufacturer and should be included in Appendix 6

Table E.4 Treatment Control BMP Sizing MWS-1

DMA Type/ ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Area x Runoff Factor		Biotreatment Basin A		
	[A]		[B]	[C]	[A] x [C]				
B-4	*14243*	*Concrete or Asphalt*	*1*	*0.89*	*12704.8*	*Design Storm Depth (in)*	*Minimum Design Capture Volume or Design Flow Rate (cubic feet or cfs)*	*Total Storm Water Credit % Reduction*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
	Σ= 14,243				Σ= 12,705	0.61	0.2	N/A	> 0.2

[B], [C] is obtained as described in Section 2.3.1 from the WQMP Guidance Document
[E] is for Flow-Based Treatment Control BMPs [E] = .2, for Volume-Based Control Treatment BMPs, [E] obtained from Exhibit A in the WQMP Guidance Document
[G] is for Flow-Based Treatment Control BMPs [G] = 43,560, for Volume-Based Control Treatment BMPs, [G] = 12
[H] is from the Total Credit Percentage as Calculated from Table E.2 above
[I] as obtained from a design procedure sheet from the BMP manufacturer and should be included in Appendix 6

Table E.5 Treatment Control BMP Sizing MWS-2

DMA Type/ ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Area x Runoff Factor		Biotreatment Basin A		
	[A]		[B]	[C]	[A] x [C]				
C-2	*20819*	*Concrete or Asphalt*	*1*	*0.89*	*18570.5*	*Design Storm Depth (in)*	*Minimum Design Capture Volume or Design Flow Rate (cubic feet or cfs)*	*Total Storm Water Credit % Reduction*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
	Σ= 20,819				Σ= 18,571	0.61	0.3	N/A	> 0.3

[B], [C] is obtained as described in Section 2.3.1 from the WQMP Guidance Document
[E] is for Flow-Based Treatment Control BMPs [E] = .2, for Volume-Based Control Treatment BMPs, [E] obtained from Exhibit A in the WQMP Guidance Document
[G] is for Flow-Based Treatment Control BMPs [G] = 43,560, for Volume-Based Control Treatment BMPs, [G] = 12
[H] is from the Total Credit Percentage as Calculated from Table E.2 above
[I] as obtained from a design procedure sheet from the BMP manufacturer and should be included in Appendix 6

Table E.6 Treatment Control BMP Sizing FIL-1

DMA Type/ ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Area x Runoff Factor		*Biotreatment Basin A*		
	[A]		[B]	[C]	[A] x [C]				
B-1	*19427*	*Concrete or Asphalt*	*1*	*0.89*	*17328.9*	*Design Storm Depth (in)*	*Minimum Design Capture Volume or Design Flow Rate (cubic feet or cfs)*	*Total Storm Water Credit % Reduction*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
B-2	*15887*	*Concrete or Asphalt*	*1*	*0.89*	*14171.2*				
B-3	*21000*	*Ornamental Landscaping*	*0.1*	*0.11*	*2319.6*				
B-3	*11280*	*Natural (C Soil)*	*0.3*	*0.23*	*2539.9*				
	Σ= 67,594				Σ= 36,360	0.61	0.5	N/A	> 0.5

[B], [C] is obtained as described in Section 2.3.1 from the WQMP Guidance Document
[E] is for Flow-Based Treatment Control BMPs [E] = .2, for Volume-Based Control Treatment BMPs, [E] obtained from Exhibit A in the WQMP Guidance Document
[G] is for Flow-Based Treatment Control BMPs [G] = 43,560, for Volume-Based Control Treatment BMPs, [G] = 12
[H] is from the Total Credit Percentage as Calculated from Table E.2 above
[I] as obtained from a design procedure sheet from the BMP manufacturer and should be included in Appendix 6

Table E.7 Treatment Control BMP Sizing FIL-2

DMA Type/ ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Area x Runoff Factor		*Biotreatment Basin A*		
	[A]		[B]	[C]	[A] x [C]				
C-1	*17978*	*Concrete or Asphalt*	*1*	*0.89*	*16036.4*	*Design Storm Depth (in)*	*Minimum Design Capture Volume or Design Flow Rate (cubic feet or cfs)*	*Total Storm Water Credit % Reduction*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
	Σ= 17,978				Σ= 16,036	0.61	0.2	N/A	> 0.2

[B], [C] is obtained as described in Section 2.3.1 from the WQMP Guidance Document
[E] is for Flow-Based Treatment Control BMPs [E] = .2, for Volume-Based Control Treatment BMPs, [E] obtained from Exhibit A in the WQMP Guidance Document
[G] is for Flow-Based Treatment Control BMPs [G] = 43,560, for Volume-Based Control Treatment BMPs, [G] = 12
[H] is from the Total Credit Percentage as Calculated from Table E.2 above
[I] as obtained from a design procedure sheet from the BMP manufacturer and should be included in Appendix 6

Table E.8 Treatment Control BMP Sizing FIL-3

DMA Type/ ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Area x Runoff Factor		*Biotreatment Basin A*		
	[A]		[B]	[C]	[A] x [C]				
D-1	*32429*	*Ornamental Landscaping*	*0.1*	*0.11*	*3582*	*Design Storm Depth (in)*	*Minimum Design Capture Volume or Design Flow Rate (cubic feet or cfs)*	*Total Storm Water Credit % Reduction*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
D-1	*67801*	*Natural (C Soil)*	*0.3*	*0.23*	*15266.5*				
D-2	*7744*	*Concrete or Asphalt*	*1*	*0.89*	*6907.6*				
	Σ= 107,974				Σ= 25,756	0.61	0.4	N/A	> 0.4

[B], [C] is obtained as described in Section 2.3.1 from the WQMP Guidance Document
[E] is for Flow-Based Treatment Control BMPs [E] = .2, for Volume-Based Control Treatment BMPs, [E] obtained from Exhibit A in the WQMP Guidance Document
[G] is for Flow-Based Treatment Control BMPs [G] = 43,560, for Volume-Based Control Treatment BMPs, [G] = 12
[H] is from the Total Credit Percentage as Calculated from Table E.2 above
[I] as obtained from a design procedure sheet from the BMP manufacturer and should be included in Appendix 6

E.4 Treatment Control BMP Selection

Treatment Control BMPs typically provide proprietary treatment mechanisms to treat potential pollutants in runoff, but do not sustain significant biological processes. Treatment Control BMPs must have a removal efficiency of a medium or high effectiveness as quantified below:

- **High**: equal to or greater than 80% removal efficiency
- **Medium**: between 40% and 80% removal efficiency

Such removal efficiency documentation (e.g., studies, reports, etc.) as further discussed in Chapter 3.5.2 of the WQMP Guidance Document, must be included in Appendix 6. In addition, ensure that proposed Treatment Control BMPs are properly identified on the WQMP Site Plan in Appendix 1.

Table E.9 Treatment Control BMP Selection

Selected Treatment Control BMP Name or ID[1]	Priority Pollutant(s) of Concern to Mitigate[2]	Removal Efficiency Percentage[3]
N/A		

[1] Treatment Control BMPs must not be constructed within Receiving Waters. In addition, a proposed Treatment Control BMP may be listed more than once if they possess more than one qualifying pollutant removal efficiency.
[2] Cross Reference Table E.1 above to populate this column.
[3] As documented in a Co-Permittee Approved Study and provided in Appendix 6.

Section F: Hydromodification

F.1 Hydrologic Conditions of Concern (HCOC) Analysis

Once you have determined that the LID design is adequate to address water quality requirements, you will need to assess if the proposed LID Design may still create a HCOC. Review Chapters 2 and 3 (including Figure 3-7) of the WQMP Guidance Document to determine if your project must mitigate for Hydromodification impacts. If your project meets one of the following criteria which will be indicated by the check boxes below, you do not need to address Hydromodification at this time. However, if the project does not qualify for Exemptions 1, 2 or 3, then additional measures must be added to the design to comply with HCOC criteria. This is discussed in further detail below in Section F.2.

HCOC EXEMPTION 1: The Priority Development Project disturbs less than one acre. The Copermittee has the discretion to require a Project-Specific WQMP to address HCOCs on projects less than one acre on a case by case basis. The disturbed area calculation should include all disturbances associated with larger common plans of development.

Does the project qualify for this HCOC Exemption? ☐ Y ☒ N

If Yes, HCOC criteria do not apply.

HCOC EXEMPTION 2: The volume and time of concentration[1] of storm water runoff for the post-development condition is not significantly different from the pre-development condition for a 2-year return frequency storm (a difference of 5% or less is considered insignificant) using one of the following methods to calculate:

- Riverside County Hydrology Manual
- Technical Release 55 (TR-55): Urban Hydrology for Small Watersheds (NRCS 1986), or derivatives thereof, such as the Santa Barbara Urban Hydrograph Method
- Other methods acceptable to the Co-Permittee

Does the project qualify for this HCOC Exemption? ☐ Y ☒ N

If Yes, report results in Table F.1 below and provide your substantiated hydrologic analysis in Appendix 7.

Table F.1 Hydrologic Conditions of Concern Summary

	2 year – 24 hour		
	Pre-condition	**Post-condition**	**% Difference**
Time of Concentration	35.56	29.20	-21.8
Volume (Cubic Feet)	116,048	138,399	19.2

[1] Time of concentration is defined as the time after the beginning of the rainfall when all portions of the drainage basin are contributing to flow at the outlet.

HCOC EXEMPTION 3: All downstream conveyance channels to an adequate sump (for example, Prado Dam, Lake Elsinore, Canyon Lake, Santa Ana River, or other lake, reservoir or naturally erosion resistant feature) that will receive runoff from the project are engineered and regularly maintained to ensure design flow capacity; no sensitive stream habitat areas will be adversely affected; or are not identified on the Co-Permittees Hydromodification Susceptibility Maps.

Does the project qualify for this HCOC Exemption? ☐ Y ☒ N

If Yes, HCOC criteria do not apply and note below which adequate sump applies to this HCOC qualifier:

Project discharges to RCFCD channel, which is concrete lined from the discharge point to the San Jacinto River, which is identified as HCOC exempt.

F.2 HCOC Mitigation

If none of the above HCOC Exemption Criteria are applicable, HCOC criteria is considered mitigated if they meet one of the following conditions:

a. Additional LID BMPS are implemented onsite or offsite to mitigate potential erosion or habitat impacts as a result of HCOCs. This can be conducted by an evaluation of site-specific conditions utilizing accepted professional methodologies published by entities such as the California Stormwater Quality Association (CASQA), the Southern California Coastal Water Research Project (SCCRWP), or other Co-Permittee approved methodologies for site-specific HCOC analysis.

b. The project is developed consistent with an approved Watershed Action Plan that addresses HCOC in Receiving Waters.

c. Mimicking the pre-development hydrograph with the post-development hydrograph, for a 2-year return frequency storm. Generally, the hydrologic conditions of concern are not significant, if the post-development hydrograph is no more than 10% greater than pre-development hydrograph. In cases where excess volume cannot be infiltrated or captured and reused, discharge from the site must be limited to a flow rate no greater than 110% of the pre-development 2-year peak flow.

Be sure to include all pertinent documentation used in your analysis of the items a, b or c in Appendix 7.

The project will mitigate for HCOC by complying with method c above. The detention basin will be fitted with an additional orifice to mitigate the 2-year, 24-hour hydrograph. See Appendix 7 for stage-storage-discharge calculations.

	2 year – 24 hour		
	Pre-condition	**Post-condition (unmitigated)**	**% Difference**
Time of Concentration	35.56	29.20	-21.8
Volume (Cubic Feet)	116,048	138,399	19.2

Section G: Source Control BMPs

Source control BMPs include permanent, structural features that may be required in your project plans — such as roofs over and berms around trash and recycling areas — and Operational BMPs, such as regular sweeping and "housekeeping", that must be implemented by the site's occupant or user. The MEP standard typically requires both types of BMPs. In general, Operational BMPs cannot be substituted for a feasible and effective permanent BMP. Using the Pollutant Sources/Source Control Checklist in Appendix 8, review the following procedure to specify Source Control BMPs for your site:

1. ***Identify Pollutant Sources*:** Review Column 1 in the Pollutant Sources/Source Control Checklist. Check off the potential sources of Pollutants that apply to your site.

2. ***Note Locations on Project-Specific WQMP Exhibit*:** Note the corresponding requirements listed in Column 2 of the Pollutant Sources/Source Control Checklist. Show the location of each Pollutant source and each permanent Source Control BMP in your Project-Specific WQMP Exhibit located in Appendix 1.

3. ***Prepare a Table and Narrative*:** Check off the corresponding requirements listed in Column 3 in the Pollutant Sources/Source Control Checklist. In the left column of Table G.1 below, list each potential source of runoff Pollutants on your site (from those that you checked in the Pollutant Sources/Source Control Checklist). In the middle column, list the corresponding permanent, Structural Source Control BMPs (from Columns 2 and 3 of the Pollutant Sources/Source Control Checklist) used to prevent Pollutants from entering runoff. **Add additional narrative** in this column that explains any special features, materials or methods of construction that will be used to implement these permanent, Structural Source Control BMPs.

4. ***Identify Operational Source Control BMPs:*** To complete your table, refer once again to the Pollutant Sources/Source Control Checklist. List in the right column of your table the Operational BMPs that should be implemented as long as the anticipated activities continue at the site. Copermittee stormwater ordinances require that applicable Source Control BMPs be implemented; the same BMPs may also be required as a condition of a use permit or other revocable Discretionary Approval for use of the site.

Table G.1 Permanent and Operational Source Control Measures

Potential Sources of Runoff pollutants	Permanent Structural Source Control BMPs	Operational Source Control BMPs
On-site Drain Inlets	Mark all inlets with the words "Only Rain Down the Storm Drain" or similar. Catch Basin Markers may be available from the Riverside County Flood Control and Water Conservation District, call 951.955.1200 to verify.	Maintain and periodically repaint or replace inlet markings.
Landscape/Outdoor Pesticide Use	Preserve existing native trees, shrubs, and ground cover to the maximum extent possible. Design Landscaping to minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to stormwater pollution. Where landscaped areas are used to retain or detain stormwater, specify plants that are tolerant of saturated soil conditions. Consider using pest-resistant plants, especially adjacent to hardscape. To insure successful establishment, select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions.	Maintain landscaping using minimum or no pesticides. See applicable operational BMPs in "What you should know for…..Landscape and Gardening" at http://rcflood.org/stormwater Provide IPM information to new owners, lessees, and operators.

Section H:Construction Plan Checklist

Populate Table H.1 below to assist the plan checker in an expeditious review of your project. The first two columns will contain information that was prepared in previous steps, while the last column will be populated with the corresponding plan sheets. This table is to be completed with the submittal of your final Project-Specific WQMP.

Table H.1 Construction Plan Cross-reference

BMP No. or ID	BMP Identifier and Description	Corresponding Plan Sheet(s)	BMP Location (Lat/Long)
BIO-1	Biotreatment Basin	See WQMP Exhibit	33.7371, -117.1668
MWS-1	Modular Wetland System 1	See WQMP Exhibit	33.7, -117.1
MWS-2	Modular Wetland System 2	See WQMP Exhibit	33.7, -117.1
FIL-1	Filterra System 1	See WQMP Exhibit	33.7, -117.1
FIL-2	Filterra System 2	See WQMP Exhibit	33.7, -117.1
FIL-3	Filterra System 3	See WQMP Exhibit	33.7, -117.1

Note that the updated table — or Construction Plan WQMP Checklist — is **only a reference tool** to facilitate an easy comparison of the construction plans to your Project-Specific WQMP. Co-Permittee staff can advise you regarding the process required to propose changes to the approved Project-Specific WQMP.

Section I: Operation, Maintenance and Funding

The Copermittee will periodically verify that Stormwater BMPs on your site are maintained and continue to operate as designed. To make this possible, your Copermittee will require that you include in Appendix 9 of this Project-Specific WQMP:

1. A means to finance and implement facility maintenance in perpetuity, including replacement cost.
2. Acceptance of responsibility for maintenance from the time the BMPs are constructed until responsibility for operation and maintenance is legally transferred. A warranty covering a period following construction may also be required.
3. An outline of general maintenance requirements for the Stormwater BMPs you have selected.
4. Figures delineating and designating pervious and impervious areas, location, and type of Stormwater BMP, and tables of pervious and impervious areas served by each facility. Geo-locating the BMPs using a coordinate system of latitude and longitude is recommended to help facilitate a future statewide database system.
5. A separate list and location of self-retaining areas or areas addressed by LID Principles that do not require specialized O&M or inspections but will require typical landscape maintenance as noted in Chapter 5, pages 85-86, in the WQMP Guidance. Include a brief description of typical landscape maintenance for these areas.

Your local Co-Permittee will also require that you prepare and submit a detailed Stormwater BMP Operation and Maintenance Plan that sets forth a maintenance schedule for each of the Stormwater BMPs built on your site. An agreement assigning responsibility for maintenance and providing for inspections and certification may also be required.

Details of these requirements and instructions for preparing a Stormwater BMP Operation and Maintenance Plan are in Chapter 5 of the WQMP Guidance Document.

Maintenance Mechanism: Owner

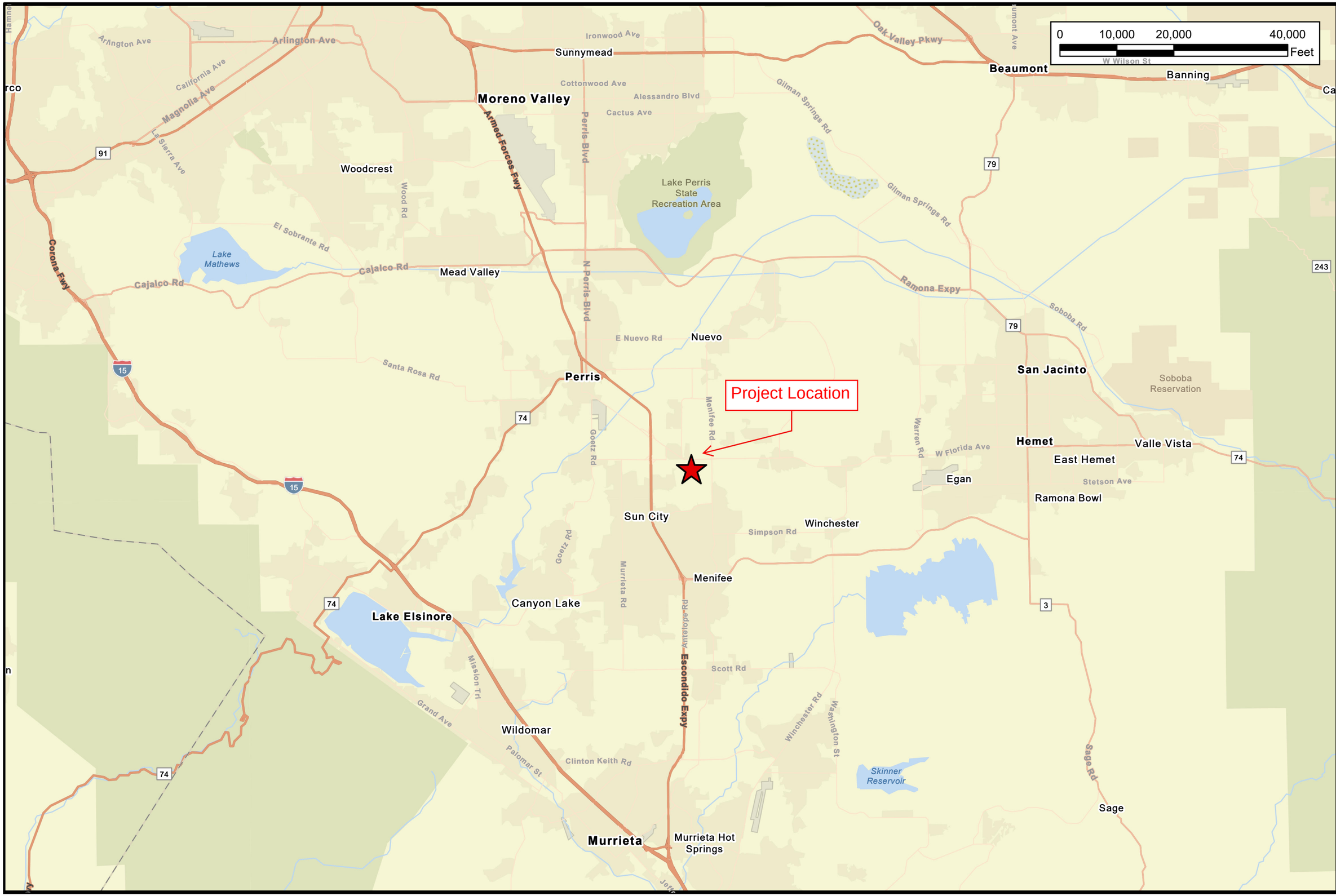
Will the proposed BMPs be maintained by a Home Owners' Association (HOA) or Property Owners Association (POA)?

☐ Y ☒ N

Include your Operation and Maintenance Plan and Maintenance Mechanism in Appendix 9. Additionally, include all pertinent forms of educational materials for those personnel that will be maintaining the proposed BMPs within this Project-Specific WQMP in Appendix 10.

Appendix 1: Maps and Site Plans

Location Map, WQMP Site Plan, Receiving Waters Map, and Isohyetal Map



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1100 W Town & Country Road
Orange, CA 92868
(714) 939-1030 Phone
www.Kimley-Horn.com

N

MENIFEE, CA

DOUBLE BUTTE BESS

VICINITY MAP

DATE:	NOVEMBER 2022
DESIGN:	NBN
DRAWN:	NBN
CHECKED:	AAT
KH NO.:	094817130

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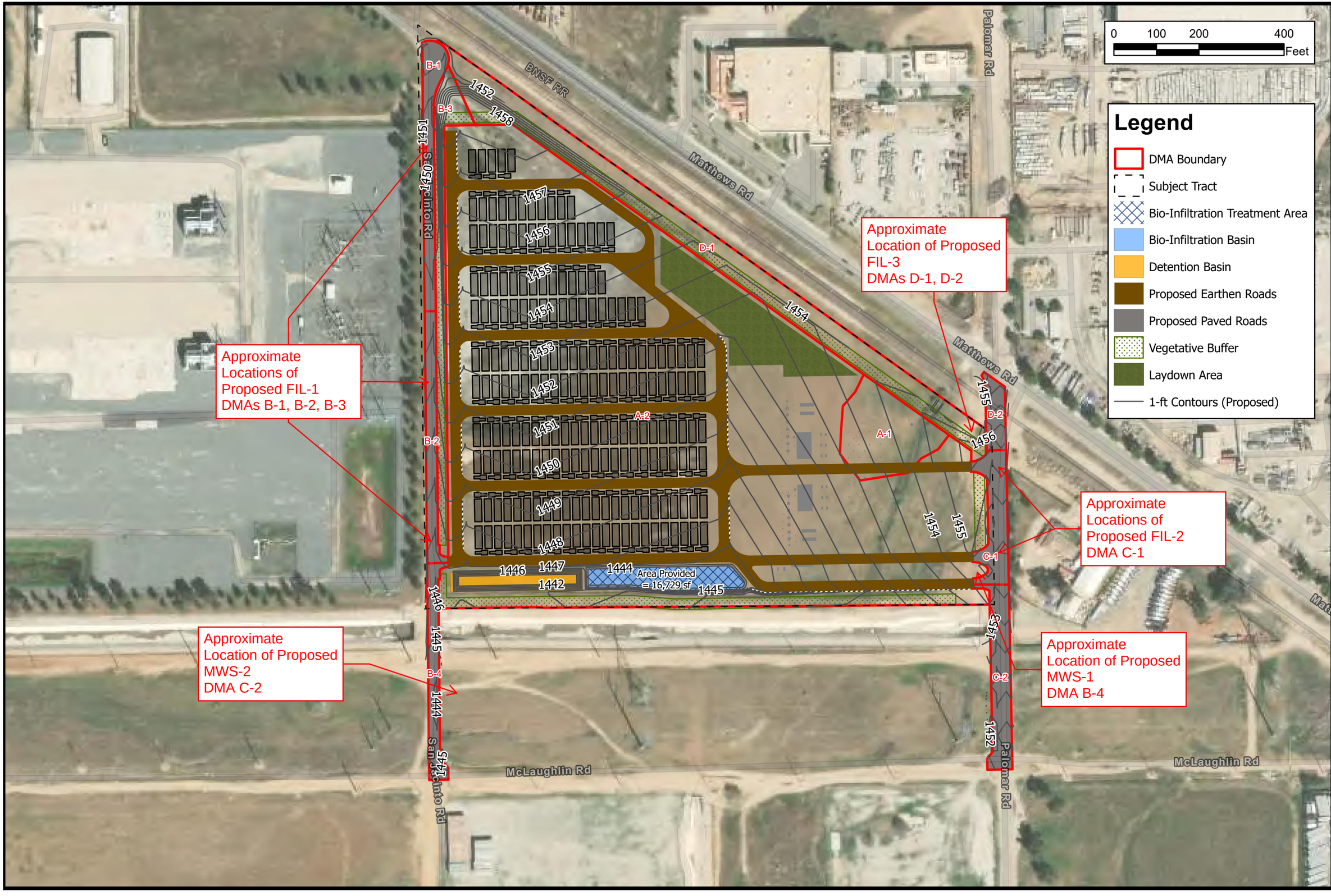

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MENIFEE, CA

DOUBLE BUTTE BESS

WQMP EXHIBIT

DATE:	NOVEMBER 2023
DESIGN:	NBN
DRAWN:	NBN
CHECKED:	AAT
KH NO.:	094817130

SHEET 2

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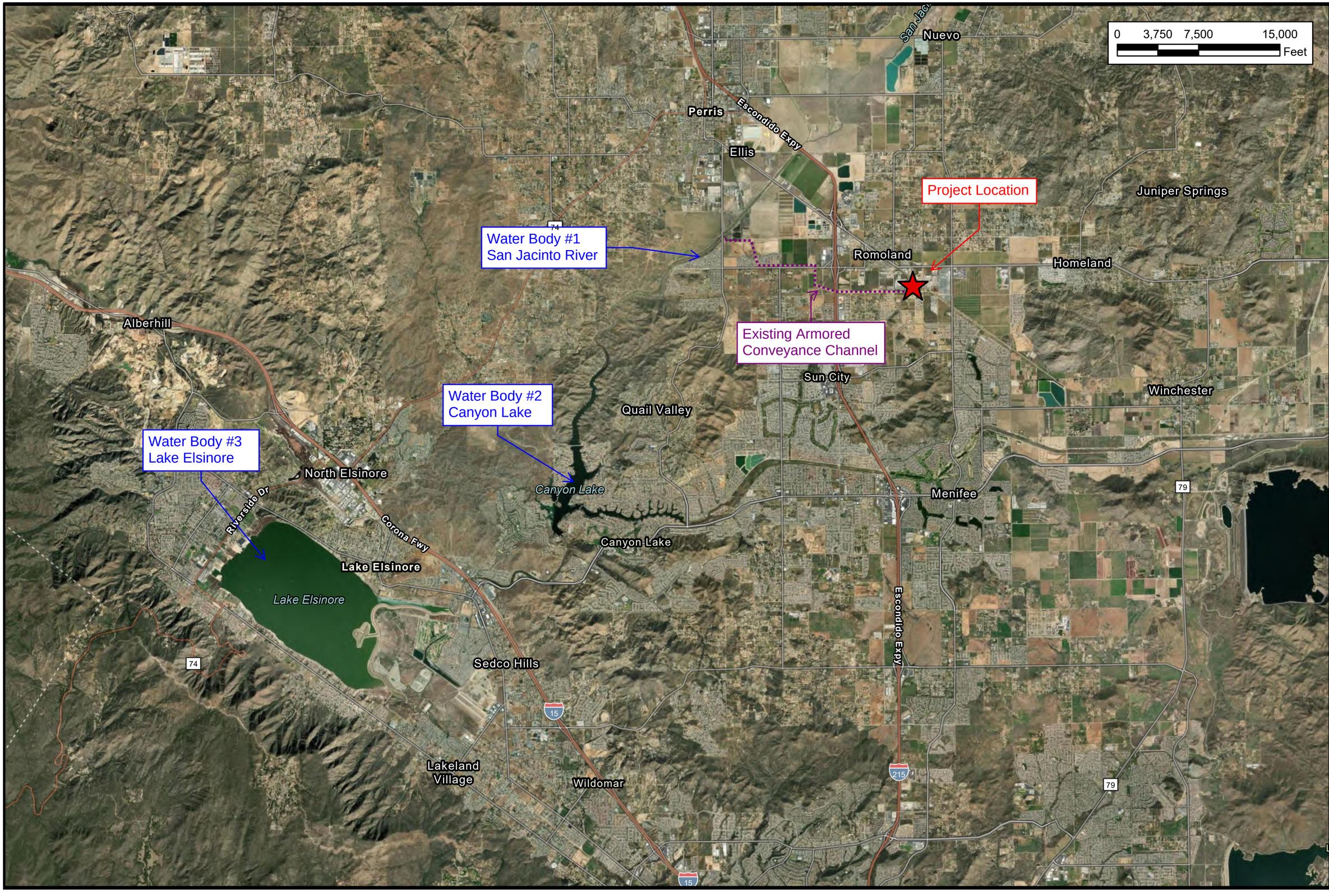

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Orange, CA 92868
(714) 939-1030 Phone
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MENIFEE, CA

DOUBLE BUTTE BESS

RECEIVING WATERS

DATE:	NOVEMBER 2022
DESIGN:	NBN
DRAWN:	NBN
CHECKED:	AAT
KH NO.:	094817130

SHEET
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T 01 S
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T 06 S
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T 08 S

06	05	04	03	02	01
07	08	09	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

0.85 MiraLoma
0.61 RiversideNorth
0.54 RiversideSouth
0.68 PigeonPass
0.66 MorenoEast
0.85 Beaumont
0.88 PradoDam
0.51 Woodcrest
0.50 LakeMathews
0.68 PerrisReservoir
0.87 VistaGrandeGS
0.70 SanJacintoNWS
1.18 Idyllwild
0.58 SunCity
0.68 Winchester
0.90 HurkeyCreek
0.70 ElsinoreNWS
1.11 ElCarisoStation
0.77 WildomarLaCresta
0.52 SkinnerLake
0.65 Anza
0.77 SantaRosaPlateau
1.00 TemeculaNWS
0.64 AguangaValley

Approximate Project Location

Santa Ana River Watershed

Santa Margarita Watershed

CORONA | NORCO | EASTVALE | JURUPA VALLEY | RIVERSIDE | MORENO VALLEY | CALIMESA | BEAUMONT | PERRIS | CANYON LAKE | LAKE ELSINORE | MENIFEE | HEMET | WILDOMAR | MURRIETA | TEMECULA

Rain Gage Locations

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

Isohyetal Map for the 85th Percentile 24 hour Storm Event

July 2011

Appendix 2: Construction Plans

Grading and Drainage Plans

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SHEET NUMBER 1	PROJECT NO. 094817190	DATE DECEMBER 2022	EXISTING CONDITION DRAINAGE AREA MAP	DOUBLE BUTTE STORAGE MENIFEE, CA	1 inch = 80 feet

Kimley»Horn
1100 W TOWN AND COUNTRY ROAD, SUITE 700
ORANGE, CA 92868
PHONE: 714-939-1030

DESIGN:	AAT
DRAWN:	AAT
REVIEW:	DB

DESIGN: NBN
DRAWN: NBN
REVIEW: AAT

Kimley»Horn
1100 W TOWN AND COUNTY ROAD, SUITE 700
ORANGE, CA 92868
PHONE: 714-939-1030

DOUBLE BUTTE BESS
MENIFEE, CA

PROPOSED CONDITION DRAINAGE AREA MAP

DATE
NOVEMBER 2023

PROJECT NO.
094817130

SHEET NUMBER
2

Document Path: C:\Users\nicholas.naylor\Desktop\DBI\GIS\Double_Butte.aprx

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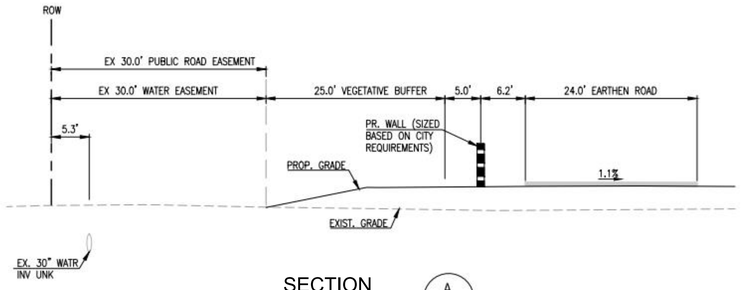

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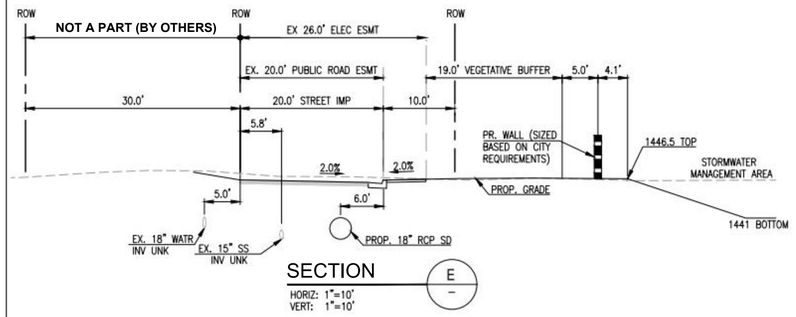

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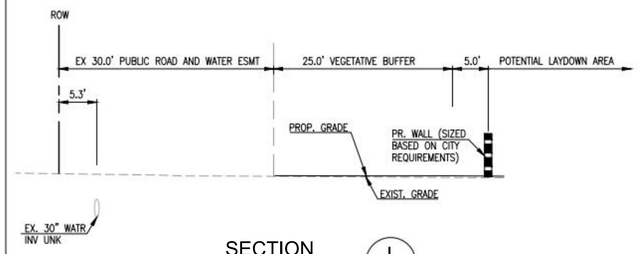

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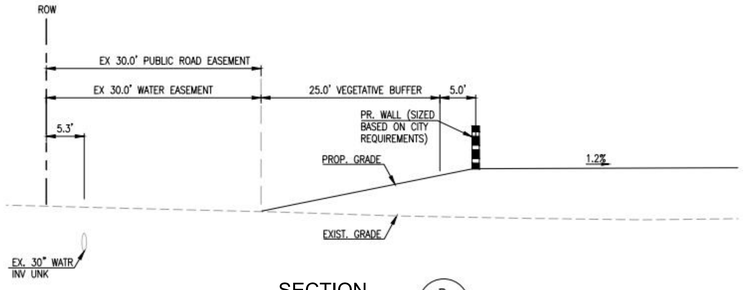

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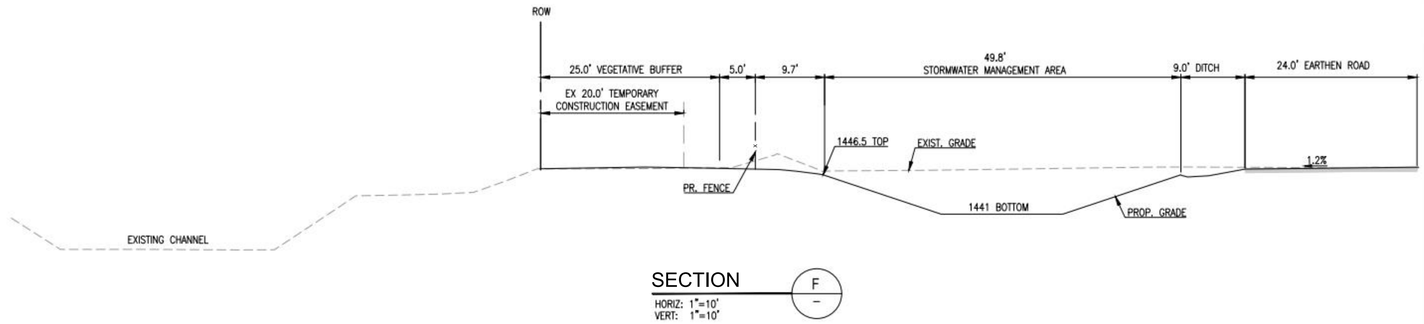

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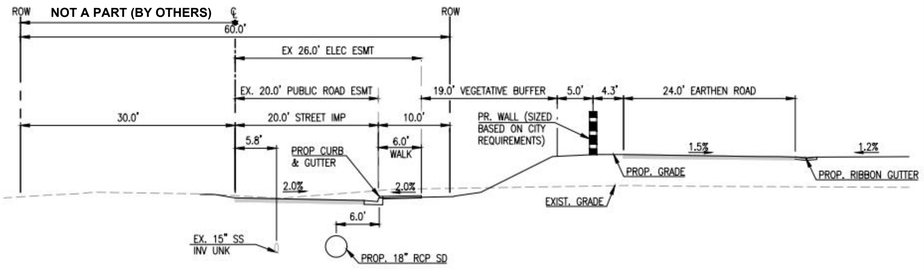

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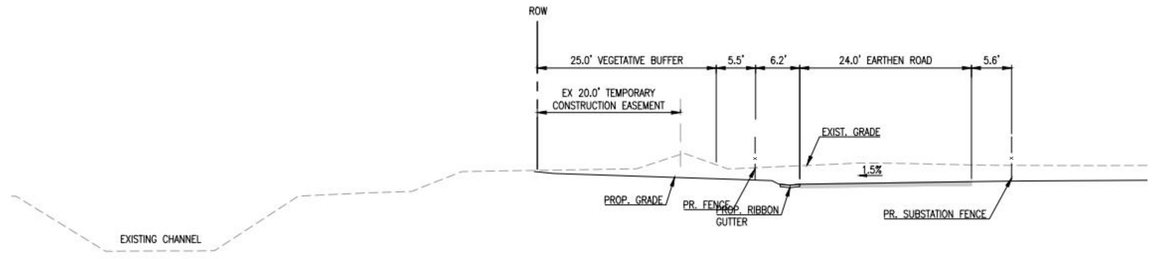

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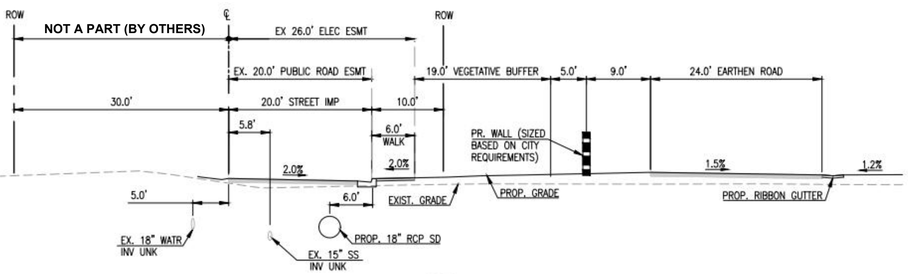

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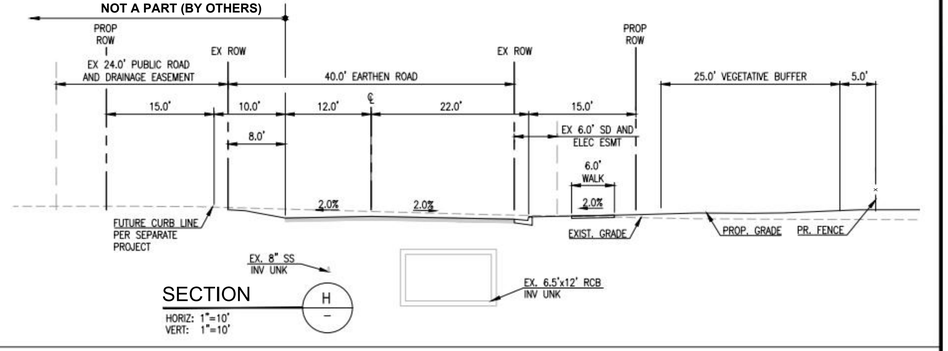

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GENERAL NOTES

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2. LOCATION OF ALL EXISTING ITEMS ARE APPROXIMATE AND MUST BE VERIFIED IN THE FIELD PRIOR TO CONSTRUCTION.
3. ALL SPECIFIED EQUIPMENT IS PRELIMINARY. FINAL EQUIPMENT SELECTION SHALL BE APPROVED BY OWNER.

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(801) 679 - 3500

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38 TECHNOLOGY DRIVE, SUITE 200
IRVINE, CA 92618
949.923.6000 stantec.com

PE STAMP:

KEY PLAN:

REVISIONS:

NO.	DATE	DESCRIPTION
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1	05/01/23	PRELIM GRADING DESIGN
2	06/21/23	PRELIM GRADING DESIGN
3	09/20/23	PRELIM GRADING DESIGN

PROJECT TITLE:

DOUBLE BUTTE STORAGE

PROJECT LOCATION:

CITY OF MENIFEE, CA
33.7412, -117.1563

SHEET TITLE & DESCRIPTION:

CROSS SECTIONS

500 MW / 2,000 MWh BESS

PROJ NUM:	ES19.0004
DES:	V. ITO
DWN:	V. ITO
CHK:	D. WATSON
APV:	
DATE:	9/20/2023

SCALE AT 24" x 36":

AS NOTED

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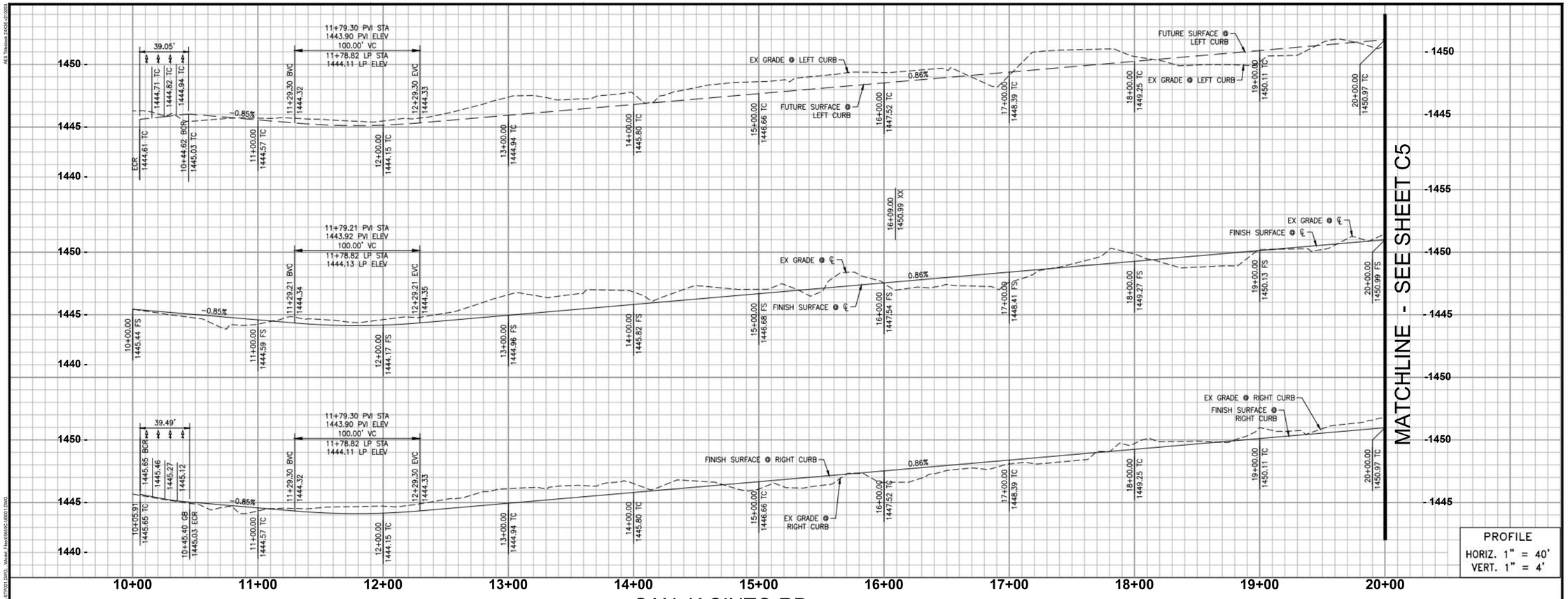


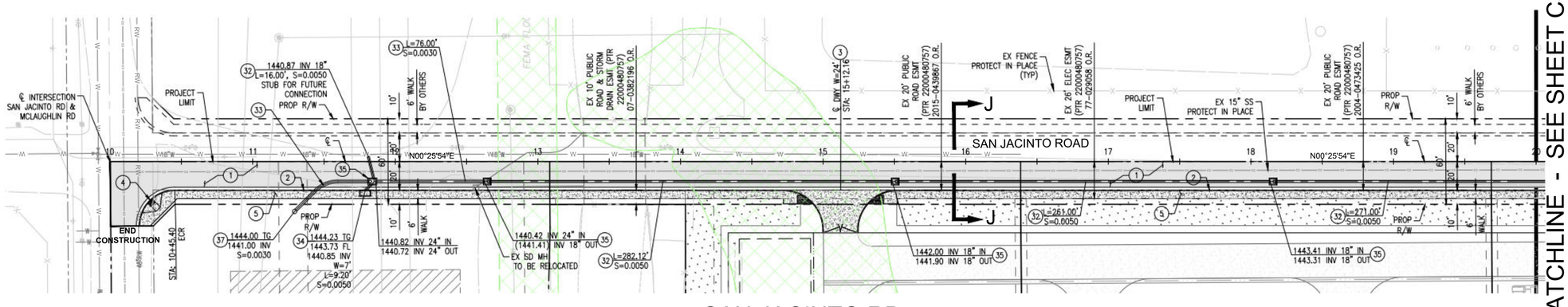
SAN JACINTO RD
PROFILE

STREET IMPROVEMENT CONSTRUCTION NOTES

1. CONSTRUCT 0.x' AC PAVEMENT OVER 0.x' CAB CLASS II
2. CONSTRUCT TYPE 6 CONCRETE CURB AND GUTTER PER CITY OF MENIFEE STD PLAN 200
3. CONSTRUCT COMMERCIAL DRIVEWAY PER CITY OF MENIFEE STD PLAN 208
4. CONSTRUCT PEDESTRIAN RAMP TYPE I PER CITY OF MENIFEE STD PLAN 405
5. CONSTRUCT CONCRETE WALK PER PER CITY OF MENIFEE STD PLAN 400

STORM DRAIN IMPROVEMENT CONSTRUCTION NOTES

32. INSTALL 18" RCP PIPE
33. INSTALL 24" RCP PIPE
34. CONSTRUCT CURB INLET (WIDTH PER PLAN)
35. CONSTRUCT JUNCTION STRUCTURE
37. INSTALL GRATED INLET



SAN JACINTO RD
PLAN VIEW

PRELIMINARY
NOT FOR CONSTRUCTION

GENERAL NOTES

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3. ALL SPECIFIED EQUIPMENT IS PRELIMINARY. FINAL EQUIPMENT SELECTION SHALL BE APPROVED BY OWNER.

0 20' 40' 60' 80'
1" = 40'

LEGEND

EXISTING	PROPOSED
PROJECT BOUNDARY	WALL / SOUND BARRIER
EASEMENT	STORM DRAIN
SEWER	FENCING
WATER	500 kV GEN TIE
STORM DRAIN	LAYDOWN AREA
RAILROAD	VEGETATIVE BUFFER
	FEMA FLOOD ZONE
	AC PAVEMENT

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IRVINE, CA 92618
949.923.6000 stantec.com

PE STAMP:

KEY PLAN:

REVISIONS:

NO.	DATE	DESCRIPTION
0	09/20/23	PRELIM STREET DESIGN

PROJECT TITLE:

DOUBLE BUTTE STORAGE

PROJECT LOCATION:

CITY OF MENIFEE, CA
33.7412, -117.1563

SHEET TITLE & DESCRIPTION:

PRELIMINARY SAN JACINTO ROAD PLAN

500 MW / 2,000 MWh BESS

PROJ NUM:	ES19.0004
DES:	V. ITO
DWN:	V. ITO
CHK:	D. WATSON
APV:	
DATE:	9/20/2023

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AS NOTED

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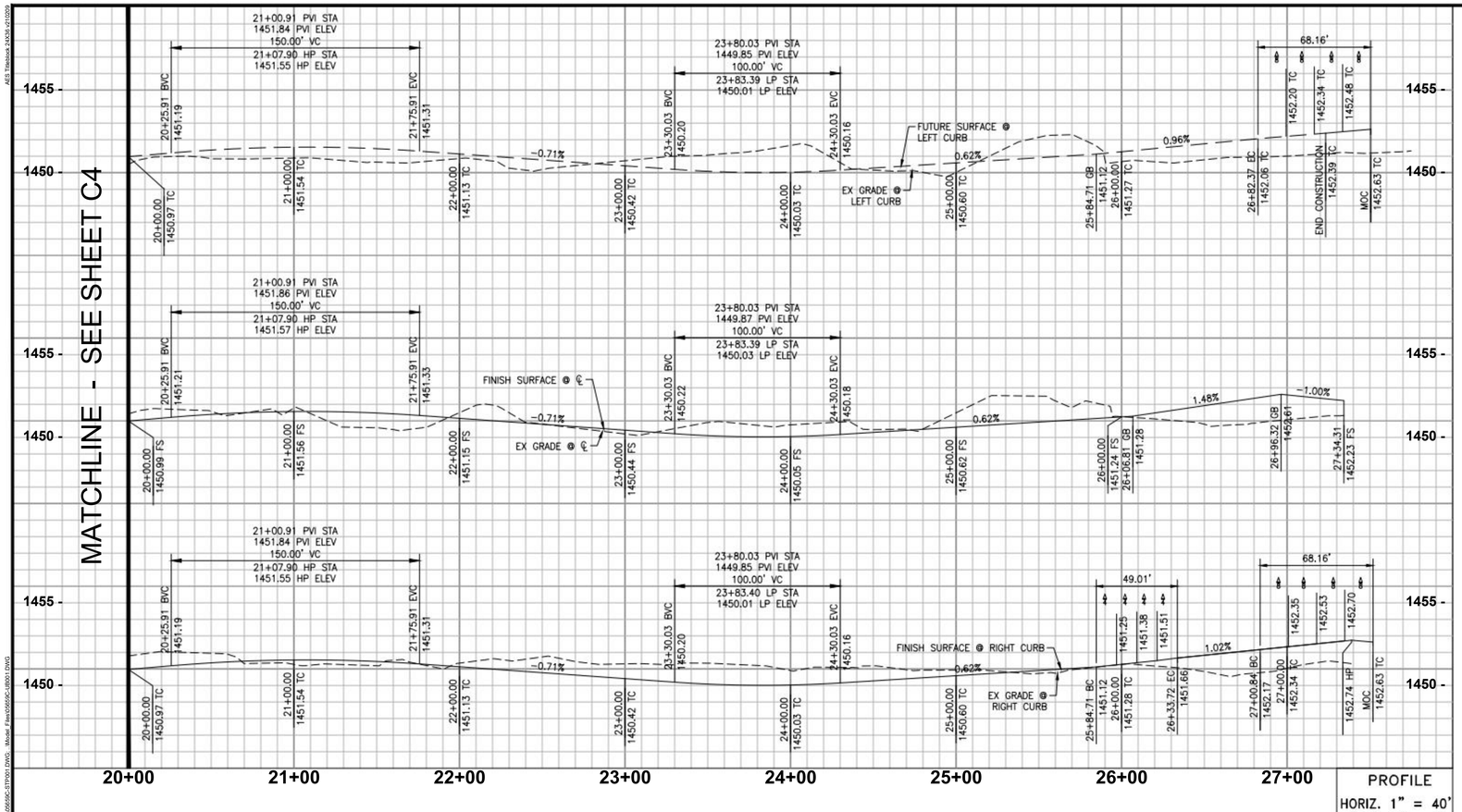
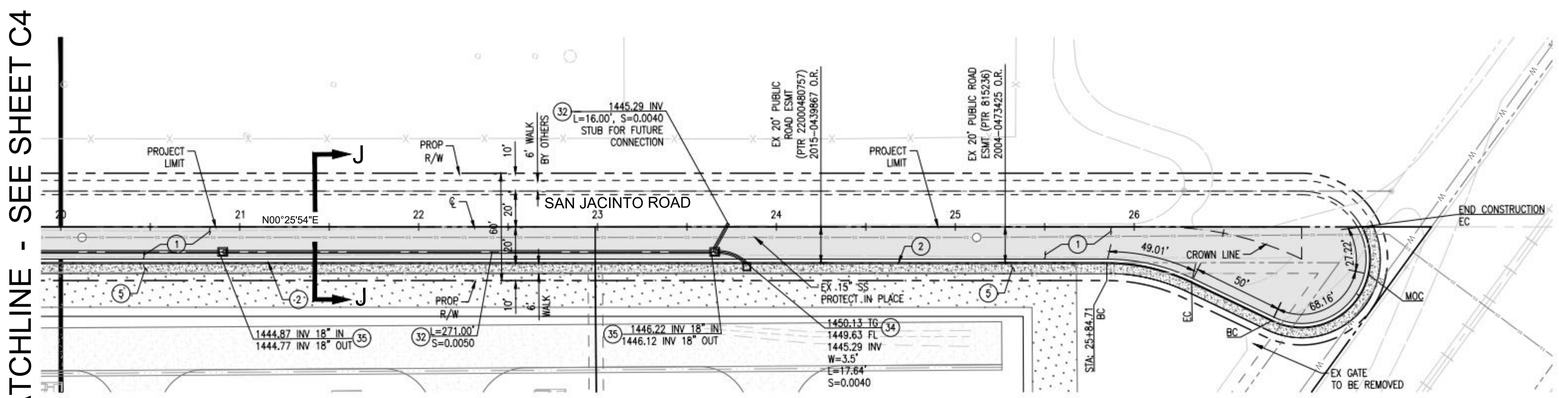


SAN JACINTO RD
PROFILE



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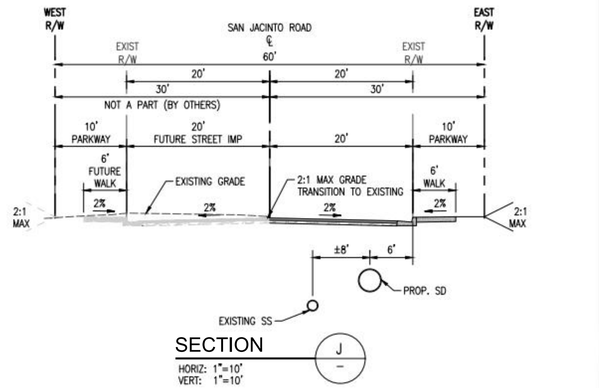

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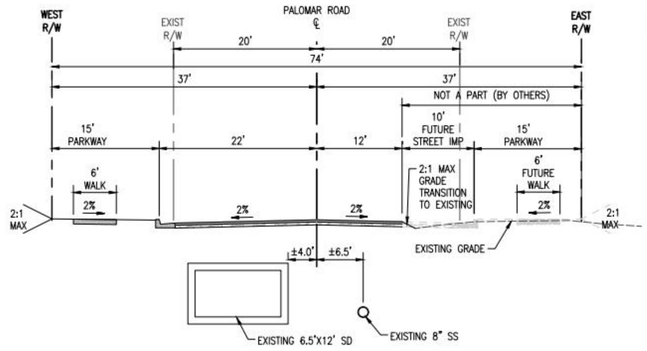

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STREET IMPROVEMENT CONSTRUCTION NOTES

1. CONSTRUCT 0.x' AC PAVEMENT OVER 0.x' CAB CLASS II
2. CONSTRUCT TYPE 6 CONCRETE CURB AND GUTTER PER CITY OF MENIFEE STD PLAN 200
3. CONSTRUCT COMMERCIAL DRIVEWAY PER CITY OF MENIFEE STD PLAN 208
4. CONSTRUCT PEDESTRIAN RAMP TYPE I PER CITY OF MENIFEE STD PLAN 405
5. CONSTRUCT CONCRETE WALK PER PER CITY OF MENIFEE STD PLAN 400

STORM DRAIN IMPROVEMENT CONSTRUCTION NOTES

32. INSTALL 18" RCP PIPE
34. CONSTRUCT CURB INLET (WIDTH PER PLAN)
35. CONSTRUCT JUNCTION STRUCTURE

LEGEND

EXISTING
- PROJECT BOUNDARY
- EASEMENT
- SEWER
- WATER
- STORM DRAIN
- RAILROAD

PROPOSED
- WALL / SOUND BARRIER
- STORM DRAIN
- FENCING
- 500 kV GEN TIE
- LAYDOWN AREA
- VEGETATIVE BUFFER
- FEMA FLOOD ZONE
- AC PAVEMENT

PRELIMINARY
NOT FOR CONSTRUCTION

GENERAL NOTES

1. THIS DRAWING IS PRELIMINARY, AND NOT FOR CONSTRUCTION. IT IS FOR ESTIMATING PURPOSES ONLY.
2. LOCATION OF ALL EXISTING ITEMS ARE APPROXIMATE AND MUST BE VERIFIED IN THE FIELD PRIOR TO CONSTRUCTION.
3. ALL SPECIFIED EQUIPMENT IS PRELIMINARY. FINAL EQUIPMENT SELECTION SHALL BE APPROVED BY OWNER.

0 20' 40' 60' 80'
1" = 40'

aes
2180 South 1300 East, Suite 600
Salt Lake City, UT 84106-2749
(801) 679 - 3500

Stantec
38 TECHNOLOGY DRIVE, SUITE 200
IRVINE, CA 92618
949.923.6000 stantec.com

PE STAMP:

KEY PLAN:

REVISIONS:

NO.	DATE	DESCRIPTION
0	09/20/23	PRELIM STREET DESIGN

PROJECT TITLE:

DOUBLE BUTTE STORAGE

PROJECT LOCATION:

CITY OF MENIFEE, CA
33.7412, -117.1563

SHEET TITLE & DESCRIPTION:

PRELIMINARY SAN JACINTO ROAD PLAN

500 MW / 2,000 MWh BESS

PROJ NUM:	ES19.0004
DES:	V. ITO
DWN:	V. ITO
CHK:	D. WATSON
APV:	
DATE:	9/20/2023
SCALE AT 24" x 36":	AS NOTED
SHEET NO:	C5
REV:	0

AES Tribeca 24536 c010209
PLOTTED: 9/20/2023 5:13 PM
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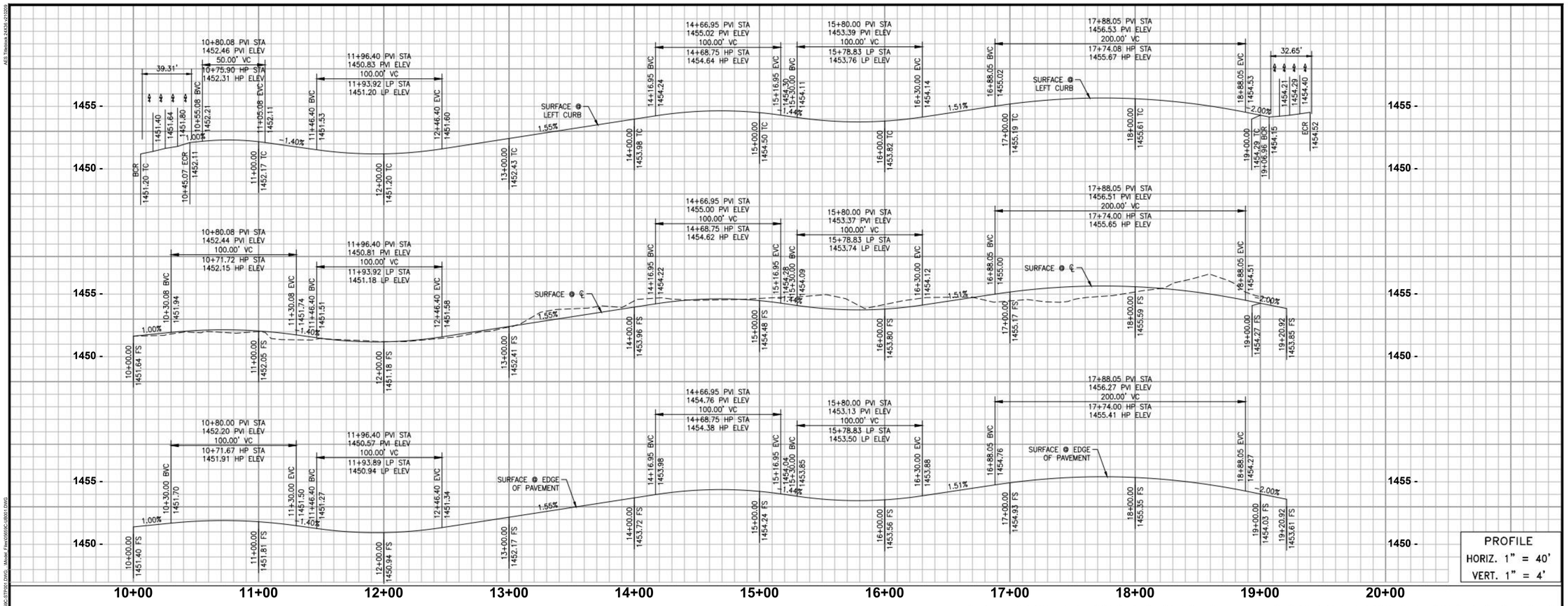


PROFILE
HORIZ. 1" = 40'
VERT. 1" = 4'

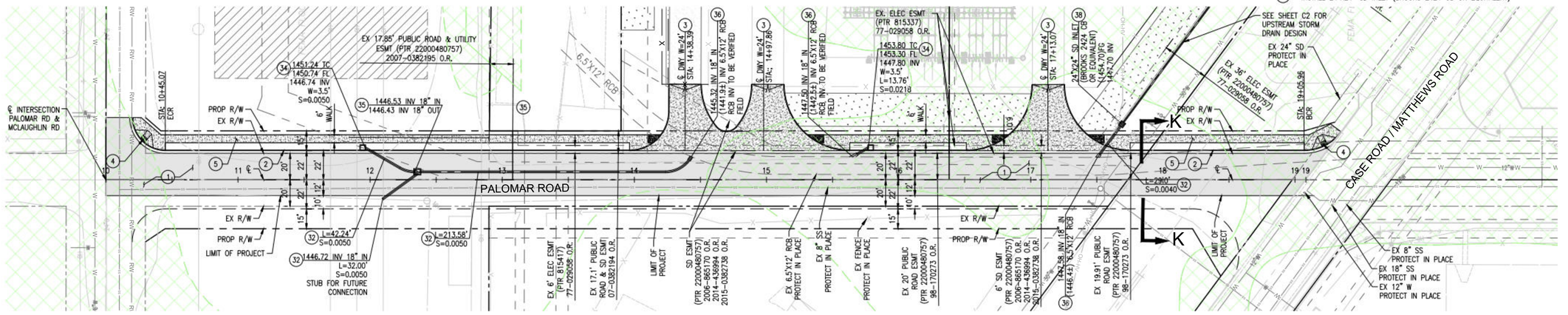
PALOMAR ROAD
PROFILE

STREET IMPROVEMENT CONSTRUCTION NOTES

1. CONSTRUCT 0.x' AC PAVEMENT OVER 0.x' CAB CLASS II
2. CONSTRUCT TYPE 6 CONCRETE CURB AND GUTTER PER CITY OF MENIFEE STD PLAN 200
3. CONSTRUCT COMMERCIAL DRIVEWAY PER CITY OF MENIFEE STD PLAN 208
4. CONSTRUCT PEDESTRIAN RAMP TYPE I PER CITY OF MENIFEE STD PLAN 405
5. CONSTRUCT CONCRETE WALK PER PER CITY OF MENIFEE STD PLAN 400

STORM DRAIN IMPROVEMENT CONSTRUCTION NOTES

31. INSTALL 12" PVC PIPE
32. INSTALL 18" RCP PIPE
34. CONSTRUCT CURB INLET (WIDTH PER PLAN)
35. CONSTRUCT JUNCTION STRUCTURE
36. CONSTRUCT PIPE TO RCB CONNECTION
38. INSTALL 24"X24" SD INLET (BROOKS 2424 CB OR EQUIVALENT)



PALOMAR ROAD
PLAN VIEW

PRELIMINARY
NOT FOR CONSTRUCTION

GENERAL NOTES

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0 20' 40' 60' 80'
1" = 40'

LEGEND

EXISTING	PROPOSED
PROJECT BOUNDARY	WALL / SOUND BARRIER
EASEMENT	STORM DRAIN
SEWER	FENCING
WATER	500 kV GEN TIE
STORM DRAIN	LAYDOWN AREA
RAILROAD	VEGETATIVE BUFFER
	FEMA FLOOD ZONE
	AC PAVEMENT

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PE STAMP:

KEY PLAN:

REVISIONS:

NO.	DATE	DESCRIPTION
0	09/20/23	PRELIM STREET DESIGN

PROJECT TITLE:

DOUBLE BUTTE STORAGE

PROJECT LOCATION:

CITY OF MENIFEE, CA
33.7412, -117.1563

SHEET TITLE & DESCRIPTION:

PRELIMINARY PALOMAR ROAD PLAN

500 MW / 2,000 MWh BESS

PROJ NUM:	ES19.0004
DES:	V. ITO
DWN:	V. ITO
CHK:	D. WATSON
APV:	
DATE:	9/20/2023
SCALE AT 24" x 36":	AS NOTED
SHEET NO:	C6
REV:	0

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PLOTTED: 9/20/2023 5:07 PM
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Appendix 3: Soils Information

Geotechnical Study and Other Infiltration Testing Data

GEOTECHNICAL INVESTIGATION
INFILTRATION REPORT

Prepared For
The AES Corporation

Proposed
Double Butte Battery Energy Storage Systems
Vicinity of Matthews Road and Palomar Road,
Menifee, Riverside County, CA
331190010, 011, 014, 017, 047, 056, 060

Job No: 22-247
September 8, 2022

BRUIN GEOTECHNICAL SERVICES, INC.
44732 Yucca Avenue
Lancaster, California 93534
www.bruingsi.net

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est. 2004

SOIL AND MATERIAL
TESTING AND INSPECTIONS

September 8, 2022 Job No.: 22-247

Mr. Michael Jenkinson, PE
The AES Corporation
282 Century Place, Suite 2000
Louisville, CO 80027

Subject: **Geotechnical Infiltration Investigation Report for the Proposed Double Butte Battery Energy Storage Systems Located in the Vicinity of Matthews Road and Palomar Road, Menifee, Riverside County, CA**
APN 331190010, 011, 014, 017, 047, 056, 060

Dear Mr. Jenkinson:

Presented herewith in is our Geotechnical Engineering Report for the subject project. Our work was performed in accordance with the scope of work outlined in our original proposal dated June 20, 2022.

This report presents the results of our field investigation, laboratory testing, along with our engineering judgment, opinions, conclusions, and recommendations pertaining to the proposed development.

It has been a pleasure to be of service to you on this project. Should you have any questions regarding the contents of this report, or should you require additional information, please contact the undersigned at (661) 273-9078.

Respectfully submitted,

BRUIN GEOTECHNICAL SERVICES, INC.

Ryan D. Duke, P.E.
RDD/mes

REGISTERED PROFESSIONAL ENGINEER
RYAN DUKE
C070729
Exp. 9-30-22
CIVIL
STATE OF CALIFORNIA

GEOTECHNICAL INVESTIGATION INFILTRATION REPORT

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Appendix B	**Laboratory Test Results**
Appendix C	**Infiltration Results and Cumulative Volume vs. Time Graphs**

GEOTECHNICAL INVESTIGATION INFILTRATION REPORT
Proposed Low Impact Development Storm Water Infiltration Basin
Double Butte Solar Battery Energy Storage Systems
Vicinity of Matthews Road and Palomar Road
Menifee, Riverside County, CA
APN 331190010, 011, 014, 017, 047, 056, 060

1.0 INTRODUCTION

This report presents the results of the geotechnical infiltration investigation performed by Bruin Geotechnical Services, Inc., specifically for the proposed infiltration basin at the subject site based on discussions, preliminary plans provided by the project civil engineer and the client. This report is specific to the proposed development.

The purpose of this investigation was to evaluate the on-site infiltration rate of the subsurface soil utilizing a double-ring infiltrometer, as well as evaluate the geotechnical engineering characteristics relative to the low impact development storm water basin and the proposed development at the subject Site. The report has been prepared in general accordance with the Riverside County Low Impact Development BMP Design Handbook (LAMP), ASTM D 3385, and the Geotechnical Engineering Report referenced below.

> Geotechnical Engineering Report for the Proposed Double Butte Battery Energy Storage Systems Located in the Vicinity of Matthews Road and Palomar Road, Menifee, Riverside County, CA, APN 331190010, 011, 014, 017, 047, 056, 060, Prepared by Bruin Geotechnical Services, Inc., dated August 17, 2022, Job No.: 22-247.

The scope of the authorized geotechnical investigation included the following tasks:

- Perform a site reconnaissance.
- Conduct a field subsurface exploration through soil trenches and soil sampling.
- Perform laboratory testing program of selected soil samples.
- Perform the infiltration testing of on-site soils.
- Perform engineering analyses and calculations of the data.
- Prepare this Geotechnical Investigation Infiltration Report.

This study also includes a review of published and unpublished literature and geotechnical maps with respect to groundwater located in proximity to the site which may have impact on the proposed improvements.

2.0 SITE LOCATION AND DESCRIPTION

The subject square-shaped site, herein after referred to as Site, is located east of the Matthews Road and Palomas Road junction, across the BNSF Railroad in the city of Menifee, Riverside County, California, and consists of seven (7) parcels totaling approximately 27.09 acres. The subject parcels include:

- APN 331190010 – approximately 5.00 acres
- APN 331190011 – approximately 5.00 acres
- APN 331190014 – approximately 3.40 acres
- APN 331190017 – approximately 1.58 acres
- APN 331190047 – approximately 4.61 acres
- APN 331190056 – approximately 3.83 acres
- APN 331190060 – approximately 3.67 acres

At the time of Bruin GSI's field investigation, the site was vacant, undeveloped land. The contiguous APNs are bound by a railroad to the north, an existing solar development to the west, commercial land to the east, and an aqueduct system to the south. The site vegetation consisted of sparse annual weeds and small shrubs.

The Site topography is relatively flat and level gently sloping down to the southwest, with drainage by sheet flow at approximately 1%. The approximate elevation at the site is 1,450 feet above mean sea level.

The intention of the site description is to be illustrative and specifically not intended for use as a legal description of the Site.

The general location of the subject Site is shown on Figure 1.

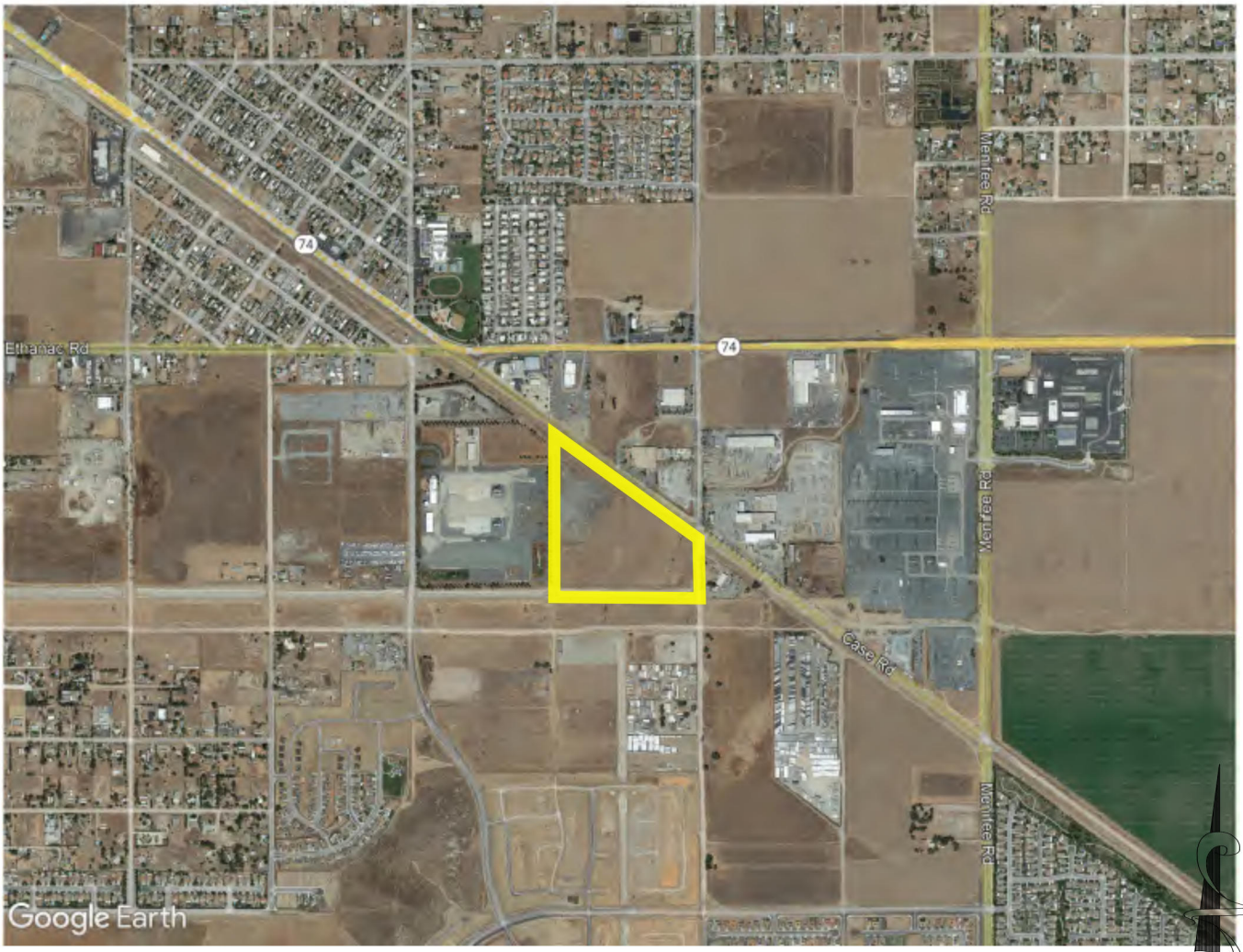
3.0 PROPOSED GRADING AND CONSTRUCTION

Based on our conversations with the client and information obtained through review of the preliminary plans, it is our understanding that the proposed project consists of a Battery Energy Storage System (BESS) Facility. The Project will utilize thickened concrete mat foundations for storage and converter equipment.

It is anticipated that the proposed earthwork will consist of clearing and grubbing of the vegetation, construction of shallow infiltration basins (approximately three to four feet deep, with maximum 4:1 slopes) and minor grading with cuts and fills of less than one (1) foot, maintaining the natural drainage through the site. Dirt or gravel drive areas for interior access are also anticipated.

Vicinity Map

N.T.S.



= Denotes approximate parcel boundary

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Project:

Proposed Double Butte Battery Storage
Vicinity of Matthews Road and Palomar Road,
Menifee, Riverside County, CA

Job Number:

22-247

Figure 1

4.0 PROPOSED INFILTRATION SYSTEM

Based on our review of the plans, a total of one (1) infiltration basin is proposed on the Site for the purpose of percolating the sheet-flow storm-drain water for the proposed industrial development. Due to the flat topography of the Site and proposed grading, it is anticipated the stormwater drainage by sheet-flow will be collected by proposed concrete swales and/or ribbon gutters and continue to the proposed basin. The proposed rectangular-shaped infiltration basin will be constructed with an invert of approximately three to four (3-4) feet below the existing ground surface and 4:1 cut slopes.

5.0 GEOTECHNICAL AND INFILTRATION INVESTIGATION

The geotechnical investigation included a field subsurface exploration program through trenching, obtaining bulk, grab, and undisturbed soil samples, and laboratory testing on soil samples collected during the infiltration testing program. These programs were performed in accordance with our Geotechnical Investigation Infiltration Report Proposal dated June 20, 2022. The scope of work did not include environmental assessment or investigation for the presence or absence of hazardous substances or toxic materials in structures, soil, and surface water, air, below or around the site. The field subsurface exploration, laboratory testing programs, and Infiltration testing protocol are described below, as required by Riverside County and ASTM D 3385.

A site reconnaissance was made by our representative prior to instigating the field exploration and infiltration testing program. The Site was observed, and boundaries roughly located for purposes of underground utility locating. As required by law, Bruin GSI contacted Underground Service Alert (one-call notification service) to attain underground utility marking and clearance, a minimum of 72 hours prior to performing the field subsurface investigation.

The field exploration program was conducted on August 31, 2022, under the technical supervision of our engineer, and consisted of Double Ring Infiltrometer test (ASTM D 3385 tested method) and exploratory excavation. Infiltration testing was performed based on the Test Requirements defined in the Riverside County LAMP, ASTM D 3385, and further described in section 5.1 of this report.

5.1 Field Exploration Program

The approximate locations of the exploratory trenches were determined by sighting and pacing from existing site improvements, such as streets, and the use of a hand-held GPS unit and should be only considered accurate to the degree implied by the method used. Test Hole Locations and pertinent Boring Locations from the Referenced Geotechnical Engineering Report are shown on Figure 2.

Test Location Map

N.T.S.

B1 = Denotes Approximate Boring (B) or Test Hole (TH) Location

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Project:

Proposed Double Butte Battery Storage
Vicinity of Matthews Road and Palomar Road,
Menifee, Riverside County, CA

Job Number:

22-247

Figure 2

Soil samples were obtained at various depths within the Test Holes prior to infiltration testing and returned to the laboratory for analysis and testing.

Final Test Hole logs and pertinent Boring Logs presented in Appendix A are Bruin GSI's interpretation of the field logs prepared by our representative during excavation, as well as laboratory test results. The stratification lines represent approximate boundaries between soil types. The actual soil transitions may be gradual.

5.2 Infiltration Testing Protocol

The Riverside County Low Impact Development BMP Design Handbook was used to determine the protocol required for infiltration testing procedures for this project. The LAMP provides examples of appropriate type of testing for various types of LID features. The use of Double-Ring Infiltrometer Test following the procedures as provided in ASTM D3385 is generally appropriate for shallow LID Feature Depths.

Riverside County requires a minimum of two (2) tests with at least one (1) test per each LID Feature. Using the Double-Ring Infiltrometer requires approximately six (6) square feet of horizontal surface area of testing to accommodate the testing infiltrometer and Mariotte tubes at the invert elevation of the proposed basin. It was determined to excavate two (2) representative locations within the limits of designated location of the basin using a tractor-mounted backhoe equipped with a thirty-six-inch bucket. The excavations for Test Hole 1 and Test Hole 2, with dimensions approximately three (3) feet square (3x3), were excavated to a depth of four (4) feet and six (6) feet, respectively, below existing ground surface (bgs).

For each test hole, two Mariotte tubes (10,000cc and 3,000cc capacity) were used to keep the water level constant within the outer and inner rings of the infiltrometer. These calibrated tubes (marked in one-centimeter increments) were placed inside the pit, near the location of the infiltrometer rings and were used as measurement of the volume of water needed to maintain the head during the duration of the test. A three-eighths (3/8) inch ID clear vinyl tubing connected the twelve (12) inch inner diameter ring and the twenty-four (24) inch diameter ring to the Mariotte Tubes. Rubber splash plates were used at the bottom of each ring to convey the water, preventing erosion and disturbance of the test pit's bottom.

The twelve (12) inch diameter ring was carefully driven with minimal disturbance of the soil surface into the ground approximately one (1) inch below the ground surface and filled with water up to one (1) inch above the proposed invert elevation using the 3,000 cc Mariotte Tube. The twenty-four (24) inch diameter ring was carefully driven with minimal disturbance of the soil surface into the ground approximately one and one-half (1.5) inches below the ground surface and filled with water up to one and one-quarter (1.25) inches above the proposed invert

elevation using the 10,000 cc Mariotte Tube. The remaining three-eighths (3/8) inch ID clear vinyl tubing connected the Mariotte Tubes to the fifty-five (55) gallon water tank.

During the initial fill of water, the rings were filled with water using a 0.50 cubic foot receptacle, up to the desired depth in each ring. A measurement of the water pH was obtained. Once the fluid became level and constant then the flow of fluid from the Mariotte Tubes were used to maintain the liquid level throughout the test. The readings of the volume of water, water surface elevation, and water temperature were checked every fifteen (15) minutes during the first hour, every thirty (30) minutes during the second hour; and every one (1) hour afterwards, until reaching a minimum of six (6) hours. The driving cap was paced over the rings during intervals of liquid measurements to minimize evaporation.

Once the instantaneous flow rate stabilized (i.e., the highest and lowest readings were within ten (10) percent of each other, for three consecutive readings), the water drop on Mariotte Tube was recorded until the test pit was empty (falling phase of the test). The total combined time of the test exceeded the four (4) hour minimum.

Infiltration Test Results are presented in Section 7.0 of this report.

5.3 Laboratory Testing

Select soil samples collected during trenching and drilling activities at the Site were then tested in the laboratory to assist in evaluating engineering properties of subsurface materials deemed within structural influence and to provide data required for conclusions related to the infiltration characteristics.

The soil samples were classified in accordance with the Unified Soils Classification System and a testing program was established. The samples were tested to determine the following:

- In-situ moisture ASTM D 2937
- Identification of soils ASTM D 2488
- Material Finer than the No. 200 Sieve ASTM D 1140
- Sand Equivalent Value ASTM D 2419

Pertinent tabular and graphic test results from the referenced Geotechnical Engineering Report are presented in Appendix B.

5.4 Site and Subsurface Conditions

Native materials were encountered within our infiltration test holes and exploratory borings from the referenced Geotechnical Engineering Report. The subsurface soil appears relatively uniform across the subject site and the soil encountered in the exploratory borings generally consists of silty sand with clay (SM) with occasional sandy clay (CL) and clayey sand (SC) to the maximum depth explored of twenty (20) feet below ground surface.

Based on the blow counts obtained during sampling, and in-situ densities obtained, the native material encountered was noted to be medium dense or firm to very dense or hard. The subsurface materials were noted to be slightly moist to saturated. No groundwater or perched water was encountered through the depth explored (20 feet below ground surface).

6.0 DESIGN CRITERIA

To determine the infiltration rate for design purposes, the volume of liquid added to the inner ring to maintain the liquid level constant (measure of liquid infiltrating the soil) during the test is converted to an incremental infiltration velocity by dividing by the area of the inner ring (in inches per hour) and plotted versus time elapsed.

The Riverside County LAMP requires the application of a safety/reduction factor to the raw measurements established at the Site in order to determine the site-specific long-term infiltration rate to be used for design. The Total Reduction Factor (RF) is applied to the raw infiltration rate in order to determine the design infiltration rate that will represent the long-term performance of the proposed infiltration BMPs.

The Infiltration Testing Requirements section of the Riverside County LAMP provides the minimum required safety or reduction factor for each type of infiltration test.

$$Total\ Reduction\ Factor\ (RF) = 3$$

The reduction factor (RF) was applied to the stabilized infiltration rates obtaining the design infiltration rate of the basin. Utilizing the raw infiltration rate of 0.066 inches per hour (0.006 feet per hour) and reduction factor of 3, the design infiltration rate obtained from Test Hole 1 (slowest rate) was calculated to be **0.022 inches per hour (.002 feet per hour)**.

The Riverside County Water Quality Management (WQMP) requires that the infiltration rate must be at least 0.83 inches per hour. The Riverside County WQMP further outlines that “If the average ‘in-situ’ tested infiltration rate for the site is less than 1.6 inches per hour, LID Infiltration BMPs (infiltration basins, infiltration trenches, etc.) shall not be used.”

It is our professional opinion that the infiltration rate is not sufficient, and the Infiltration Basin is not recommended for construction.

Data calculations, reduction factors, raw and calculated design infiltration rates, as well as unit conversions are shown in Appendix C.

7.0 OPINIONS AND CONCLUSIONS

Based upon the results of our investigation, the proposed development is not considered feasible from a geotechnical standpoint.

The soils explored and tested at the Site were found to be relatively uniform in classification, infiltration, and strength. Based on the laboratory testing and subsurface data obtained, it is Bruin GSI's opinion that the upper Site soils will be not suitable for infiltration purposes and do not meet or exceed the county minimum rates required.

Based on our calculations of the design infiltration rates, verified with the laboratory test results on soil samples obtained on each infiltration basin locations, it is our professional opinion the proposed infiltration basins are not feasible from a geotechnical perspective.

Refer to the Geotechnical Engineering Report for the proposed development prepared by Bruin Geotechnical Services Inc. referenced herein for guidelines regarding grading and remedy any soil related issues relative to structures.

8.0 ADDITIONAL SERVICES

Final project plans and specifications should be reviewed prior to construction to confirm that the full intent of the recommendations presented herein have been applied to design and construction. This report is based on the assumption that an adequate testing and inspection program along with client consultation will be performed during final design and construction phases to verify compliance with the recommendations of this report.

Retaining Bruin GSI as the geotechnical consultant to provide additional services from preliminary design through project completion will assure continuity of services.

Additional services include:

- Consultation during design stages of the project.
- Review, stamp and signature of the grading and building plans.
- Observation and testing during rough grading, fine grading and trench backfill as well as placement of engineered fill.
- Consultation as required during construction.

Cost estimates can be prepared if requested. Please contact our office.

9.0 LIMITATIONS AND UNIFORMITY OF CONDITIONS

This report is based on the development plans provided to our office. If structure design changes or structure locations changes occur, the conclusion and recommendations in this report may not be considered valid unless the changes are reviewed and the conclusions of this report are modified or approved by the Geotechnical Consultant.

The subsurface conditions and characteristics described herein have been projected from individual borings or test pits placed across the subject property. Actual variations in the subsurface conditions and characteristics may occur.

If conditions encountered during construction differ from those described in this report, this office should be notified so as to consider the necessity for modifications. No responsibility for construction compliance with the design concepts, specifications, or recommendations is assumed unless on-site construction review is performed during the course of construction, which pertains to the specific recommendations contained herein.

It is recommended that Bruin GSI be provided the opportunity for a general review of final design and specifications in order that the geotechnical recommendations may be properly interpreted and implemented in the design specifications. If Bruin GSI is not accorded the privilege of making this recommended review, Bruin GSI can assume no responsibility for misinterpretation of the recommendations contained in this report.

This report has been prepared in accordance with generally accepted practice and standards in this community at this time. No warranties, either expressed or implied, are made as to the professional advice provided under the terms of the agreement and included in this report. This report has been prepared for the exclusive use of The AES Corporation and their authorized agents. Unauthorized reproduction of any portion of this report without expressed written permission is prohibited.

If parties other than Bruin GSI are engaged to provide construction geotechnical services, they must be notified that they will be required to assume complete responsibility for the geotechnical phase of the project by concurring with the findings and recommendations in this report or providing alternate recommendations.

10.0 CLOSURE

The conclusions, recommendations, and opinions presented herein are: (1) based upon our evaluation and interpretations of the limited data obtained from our field and laboratory

programs; (2) based upon an interpolation of soil conditions between and beyond the borings and/or trenches; (3) are subject to confirmation of the actual conditions encountered during construction; and, (4) are based upon the assumption that sufficient observation and testing will be provided during the grading, infrastructure installation and building phases of site development, (5) a design level Geotechnical Engineering Report will be completed to address subsurface conditions and issues and provide remedial recommendations to reduce potential adverse impacts of soils on the proposed development.

APPENDIX A

Test Hole and Boring Logs and Classification Key

BRUIN GEOTECHNICAL SERVICES INC. est. 2004 TM

Client:	**AES - Double Butte**
Project Location:	**Menifee**
Date(s) trenched	**8/31/2022**
Total Depth of Trench	**4' BGS**
Trenching Equipment	**Backhoe**
Sampling Method(s)	**Hand-Sampler**
Trench Backfill	**Native Cuttings**
Ground- water	**None Encountered**

TEST HOLE LOG 1

Logged By	**LW**
Checked By:	**MS**
Notes:	**Post-Infiltration Testing**
	Center of Hole

Project number: **22-247**

Depth	Sample	USCS	Graphic Log	Material Description	Dry Unit Weight pcf	Water Content %
		SM		Reddish brown very silty fine to medium sand w/ clay (cemented) Medium dense, very moist		12.1
5'				Excavation terminated @ 4' bgs No groundwater encountered No caving		
10'						
15'						
20'						
25'						
30'						

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Client:	**AES - Double Butte**
Project Location:	**Menifee**
Date(s) trenched	**8/31/2022**
Total Depth of Trench	**6' BGS**
Trenching Equipment	**Backhoe**
Sampling Method(s)	**Hand-Sampler**
Trench Backfill	**Native Cuttings**
Ground- water	**None Encountered**

TEST HOLE LOG 2

Logged By	**LW**
Checked By:	**MS**
Notes:	**Post-Infiltration Testing**
	Center of Hole

Project number: **22-247**

Depth	Sample	USCS	Graphic Log	Material Description	Dry Unit Weight pcf	Water Content %
		SM		Dark reddish brown silty fine to medium sand w/ clay (cemented) Medium dense, moist		9.2
5'		CL		Dark brown fine to medium sandy clay w/ slight silt (cemented) hard, very moist		13.2
10'				Excavation terminated @ 6' bgs No groundwater encountered No caving		
15'						
20'						
25'						
30'						

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SOIL CLASSIFICATION KEY

MAJOR DIVISIONS			SYMBOL		TYPICAL NAMES
Coarse Grained Soils 50% or more larger than #200 sieve	**Gravels** More than half coarse-fraction is larger than No. 4 sieve size	Clean gravels with little or no fines	GW		Well graded gravels, gravel-sand mixtures
			GP		Poorly graded gravels, gravel-sand mixtures
		Gravel with over 12% fines	GM		Silty gravels, poorly graded gravel-sand-silt mixtures
			GC		Clayey gravels, poorly graded gravel-sand-clay mixtures
	Sands More than half coarse-fraction is smaller than No. 4 sieve size	Clean sands with little or no fines	SW		Well graded sands, gravelly sands
			SP		Poorly graded sands, gravelly sands
		Sands with over 12% fines	SM		Silty sands, poorly graded sand-silt mixtures
			SC		Clayey sands, poorly graded sand-clay mixtures
Fine Grained Soils 50% or more smaller than #200 sieve	**Silts and Clays** Liquid limit less than 50		ML		Inorganic silts, rock flour, clayey silts
			CL		Inorganic clays of low to medium plasticity, sandy clays, silty clays
			OL		Organic clays and organic silty clays of low plasticity
	Silts and Clays Liquid limit greater than 50		MH		Inorganic silts, micaceous or diatomaceous fine sandy/silty soils, elastic silts
			CH		Inorganic clays with high plasticity, fat clays
			OH		Organic clays of medium to high plasticity, organic silts
Highly Organic Soils			Pt		Peat and other highly organic soils

CLASSIFICATION SYSTEM BASED ON THE UNIFIED SOIL CLASSIFICATION SYSTEM

Excavation Log Key

Depth	Sample	USCS	Graphic Log	Material Description	Penetration Resistance (Blows/6")	Dry Unit Weight pcf	Water Content %
1	2	3	4	5	6	7	8

COLUMN DESCRIPTIONS

1	Depth in feet below the ground surface
2	Sampling Method see "symbols" below
3	USCS symbol
4	Graphic depiction of the subsurface material
5	Description of the material encountered. May include consistency, moisture, color, and other descriptors
6	Number of blows to advance driven sampler one foot (or distance shown) beyond seating interval
7	Dry weight per unit volume of soil sample measured in laboratory units in pounds per cubic foot
8	Water content of the sample expressed as a percentage of the dry weight of the sample

ABBREVIATIONS

DIST = Disturbed Sample
N/R = No Recovery
CHEM = Chemical Test
N/A = Not Analyzed

SAMPLING METHOD SYMBOLS

Hand Sample

Bulk Sample

Grab Sample

GENERAL NOTES

1. Soil classifications are based on the Unified Soil Classification System. Descriptions and stratum lines are interpretive, and actual lithologic changes may be gradual. Field descriptions may have been modified to reflect results of lab tests.

2. Descriptions on these logs apply only at the specific boring locations and at the time the borings were advanced. They are not warranted to be representative of subsurface conditions at other locations or times.

Date(s) drilled	**7/15/2022**	**LOG OF BORING 7**	
Drilling Contractor	**GP Drilling**	**Page 1 of 1**	
Drilling Method	**Hollow Stem Auger**		
Drill Rig Type	**CME 75**	Logged By:	**AM**
Drill Bit Size/Type	**8"**	Checked By:	**MS**
Sampling Method(s)	**CSS/Bulk**	Total Depth of Borehole	**20' BGS**
Client: **AES - Double Butte BESS**	Groundwater	**None Encountered**	Boring Location: **See Figure 2**
Project Number: **22-247**	Borehole Backfill	**Native/ Cuttings**	Notes:
Project Location: **Menifee, CA**	Hammer Data	**140#, 30" drop**	

Depth	Sample	USCS	Graphic Log	Material Description	Penetration Resistance (Blows/6")	Dry Unit Weight pcf	Water Content %
		SM		Reddish brown very silty fine to medium sand w/ clay Medium dense, very moist	18-20	104.6	11.7
		SM		Dark yellowish brown silty fine to medium sand w/ clay Medium dense, moist	22-30	116.1	7.9
5'		SM		Dark yellowish brown silty fine to medium sand w/ coarse sand & occ #4 gravel Dense, moist	50/6"	113.7	7.5
		SM		Brown silty fine to medium sand Dense, moist	50/6"	119.5	8.8
10'		SM		Brown silty fine to medium sand Dense, moist	27-50/6"	113.1	9.8
15'		SM		Yellowish brown silty fine to medium sand w/ coarse sand Medium dense, saturated	18-25	113.9	17.1
20'		SM		Brown silty fine to medium sand w/ clay Medium dense, very moist	21-18	118.2	13.4
25'				Boring terminated @ 20' bgs No groundwater No caving			
30'							

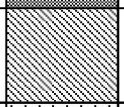
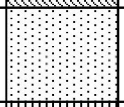
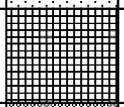
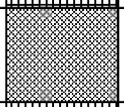
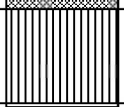
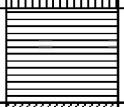
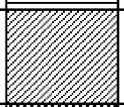
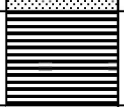
Date(s) drilled	**7/15/2022**	**LOG OF BORING 8**	
Drilling Contractor	**GP Drilling**	**Page 1 of 1**	
Drilling Method	**Hollow Stem Auger**		
Drill Rig Type	**CME 75**	Logged By:	**AM**
Drill Bit Size/Type	**8"**	Checked By:	**MS**
Sampling Method(s)	**CSS**	Total Depth of Borehole	**20' BGS**
Client: **AES - Double Butte BESS**	Groundwater	**None Encountered**	Boring Location: **See Figure 2**
Project Number: **22-247**	Borehole Backfill	**Native/ Cuttings**	Notes:
Project Location: **Menifee, CA**	Hammer Data	**140#, 30" drop**	

Depth	Sample	USCS	Graphic Log	Material Description	Penetration Resistance (Blows/6")	Dry Unit Weight pcf	Water Content %
	■	SM		Brown silty fine to medium sand	18-20	117.2	3.2
				Medium dense, dry			
	■	SM		Orange brown silty fine to medium sand w/ clay (cemented)	12-30	102.9	10.1
5'				Medium dense, moist			
	■	SM		Brown silty fine to medium sand w/ clay	50/6"	110.1	8.0
				Very dense, moist			
	■	SM		Dark yellowish brown silty fine to medium sand w/ clay binder	50/4"	110.8	8.9
				Very dense, moist			
10'	■	SM		Brown silty fine to medium sand	32-50/6"	123.9	9.6
				Very dense, moist			
15'	■	SC		Brown clayey fine to medium sand w/ silt (cemented)	20-39	114.6	14.0
				Medium dense, very moist			
20'	■	SM		Brown silty fine to medium sand w/ clay	23-50/6"	112.3	13.4
				Very dense, very moist			
				Boring terminated @ 20' bgs			
25'				No groundwater			
				No caving			
30'							

BRUIN GEOTECHNICAL SERVICES, INC.

GEOTECHNICAL REPORTS | MATERIAL TESTING | CONSTRUCTION INSPECTION

SOIL CLASSIFICATION KEY

MAJOR DIVISIONS			SYMBOL		TYPICAL NAMES
Coarse Grained Soils 50% or more larger than #200 sieve	**Gravels** More than half coarse-fraction is larger than No. 4 sieve size	Clean gravels with little or no fines	GW		Well graded gravels, gravel-sand mixtures
			GP		Poorly graded gravels, gravel-sand mixtures
		Gravel with over 12% fines	GM		Silty gravels, poorly graded gravel-sand-silt mixtures
			GC		Clayey gravels, poorly graded gravel-sand-clay mixtures
	Sands More than half coarse-fraction is smaller than No. 4 sieve size	Clean sands with little or no fines	SW		Well graded sands, gravelly sands
			SP		Poorly graded sands, gravelly sands
		Sands with over 12% fines	SM		Silty sands, poorly graded sand-silt mixtures
			SC		Clayey sands, poorly graded sand-clay mixtures
Fine Grained Soils 50% or more smaller than #200 sieve	**Silts and Clays** Liquid limit less than 50		ML		Inorganic silts, rock flour, clayey silts
			CL		Inorganic clays of low to medium plasticity, sandy clays, silty clays
			OL		Organic clays and organic silty clays of low plasticity
	Silts and Clays Liquid limit greater than 50		MH		Inorganic silts, micaceous or diatomaceous fine sandy/silty soils, elastic silts
			CH		Inorganic clays with high plasticity, fat clays
			OH		Organic clays of medium to high plasticity, organic silts
Highly Organic Soils			Pt		Peat and other highly organic soils

CLASSIFICATION SYSTEM BASED ON THE UNIFIED SOIL CLASSIFICATION SYSTEM

44732 Yucca Avenue
Tel (661) 273-9078

Lancaster, California 93534
www.bruingsi.net

Boring Log Key

Depth	Sample	USCS	Graphic Log	Material Description	Penetration Resistance (Blows/6")	Dry Unit Weight pcf	Water Content %
1	2	3	4	5	6	7	8

COLUMN DESCRIPTIONS

1	Depth in feet below the ground surface
2	Sampling Method see "symbols" below
3	USCS symbol
4	Graphic depiction of the subsurface material
5	Description of the material encountered. May include consistency, moisture, color, and other descriptors
6	Number of blows to advance driven sampler one foot (or distance shown) beyond seating interval
7	Dry weight per unit volume of soil sample measured in laboratory units in pounds per cubic foot
8	Water content of the sample expressed as a percentage of the dry weight of the sample

ABBREVIATIONS

DIST = Disturbed Sample
N/R = No Recovery
CHEM = Chemical Test
N/A = Not Analyzed

SAMPLING METHOD SYMBOLS

California Split Spoon (CSS)

Standard Penetration Test (SPT)

Bulk Sample

Grab Sample

GENERAL NOTES

1. Soil classifications are based on the Unified Soil Classification System. Descriptions and stratum lines are interpretive, and actual lithologic changes may be gradual. Field descriptions may have been modified to reflect results of lab tests.

2. Descriptions on these logs apply only at the specific boring locations and at the time the borings were advanced. They are not warranted to be representative of subsurface conditions at other locations or times.

APPENDIX B

Laboratory Test Data

SUMMARY OF LABORATORY TEST RESULTS

SIEVE ANALYSIS

Percent passing individual sieves

Sample I.D.	1/2"	3/8"	#4	#10	#40	#100	#200
TH1@2’		100	99	91	59	33	23
TH2@2’			100	97	79	56	42
TH2@4’			100	98	76	72	70

SAND EQUIVALENT

Sample I.D.	Sand Equivalent
TH1@2’	22
TH2@4’	8

APPENDIX C

Infiltration Results and Cumulative Volume vs. Time Graph

Bruin Geotechnical Services, Inc.
44732 Yucca Avenue
Lancaster, CA 93534
661-273-9078

Infiltration Basin Percolation Test ASTM D 3385
Double Ring Infiltrometer

DATA CALCULATIONS (INNER RING):

TEST HOLE NO.	STABILIZED FLOW RATE		SURFACE AREA OF PERCOLATION				RAW INFIL. RATE [FT/HR]
	[GAL/HR]	[CF/HR]	DIA. [FT]	RADIUS, [FT]	HEIGHT, [FT]	SURFACE AREA, [SF]	
1	0.035	0.005	1.04	0.52	0.48	0.85	0.005
2	0.050	0.007	1.04	0.52	0.48	0.85	0.008

REDUCTION FACTORS:

RIVERSIDE COUNTY REQUIRED REDUCTION FACTOR	RF
	3

DESIGN INFILTRATION RATE:

CALC. DESIGN INFILTRATION RATE		MIN. INFIL. RATE	CRITERIA MET?
FT/HR	IN/HR	[IN/HR]	
0.002	0.022	0.85	NO
0.003	0.063	0.85	

0.0658825

DOUBLE RING INFILTROMETER TEST

(ASTM D 3385)

Constants:	Diameter (in)	Area (in^2)	Height (in)	Depth of liquid (in)	Liquid No.	Water containers (Vol/DH), in^3/in)
Inner ring	12.375	120	20.25	4.00	1	33.29
Annular Space	24.375	346	20.125	3.50	2	79.62

Project: 22-247 Double Butte

Test Location: Vicinity of Matthews Road and Palomar Road, Menifee, Riverside County, CA

Tested by: LW

Water Source: Clean, tap water pH: 7.5

Water level maintained using: Flow Valve Float Valve **Mariotte Tube**

Depth to water table, (ft): Unknown

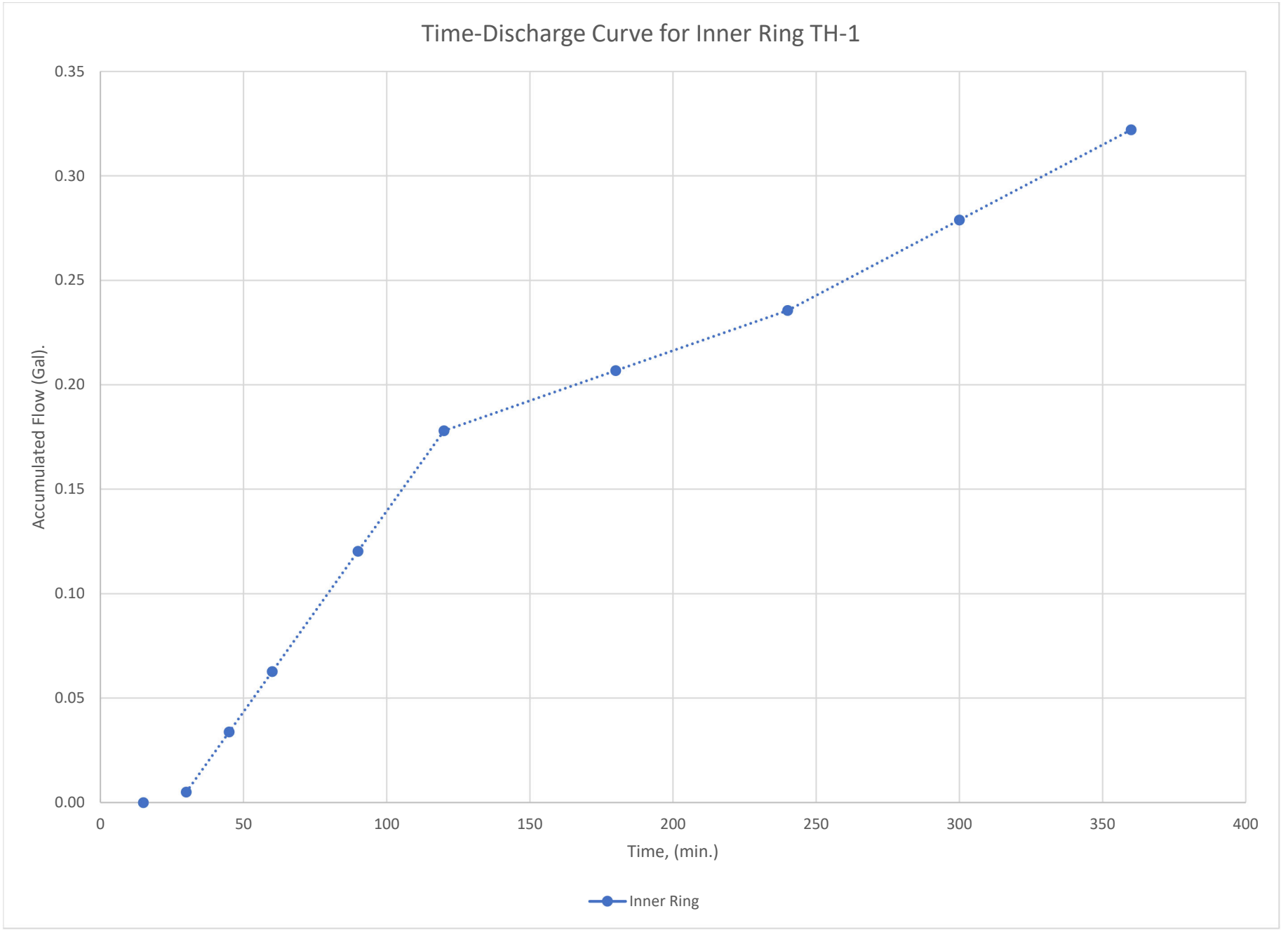
Penetration of rings, (in): Inner: 1.8 Outer: 1.4

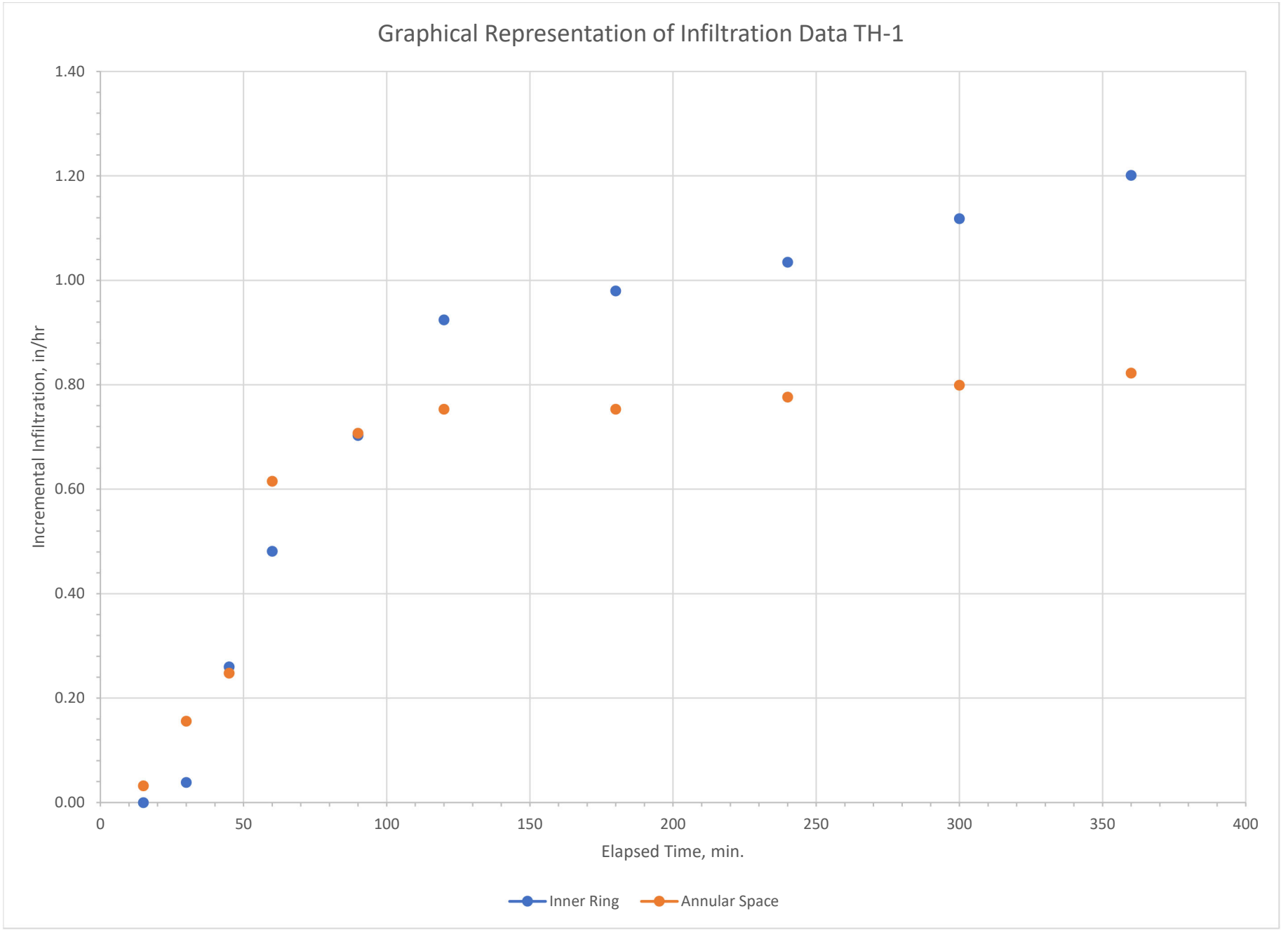
Date: 8/31/22 Test Hole: 1

Invert Depth: 4'

Trial No.		Date	Time hh:mm	Elapsed Time (minutes)	Flow Readings					Water Temp. (°F)	Increm. Infiltration		Remarks
					Inner Ring		Accumul	Annular Space			Inner	Annular	Ground Temp. (°F): 62
					Reading (in)	Flow (in^3)	Flow (gal)	Reading (in)	Flow (in^3)		in/hr	in/hr	Weather Conditions
1	S	8/31/22	9:50		22.8	0	0.00	22.8	3	68	0.00	0.0	partly cloudy, 70°F, no wind
	E	8/31/22	10:05	15	22.8			22.8		68			
2	S	8/31/22	10:07		22.8	1	0.00	22.8	11	69	0.04	0.2	
	E	8/31/22	10:22	30	22.8			22.7		69			
3	S	8/31/22	10:24		22.8	7	0.03	22.7	8	68	0.26	0.2	
	E	8/31/22	10:39	45	22.6			22.6		69			
4	S	8/31/22	10:39		22.6	7	0.06	22.6	32	70	0.48	0.6	
	E	8/31/22	10:54	60	22.4			22.2		70			
5	S	8/31/22	10:54		22.4	13	0.12	22.2	16	70	0.70	0.7	74°F, sunny
	E	8/31/22	11:24	90	22.0			22.0		71			
6	S	8/31/22	11:24		22.8	13	0.18	22.8	8	69	0.92	0.8	Refilled bottles
	E	8/31/22	11:54	120	22.4			22.7		70			
7	S	8/31/22	11:54		22.7	7	0.21 *	22.7	0	71	0.98 *	0.8	
	E	8/31/22	12:54	180	22.5			22.7		71			
8	S	8/31/22	12:54		22.5	7	0.24	22.7	8	71	1.03	0.8	
	E	8/31/22	1:54	240	22.3			22.6		71			
9	S	8/31/22	1:54		22.3	10	0.28 *	22.6	8	72	1.12 *	0.8	81°F, sunny
	E	8/31/22	2:54	300	22.0			22.5		72			
10	S	8/31/22	2:54		22.0	10	0.32	22.5	8	72	1.20	0.8	
	E	8/31/22	3:54	360	21.7			22.4		72			

* Cummulative volume used to determine the raw infiltration rate


Time-Discharge Curve for Inner Ring TH-1
Accumulated Flow (Gal).
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
0
50
100
150
200
250
300
350
400
Time, (min.)
Inner Ring


Graphical Representation of Infiltration Data TH-1
Incremental Infiltration, in/hr
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
0
50
100
150
200
250
300
350
400
Elapsed Time, min.
Inner Ring
Annular Space

DOUBLE RING INFILTROMETER TEST

(ASTM D 3385)

Constants:	Diameter (in)	Area (in^2)	Height (in)	Depth of liquid (in)	Liquid No.	Water containers (Vol/DH), in^3/in)
Inner ring	12.5	123	20.12	4.00	1	37.41
Annular Space	24.45	347	20.125	3.50	2	83.56

Project: 22-247 Double Butte

Test Location: Vicinity of Matthews Road and Palomar Road, Menifee, Riverside County, CA

Tested by: LW

Water Source: Clean, tap water pH: 7.5

Depth to water table, (ft): Unknown

Date: 8/31/22 Test Hole: 2

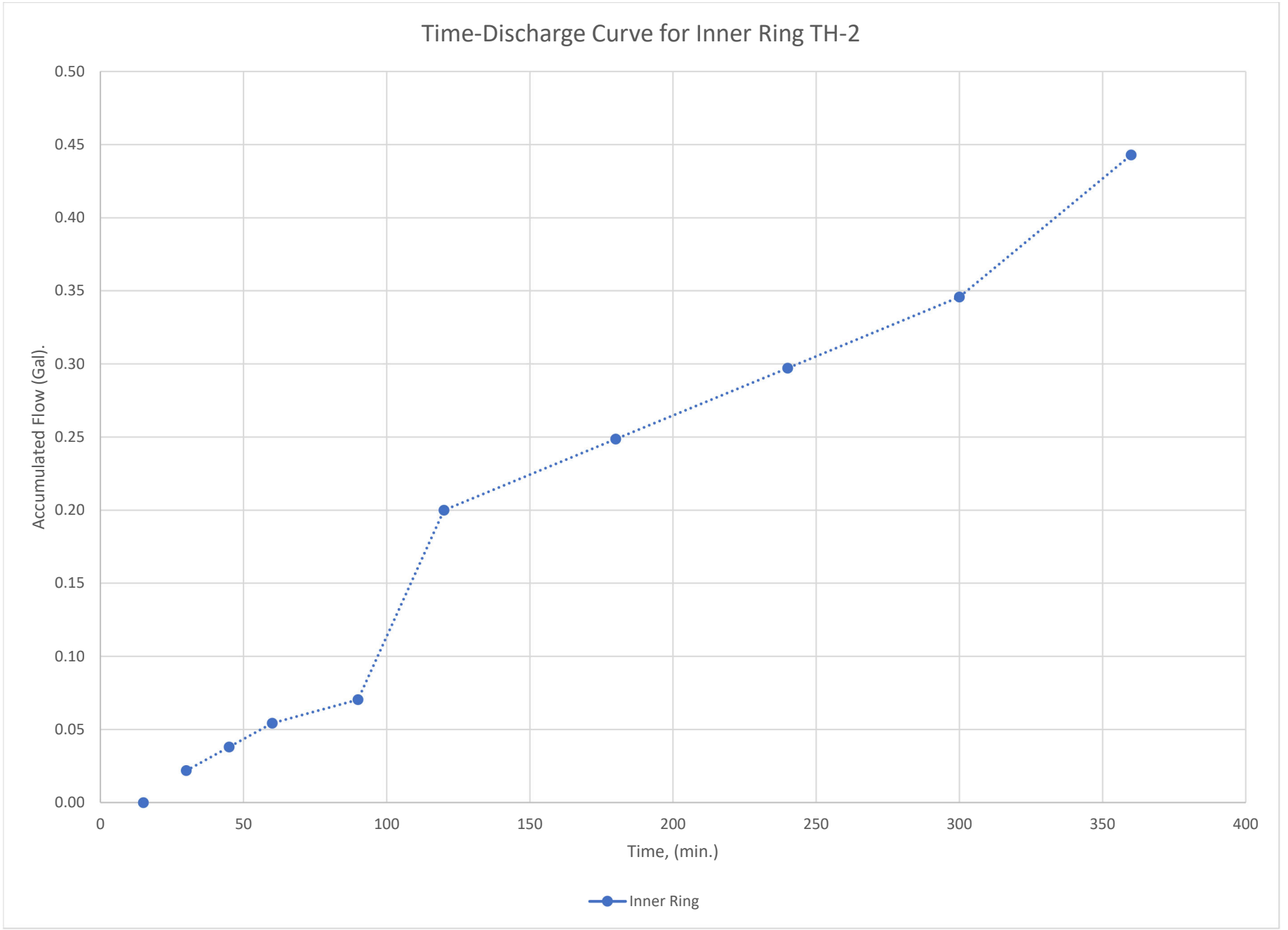
Water level maintained using: Flow Valve Float Valve **Mariotte Tube**

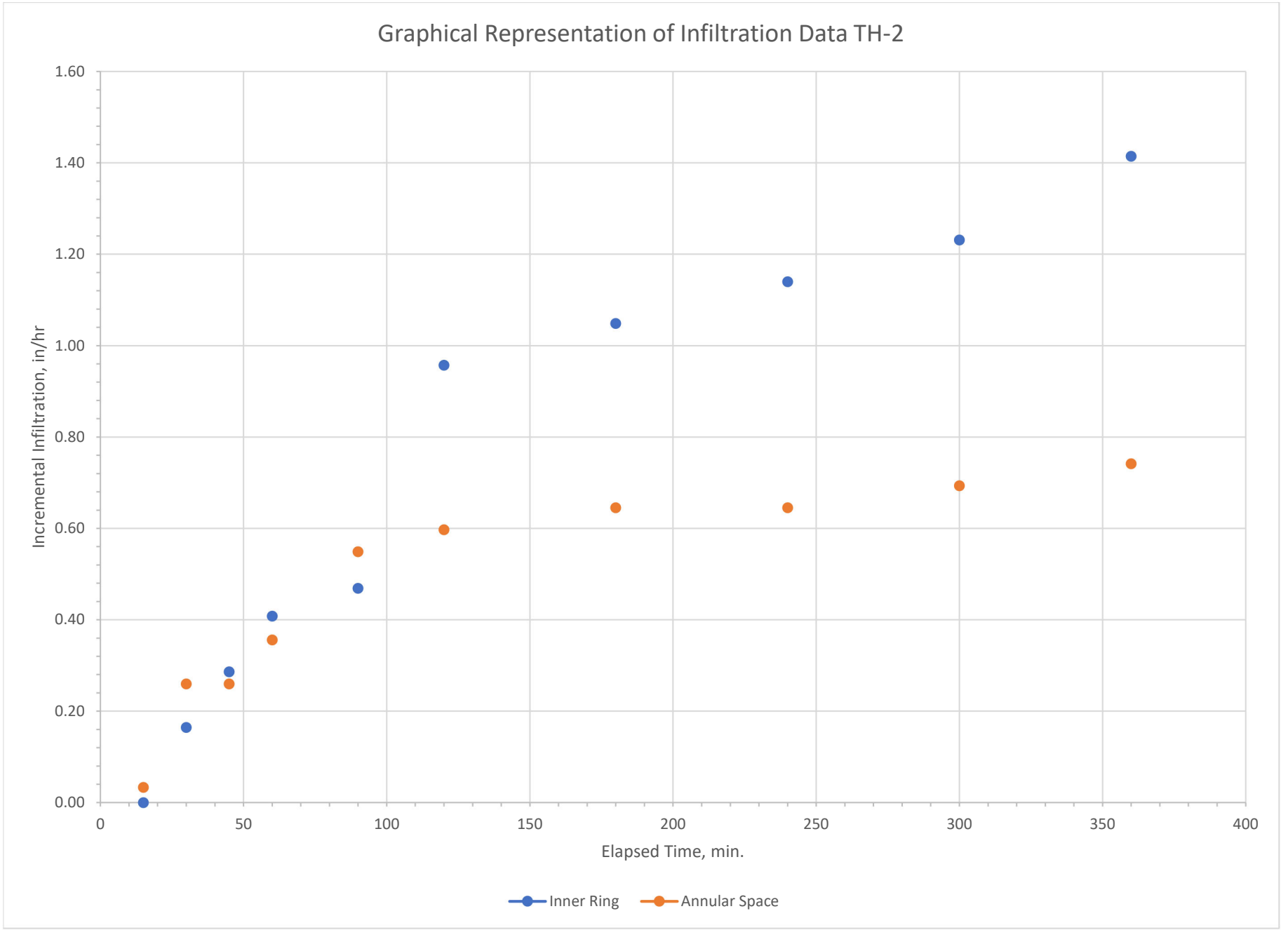
Penetration of rings, (in): Inner: 3.0 Outer: 2.1

Invert Depth: 6'

Trial No.		Date	Time hh:mm	Elapsed Time (minutes)	Flow Readings: Inner Ring Reading (in)	Inner Ring Flow (in^3)	Accumul Flow (gal)	Annular Space Reading (in)	Annular Space Flow (in^3)	Water Temp. (°F)	Increm. Infiltration: Inner in/hr	Increm. Infiltration: Annular in/hr	Remarks
													Ground Temp. (°F): 66
1	S	8/31/22	10:15		22.8	0	0.00	22.8	3	68	0.00	0.0	partly cloudy, 72°F, no wind
	E	8/31/22	10:30	15	22.8			22.8		69			
2	S	8/31/22	10:34		22.8	5	0.02	22.8	20	70	0.16	0.3	
	E	8/31/22	10:49	30	22.7			22.6		70			
3	S	8/31/22	10:52		22.7	4	0.04	22.6	0	70	0.29	0.3	
	E	8/31/22	11:09	45	22.6			22.6		71			
4	S	8/31/22	11:12		22.6	4	0.05	22.6	8	71	0.41	0.4	
	E	8/31/22	11:27	60	22.5			22.5		71			
5	S	8/31/22	11:28		22.5	4	0.07	22.5	33	71	0.47	0.5	
	E	8/31/22	11:48	90	22.4			22.1		72			
6	S	8/31/22	11:48		22.0	30	0.20	22.1	8	72	0.96	0.6	76°F, sunny
	E	8/31/22	12:18	120	21.2			22.0		72			
7	S	8/31/22	12:21		22.8	11	0.25 *	22.8	17	70	1.05 *	0.6	Refill Bottles
	E	8/31/22	1:21	180	22.5			22.6		71			
8	S	8/31/22	1:26		22.5	11	0.30	22.6	0	72	1.14	0.6	
	E	8/31/22	2:26	240	22.2			22.6		72			
9	S	8/31/22	2:30		22.2	11	0.35 *	22.6	17	72	1.23 *	0.7	83°F, sunny
	E	8/31/22	3:30	300	21.9			22.4		73			
10	S	8/31/22	3:35		21.9	22	0.44	22.4	17	73	1.41	0.7	
	E	8/31/22	4:35	360	21.3			22.2		73			

* Cummulative volume used to determine the raw infiltration rate


Time-Discharge Curve for Inner Ring TH-2
Accumulated Flow (Gal).
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
0
50
100
150
200
250
300
350
400
Time, (min.)
Inner Ring


Graphical Representation of Infiltration Data TH-2
Incremental Infiltration, in/hr
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
0
50
100
150
200
250
300
350
400
Elapsed Time, min.
Inner Ring
Annular Space

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

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

Custom Soil Resource Report for Western Riverside Area, California

July 1, 2022

Preface

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

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

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

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

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

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

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How Soil Surveys Are Made

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

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

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

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

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

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

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

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

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

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

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

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

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

Custom Soil Resource Report
Soil Map

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

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

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

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

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

Soil Survey Area: Western Riverside Area, California
Survey Area Data: Version 14, Sep 13, 2021

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

Date(s) aerial images were photographed: May 25, 2019—Jun 25, 2019

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
EnC2	Exeter sandy loam, 2 to 8 percent slopes, eroded	72.2	70.0%
EpC2	Exeter sandy loam, deep, 2 to 8 percent slopes, eroded	9.6	9.3%
GyC2	Greenfield sandy loam, 2 to 8 percent slopes, eroded	12.3	11.9%
MmB	Monserate sandy loam, 0 to 5 percent slopes	3.1	3.0%
MnD2	Monserate sandy loam, shallow, 5 to 15 percent slopes, eroded	5.5	5.3%
RaB2	Ramona sandy loam, 2 to 5 percent slopes, eroded	0.5	0.5%
Totals for Area of Interest		**103.1**	**100.0%**

Map Unit Descriptions

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

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

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

mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

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

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

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

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

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

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

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

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

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

Western Riverside Area, California

EnC2—Exeter sandy loam, 2 to 8 percent slopes, eroded

Map Unit Setting

National map unit symbol: hcth
Elevation: 20 to 700 feet
Mean annual precipitation: 7 to 20 inches
Mean annual air temperature: 61 to 64 degrees F
Frost-free period: 250 to 300 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

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

Description of Exeter

Setting

Landform: Alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite

Typical profile

H1 - 0 to 16 inches: sandy loam
H2 - 16 to 37 inches: sandy clay loam
H3 - 37 to 50 inches: indurated
H4 - 50 to 60 inches: stratified sandy loam to silt loam

Properties and qualities

Slope: 2 to 8 percent
Depth to restrictive feature: 20 to 40 inches to duripan
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: R019XD029CA - LOAMY
Hydric soil rating: No

Minor Components

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

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

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

EpC2—Exeter sandy loam, deep, 2 to 8 percent slopes, eroded

Map Unit Setting
National map unit symbol: hctl
Elevation: 300 to 700 feet
Mean annual precipitation: 7 to 15 inches
Mean annual air temperature: 64 degrees F
Frost-free period: 250 to 300 days
Farmland classification: Prime farmland if irrigated

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

Description of Exeter

Setting
Landform: Alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite

Typical profile
H1 - 0 to 16 inches: sandy loam
H2 - 16 to 37 inches: sandy clay loam
H3 - 37 to 50 inches: indurated
H4 - 50 to 60 inches: stratified sandy loam to silt loam

Properties and qualities
Slope: 2 to 8 percent
Depth to restrictive feature: 35 to 60 inches to duripan
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)

Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: R019XD029CA - LOAMY
Hydric soil rating: No

Minor Components

Ramona

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

Monserate

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

Greenfield

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

GyC2—Greenfield sandy loam, 2 to 8 percent slopes, eroded

Map Unit Setting

National map unit symbol: hcvw
Elevation: 100 to 3,500 feet
Mean annual precipitation: 9 to 20 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 200 to 300 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

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

Description of Greenfield

Setting

Landform: Terraces, alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite

Typical profile

H1 - 0 to 26 inches: sandy loam
H2 - 26 to 43 inches: fine sandy loam
H3 - 43 to 60 inches: loam
H4 - 60 to 72 inches: stratified loamy sand to sandy loam

Properties and qualities

Slope: 2 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.3 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: A
Ecological site: R019XD029CA - LOAMY
Hydric soil rating: No

Minor Components

Hanford

Percent of map unit: 3 percent
Hydric soil rating: No

Pachappa

Percent of map unit: 3 percent
Hydric soil rating: No

Arlington

Percent of map unit: 3 percent
Hydric soil rating: No

Unnamed

Percent of map unit: 3 percent
Hydric soil rating: No

Ramona

Percent of map unit: 3 percent
Hydric soil rating: No

MmB—Monserate sandy loam, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: hcx4

Elevation: 700 to 2,500 feet
Mean annual precipitation: 10 to 18 inches
Mean annual air temperature: 63 to 64 degrees F
Frost-free period: 220 to 280 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

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

Description of Monserate

Setting

Landform: Alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite

Typical profile

H1 - 0 to 10 inches: sandy loam
H2 - 10 to 28 inches: sandy clay loam
H3 - 28 to 45 inches: indurated
H4 - 45 to 57 inches: cemented
H5 - 57 to 70 inches: loamy coarse sand

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: 20 to 39 inches to duripan
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.1 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: R019XD029CA - LOAMY
Hydric soil rating: No

Minor Components

Greenfield

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

Tujunga

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

Hanford

Percent of map unit: 5 percent

Hydric soil rating: No

MnD2—Monserate sandy loam, shallow, 5 to 15 percent slopes, eroded

Map Unit Setting

National map unit symbol: hcx8
Elevation: 700 to 2,500 feet
Mean annual precipitation: 10 to 18 inches
Mean annual air temperature: 63 to 64 degrees F
Frost-free period: 220 to 280 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Monserate

Setting

Landform: Alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite

Typical profile

H1 - 0 to 10 inches: sandy loam
H2 - 10 to 18 inches: sandy clay loam
H3 - 18 to 45 inches: indurated
H4 - 45 to 57 inches: cemented
H5 - 57 to 70 inches: loamy coarse sand

Properties and qualities

Slope: 5 to 15 percent
Depth to restrictive feature: 10 to 20 inches to duripan
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: R019XD060CA - SHALLOW LOAMY (1975)
Hydric soil rating: No

Minor Components

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

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

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

RaB2—Ramona sandy loam, 2 to 5 percent slopes, eroded

Map Unit Setting
National map unit symbol: hcy5
Elevation: 250 to 3,500 feet
Mean annual precipitation: 10 to 20 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 230 to 320 days
Farmland classification: Prime farmland if irrigated

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

Description of Ramona

Setting
Landform: Terraces, alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite

Typical profile
H1 - 0 to 14 inches: sandy loam
H2 - 14 to 23 inches: fine sandy loam
H3 - 23 to 68 inches: sandy clay loam
H4 - 68 to 74 inches: gravelly sandy loam

Properties and qualities
Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)

Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Available water supply, 0 to 60 inches: Moderate (about 8.1 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: R019XD029CA - LOAMY
Hydric soil rating: No

Minor Components

Hanford

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

Arlington

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

Greenfield

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

Tujunga

Percent of map unit: 3 percent
Hydric soil rating: No

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

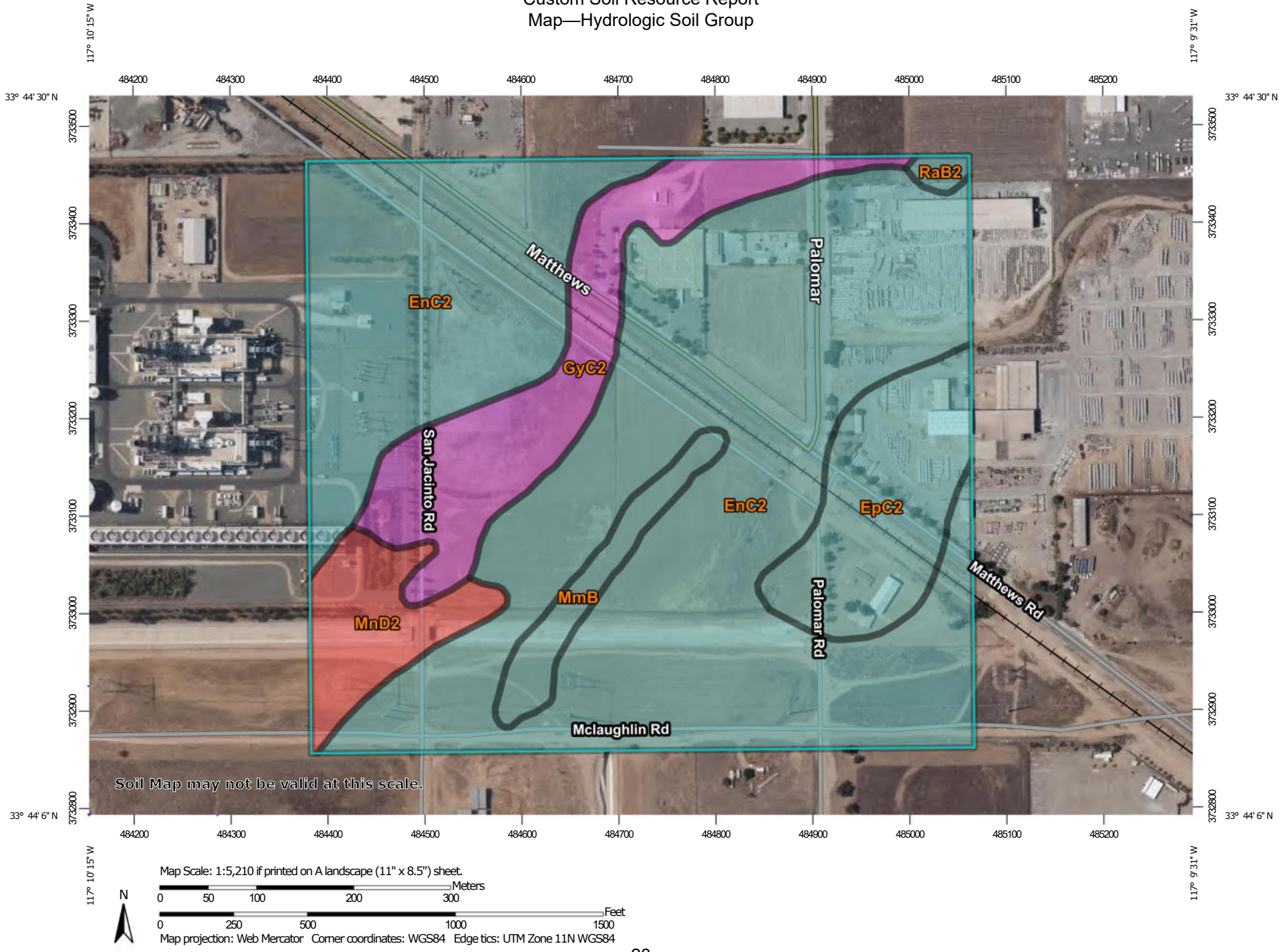
Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly 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 chiefly 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 chiefly 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.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.


117° 10' 15" W
117° 9' 31" W
33° 44' 30" N
33° 44' 6" N
484200
484300
484400
484500
484600
484700
484800
484900
485000
485100
485200
3733500
3733400
3733300
3733200
3733100
3733000
3732900
3732800
RaB2
Matthews
Palomar
EnC2
GyC2
San Jacinto Rd
EnC2
EpC2
Matthews Rd
MmB
Palomar Rd
MnD2
Mclaughlin Rd
Soil Map may not be valid at this scale.
Map Scale: 1:5,210 if printed on A landscape (11" x 8.5") sheet.
N
Meters
0 50 100 200 300
Feet
0 250 500 1000 1500
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

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

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

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

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

Soil Survey Area: Western Riverside Area, California
Survey Area Data: Version 14, Sep 13, 2021

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

Date(s) aerial images were photographed: May 25, 2019—Jun 25, 2019

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

Table—Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
EnC2	Exeter sandy loam, 2 to 8 percent slopes, eroded	C	72.2	70.0%
EpC2	Exeter sandy loam, deep, 2 to 8 percent slopes, eroded	C	9.6	9.3%
GyC2	Greenfield sandy loam, 2 to 8 percent slopes, eroded	A	12.3	11.9%
MmB	Monserate sandy loam, 0 to 5 percent slopes	C	3.1	3.0%
MnD2	Monserate sandy loam, shallow, 5 to 15 percent slopes, eroded	D	5.5	5.3%
RaB2	Ramona sandy loam, 2 to 5 percent slopes, eroded	C	0.5	0.5%
Totals for Area of Interest			**103.1**	**100.0%**

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

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Appendix 4: Historical Site Conditions

Phase I Environmental Site Assessment or Other Information on Past Site Use

Appendix 5: LID Infeasibility

LID Technical Infeasibility Analysis

4.0 PROPOSED INFILTRATION SYSTEM

Based on our review of the plans, a total of one (1) infiltration basin is proposed on the Site for the purpose of percolating the sheet-flow storm-drain water for the proposed industrial development. Due to the flat topography of the Site and proposed grading, it is anticipated the stormwater drainage by sheet-flow will be collected by proposed concrete swales and/or ribbon gutters and continue to the proposed basin. The proposed rectangular-shaped infiltration basin will be constructed with an invert of approximately three to four (3-4) feet below the existing ground surface and 4:1 cut slopes.

5.0 GEOTECHNICAL AND INFILTRATION INVESTIGATION

The geotechnical investigation included a field subsurface exploration program through trenching, obtaining bulk, grab, and undisturbed soil samples, and laboratory testing on soil samples collected during the infiltration testing program. These programs were performed in accordance with our Geotechnical Investigation Infiltration Report Proposal dated June 20, 2022. The scope of work did not include environmental assessment or investigation for the presence or absence of hazardous substances or toxic materials in structures, soil, and surface water, air, below or around the site. The field subsurface exploration, laboratory testing programs, and Infiltration testing protocol are described below, as required by Riverside County and ASTM D 3385.

A site reconnaissance was made by our representative prior to instigating the field exploration and infiltration testing program. The Site was observed, and boundaries roughly located for purposes of underground utility locating. As required by law, Bruin GSI contacted Underground Service Alert (one-call notification service) to attain underground utility marking and clearance, a minimum of 72 hours prior to performing the field subsurface investigation.

The field exploration program was conducted on August 31, 2022, under the technical supervision of our engineer, and consisted of Double Ring Infiltrometer test (ASTM D 3385 tested method) and exploratory excavation. Infiltration testing was performed based on the Test Requirements defined in the Riverside County LAMP, ASTM D 3385, and further described in section 5.1 of this report.

5.1 Field Exploration Program

The approximate locations of the exploratory trenches were determined by sighting and pacing from existing site improvements, such as streets, and the use of a hand-held GPS unit and should be only considered accurate to the degree implied by the method used. Test Hole Locations and pertinent Boring Locations from the Referenced Geotechnical Engineering Report are shown on Figure 2.

Test Location Map

N.T.S.

B1 = Denotes Approximate Boring (B) or Test Hole (TH) Location

BRUIN GEOTECHNICAL SERVICES INC. est. 2004 ™

www.bruingsi.net

Project:

Proposed Double Butte Battery Storage
Vicinity of Matthews Road and Palomar Road,
Menifee, Riverside County, CA

Job Number:

22-247

Figure 2

Soil samples were obtained at various depths within the Test Holes prior to infiltration testing and returned to the laboratory for analysis and testing.

Final Test Hole logs and pertinent Boring Logs presented in Appendix A are Bruin GSI's interpretation of the field logs prepared by our representative during excavation, as well as laboratory test results. The stratification lines represent approximate boundaries between soil types. The actual soil transitions may be gradual.

5.2 Infiltration Testing Protocol

The Riverside County Low Impact Development BMP Design Handbook was used to determine the protocol required for infiltration testing procedures for this project. The LAMP provides examples of appropriate type of testing for various types of LID features. The use of Double-Ring Infiltrometer Test following the procedures as provided in ASTM D3385 is generally appropriate for shallow LID Feature Depths.

Riverside County requires a minimum of two (2) tests with at least one (1) test per each LID Feature. Using the Double-Ring Infiltrometer requires approximately six (6) square feet of horizontal surface area of testing to accommodate the testing infiltrometer and Mariotte tubes at the invert elevation of the proposed basin. It was determined to excavate two (2) representative locations within the limits of designated location of the basin using a tractor-mounted backhoe equipped with a thirty-six-inch bucket. The excavations for Test Hole 1 and Test Hole 2, with dimensions approximately three (3) feet square (3x3), were excavated to a depth of four (4) feet and six (6) feet, respectively, below existing ground surface (bgs).

For each test hole, two Mariotte tubes (10,000cc and 3,000cc capacity) were used to keep the water level constant within the outer and inner rings of the infiltrometer. These calibrated tubes (marked in one-centimeter increments) were placed inside the pit, near the location of the infiltrometer rings and were used as measurement of the volume of water needed to maintain the head during the duration of the test. A three-eighths (3/8) inch ID clear vinyl tubing connected the twelve (12) inch inner diameter ring and the twenty-four (24) inch diameter ring to the Mariotte Tubes. Rubber splash plates were used at the bottom of each ring to convey the water, preventing erosion and disturbance of the test pit's bottom.

The twelve (12) inch diameter ring was carefully driven with minimal disturbance of the soil surface into the ground approximately one (1) inch below the ground surface and filled with water up to one (1) inch above the proposed invert elevation using the 3,000 cc Mariotte Tube. The twenty-four (24) inch diameter ring was carefully driven with minimal disturbance of the soil surface into the ground approximately one and one-half (1.5) inches below the ground surface and filled with water up to one and one-quarter (1.25) inches above the proposed invert

elevation using the 10,000 cc Mariotte Tube. The remaining three-eighths (3/8) inch ID clear vinyl tubing connected the Mariotte Tubes to the fifty-five (55) gallon water tank.

During the initial fill of water, the rings were filled with water using a 0.50 cubic foot receptacle, up to the desired depth in each ring. A measurement of the water pH was obtained. Once the fluid became level and constant then the flow of fluid from the Mariotte Tubes were used to maintain the liquid level throughout the test. The readings of the volume of water, water surface elevation, and water temperature were checked every fifteen (15) minutes during the first hour, every thirty (30) minutes during the second hour; and every one (1) hour afterwards, until reaching a minimum of six (6) hours. The driving cap was paced over the rings during intervals of liquid measurements to minimize evaporation.

Once the instantaneous flow rate stabilized (i.e., the highest and lowest readings were within ten (10) percent of each other, for three consecutive readings), the water drop on Mariotte Tube was recorded until the test pit was empty (falling phase of the test). The total combined time of the test exceeded the four (4) hour minimum.

Infiltration Test Results are presented in Section 7.0 of this report.

5.3 Laboratory Testing

Select soil samples collected during trenching and drilling activities at the Site were then tested in the laboratory to assist in evaluating engineering properties of subsurface materials deemed within structural influence and to provide data required for conclusions related to the infiltration characteristics.

The soil samples were classified in accordance with the Unified Soils Classification System and a testing program was established. The samples were tested to determine the following:

- In-situ moisture ASTM D 2937
- Identification of soils ASTM D 2488
- Material Finer than the No. 200 Sieve ASTM D 1140
- Sand Equivalent Value ASTM D 2419

Pertinent tabular and graphic test results from the referenced Geotechnical Engineering Report are presented in Appendix B.

5.4 Site and Subsurface Conditions

Native materials were encountered within our infiltration test holes and exploratory borings from the referenced Geotechnical Engineering Report. The subsurface soil appears relatively uniform across the subject site and the soil encountered in the exploratory borings generally consists of silty sand with clay (SM) with occasional sandy clay (CL) and clayey sand (SC) to the maximum depth explored of twenty (20) feet below ground surface.

Based on the blow counts obtained during sampling, and in-situ densities obtained, the native material encountered was noted to be medium dense or firm to very dense or hard. The subsurface materials were noted to be slightly moist to saturated. No groundwater or perched water was encountered through the depth explored (20 feet below ground surface).

6.0 DESIGN CRITERIA

To determine the infiltration rate for design purposes, the volume of liquid added to the inner ring to maintain the liquid level constant (measure of liquid infiltrating the soil) during the test is converted to an incremental infiltration velocity by dividing by the area of the inner ring (in inches per hour) and plotted versus time elapsed.

The Riverside County LAMP requires the application of a safety/reduction factor to the raw measurements established at the Site in order to determine the site-specific long-term infiltration rate to be used for design. The Total Reduction Factor (RF) is applied to the raw infiltration rate in order to determine the design infiltration rate that will represent the long-term performance of the proposed infiltration BMPs.

The Infiltration Testing Requirements section of the Riverside County LAMP provides the minimum required safety or reduction factor for each type of infiltration test.

$$Total\ Reduction\ Factor\ (RF) = 3$$

The reduction factor (RF) was applied to the stabilized infiltration rates obtaining the design infiltration rate of the basin. Utilizing the raw infiltration rate of 0.066 inches per hour (0.006 feet per hour) and reduction factor of 3, the design infiltration rate obtained from Test Hole 1 (slowest rate) was calculated to be **0.022 inches per hour (.002 feet per hour)**.

The Riverside County Water Quality Management (WQMP) requires that the infiltration rate must be at least 0.83 inches per hour. The Riverside County WQMP further outlines that “If the average ‘in-situ’ tested infiltration rate for the site is less than 1.6 inches per hour, LID Infiltration BMPs (infiltration basins, infiltration trenches, etc.) shall not be used.”

It is our professional opinion that the infiltration rate is not sufficient, and the Infiltration Basin is not recommended for construction.

Data calculations, reduction factors, raw and calculated design infiltration rates, as well as unit conversions are shown in Appendix C.

7.0 OPINIONS AND CONCLUSIONS

Based upon the results of our investigation, the proposed development is not considered feasible from a geotechnical standpoint.

The soils explored and tested at the Site were found to be relatively uniform in classification, infiltration, and strength. Based on the laboratory testing and subsurface data obtained, it is Bruin GSI's opinion that the upper Site soils will be not suitable for infiltration purposes and do not meet or exceed the county minimum rates required.

Based on our calculations of the design infiltration rates, verified with the laboratory test results on soil samples obtained on each infiltration basin locations, it is our professional opinion the proposed infiltration basins are not feasible from a geotechnical perspective.

Refer to the Geotechnical Engineering Report for the proposed development prepared by Bruin Geotechnical Services Inc. referenced herein for guidelines regarding grading and remedy any soil related issues relative to structures.

8.0 ADDITIONAL SERVICES

Final project plans and specifications should be reviewed prior to construction to confirm that the full intent of the recommendations presented herein have been applied to design and construction. This report is based on the assumption that an adequate testing and inspection program along with client consultation will be performed during final design and construction phases to verify compliance with the recommendations of this report.

Retaining Bruin GSI as the geotechnical consultant to provide additional services from preliminary design through project completion will assure continuity of services.

Additional services include:

- Consultation during design stages of the project.
- Review, stamp and signature of the grading and building plans.
- Observation and testing during rough grading, fine grading and trench backfill as well as placement of engineered fill.
- Consultation as required during construction.

Appendix 6: BMP Design Details

BMP Sizing, Design Details and other Supporting Documentation

Santa Ana Watershed - BMP Design Volume, V_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	Kimley-Horn	Date	11/6/2023
Designed by	Nicholas Naylor	Case No	DEV2022-026
Company Project Number/Name	Double Butte BESS		

BMP Identification

BMP NAME / ID: BIO-1

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85}= 0.61 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
A-1	*193*	*Concrete or Asphalt*	*1*	*0.89*	*172.2*			
A-1	*31894*	*Natural (C Soil)*	*0.3*	*0.23*	*7181.4*			
A-2	*230457*	*Concrete or Asphalt*	*1*	*0.89*	*205567.6*			
A-2	*173874*	*Compacted Soil (e.g. unpaved parking)*	*0.4*	*0.28*	*48634.6*			
A-2	*523322*	*Natural (C Soil)*	*0.3*	*0.23*	*117834.3*			
A-2	*35840*	*Ornamental Landscaping*	*0.1*	*0.11*	*3958.8*			
	995580	*Total*			*383348.9*	*0.61*	*19486.9*	*24284*

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	Kimley-Horn	Date	11/6/2023
Designed by	Nicholas Naylor	Case No	DEV2022-026
Company Project Number/Name	Double Butte BESS		

BMP Identification

BMP NAME / ID: FIL-1

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85} = 0.61 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
B-1	*19427*	*Concrete or Asphalt*	*1*	*0.89*	*17328.9*			
B-2	*15887*	*Concrete or Asphalt*	*1*	*0.89*	*14171.2*			
B-3	*21000*	*Ornamental Landscaping*	*0.1*	*0.11*	*2319.6*			
B-3	*11280*	*Natural (C Soil)*	*0.3*	*0.23*	*2539.9*			
	67594		*Total*		*36359.6*	*0.61*	*1848.3*	*> 1849*

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	Kimley-Horn	Date	11/6/2023
Designed by	Nicholas Naylor	Case No	DEV2022-026
Company Project Number/Name	Double Butte BESS		

BMP Identification

BMP NAME / ID: FIL-2

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85} = 0.61 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
C-1	*17978*	*Concrete or Asphalt*	*1*	*0.89*	*16036.4*			
	17978		***Total***		**16036.4**	**0.61**	***815.2***	***> 816***

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	Kimley-Horn	Date	11/6/2023
Designed by	Nicholas Naylor	Case No	DEV2022-026
Company Project Number/Name	Double Butte BESS		

BMP Identification

BMP NAME / ID: FIL-3

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85}= 0.61 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
D-1	*36428*	*Ornamental Landscaping*	*0.1*	*0.11*	*4023.8*			
D-1	*63802*	*Natural (C Soil)*	*0.3*	*0.23*	*14366*			
D-2	*7744*	*Concrete or Asphalt*	*1*	*0.89*	*6907.6*			
	107974		***Total***		**25297.4**	**0.61**	***1286***	***> 1286***

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

(Rev. 10-2011)

Legend: Required Entries; Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	Kimley-Horn	Date	11/6/2023
Designed by	Nicholas Naylor	Case No	DEV2022-026
Company Project Number/Name	Double Butte BESS		

BMP Identification

BMP NAME / ID: MWS-1

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85} = 0.61 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
B-4	*14243*	*Concrete or Asphalt*	*1*	*0.89*	*12704.8*			
	14243		***Total***		**12704.8**	**0.61**	***645.8***	***> 646***

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

(Rev. 10-2011)

Legend: Required Entries; Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	Kimley-Horn	Date	11/6/2023
Designed by	Nicholas Naylor	Case No	DEV2022-026
Company Project Number/Name	Double Butte BESS		

BMP Identification

BMP NAME / ID: MWS-2

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85} = 0.61 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
C-2	*20819*	*Concrete or Asphalt*	*1*	*0.89*	*18570.5*			
	20819		***Total***		**18570.5**	**0.61**	***944***	***> 944***

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	Kimley-Horn	Date	11/6/2023
Designed by	Nicholas Naylor	Case No	
Company Project Number/Name	Double Butte BESS		

BMP Identification

BMP NAME / ID: BIO-1

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity: I = 0.61 in/hr

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	Design Rainfall Intensity (in/hr)	Design Flow Rate (cfs)	Proposed Flow Rate (cfs)
A-1	193	Concrete or Asphalt	1	0.89	172.2			
A-1	31894	Natural (C Soil)	0.3	0.23	7181.4			
A-2	230457	Concrete or Asphalt	1	0.89	205567.6			
A-2	173874	Compacted Soil (e.g. unpaved parking)	0.4	0.28	48634.6			
A-2	523322	Natural (C Soil)	0.3	0.23	117834.3			
A-2	35840	Ornamental Landscaping	0.1	0.11	3958.8			
	995580	Total			383348.9	0.61	5.4	> 5.4

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	Kimley-Horn	Date	11/6/2023
Designed by	Nicholas Naylor	Case No	
Company Project Number/Name	Double Butte BESS		

BMP Identification

BMP NAME / ID: FIL-1

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity: I = 0.61 in/hr

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
B-1	*19427*	*Concrete or Asphalt*	*1*	*0.89*	*17328.9*			
B-2	*15887*	*Concrete or Asphalt*	*1*	*0.89*	*14171.2*			
B-3	*21000*	*Ornamental Landscaping*	*0.1*	*0.11*	*2319.6*			
B-3	*11280*	*Natural (C Soil)*	*0.3*	*0.23*	*2539.9*			
	67594		*Total*		*36359.6*	*0.61*	*0.5*	*> 0.5*

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	Kimley-Horn	Date	11/6/2023
Designed by	Nicholas Naylor	Case No	
Company Project Number/Name	Double Butte BESS		

BMP Identification

BMP NAME / ID: FIL-2

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity: I = 0.61 in/hr

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
C-1	*17978*	*Concrete or Asphalt*	*1*	*0.89*	*16036.4*			
	17978		***Total***		**16036.4**	**0.61**	***0.2***	***> 0.2***

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	Kimley-Horn	Date	11/6/2023
Designed by	Nicholas Naylor	Case No	
Company Project Number/Name	Double Butte BESS		

BMP Identification

BMP NAME / ID: FIL-3

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity: I = 0.61 in/hr

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	Design Rainfall Intensity (in/hr)	Design Flow Rate (cfs)	Proposed Flow Rate (cfs)
D-1	36428	Ornamental Landscaping	0.1	0.11	4023.8			
D-1	63802	Natural (C Soil)	0.3	0.23	14366			
D-2	7744	Concrete or Asphalt	1	0.89	6907.6			
	107974	Total			25297.4	0.61	0.4	> 0.4

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	Kimley-Horn	Date	11/6/2023
Designed by	Nicholas Naylor	Case No	
Company Project Number/Name	Double Butte BESS		

BMP Identification

BMP NAME / ID: MWS-1

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity: I = 0.61 in/hr

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
B-4	*14243*	*Concrete or Asphalt*	*1*	*0.89*	*12704.8*			
	14243		***Total***		**12704.8**	**0.61**	***0.2***	***> 0.2***

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries | Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name: Kimley-Horn — Date: 11/6/2023

Designed by: Nicholas Naylor — Case No:

Company Project Number/Name: Double Butte BESS

BMP Identification

BMP NAME / ID: MWS-2

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity — I = 0.61 in/hr

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

	DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	Design Rainfall Intensity (in/hr)	Design Flow Rate (cfs)	Proposed Flow Rate (cfs)
DMAs	C-2	20819	Concrete or Asphalt	1	0.89	18570.5			
		20819	Total			18570.5	0.61	0.3	> 0.3

Notes:

Bioretention Facility - Design Procedure	BMP ID	Legend:	Required Entries	
	BIO-1		Calculated Cells	

Company Name:	Kimley-Horn	Date:	11/6/2023
Designed by:	Ashley Teani	County/City Case No.:	)EV2022-026

Design Volume

Enter the area tributary to this feature	A_T=	30.12	acres
Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP}=	24,284	ft^3

Type of Bioretention Facility Design

(●) Side slopes required (parallel to parking spaces or adjacent to walkways)

( ) No side slopes required (perpendicular to parking space or Planter Boxes)

Bioretention Facility Surface Area

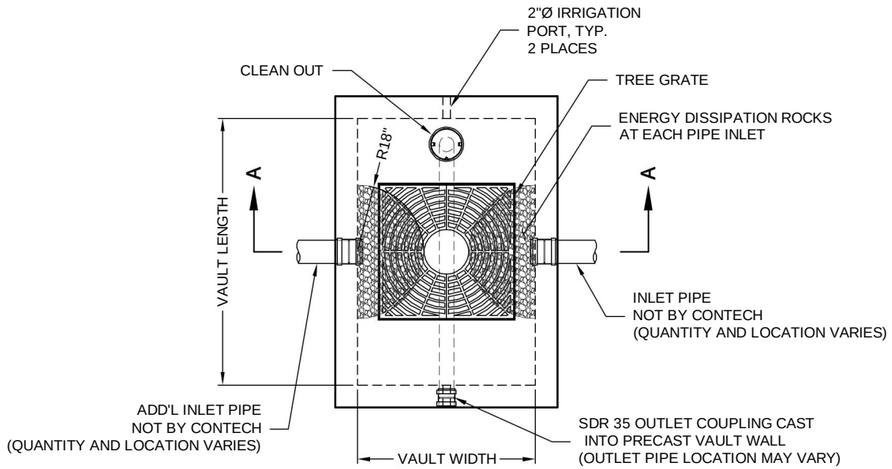
Depth of Soil Filter Media Layer	d_S =	2.0	ft
Top Width of Bioretention Facility, excluding curb	w_T =	48.7	ft
Total Effective Depth, d_E $d_E = (0.3) \times d_S + (0.4) \times 1 - (0.7/w_T) + 0.5$	d_E =	1.49	ft
Minimum Surface Area, A_m $A_M\ (ft^2) = \frac{V_{BMP}\ (ft^3)}{d_E\ (ft)}$	A_M =	16,346	ft^2
Proposed Surface Area	A=	16,726	ft^2

Bioretention Facility Properties

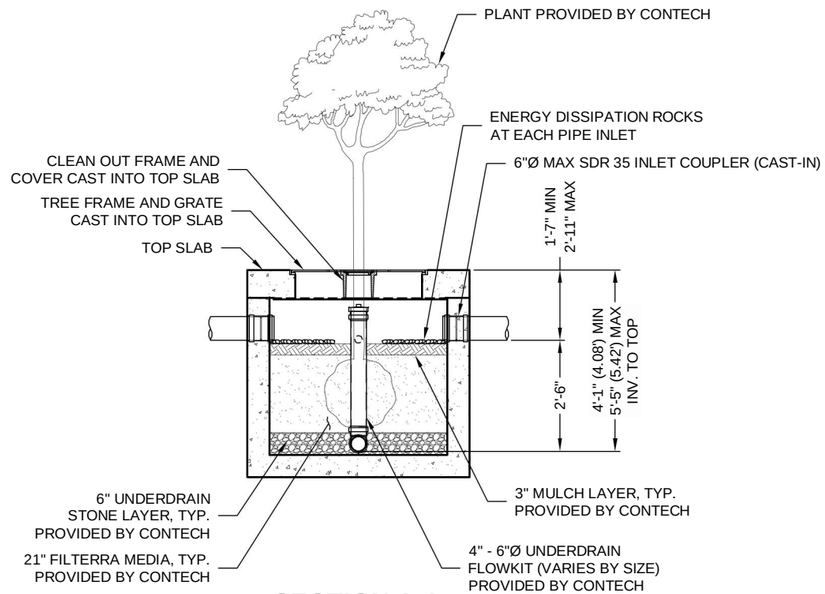
Side Slopes in Bioretention Facility	z =	4	:1
Diameter of Underdrain		6	inches
Longitudinal Slope of Site (3% maximum)		0	%
6" Check Dam Spacing		0	feet
Describe Vegetation:		Shrubs	

Notes: As currently designed, BIO-1 can be used to treat the Design Volume of DMAs A-1, A-2, B-1, B-2, B-3, & C-1. Final basin sizing will be adjusted to account for all contributing DMAs.

I:\STORMWATER\COMMOPS\54 FILTERRA\40 STANDARD DRAWINGS\FT - FILTERRA OFFLINE\FT-P - FILTERRA OFFLINE - PIPE\LAYOUT DETAILS\DWG\FT-P - FILTERRA OFFLINE - PIPE CONFIG DTL.DWG 9/8/2022 10:41 AM



PLAN VIEW



SECTION A-A

INTERNAL PIPE CONFIGURATION MAY VARY DEPENDING UPON OUTLET LOCATION.

FT-P STANDARD OFFLINE CONFIGURATION

DESIGNATION	AVAILABILITY	MEDIA BAY SIZE	VAULT SIZE (L x W)	OUTLET PIPE	TREE GRATE QTY & SIZE	MIN NO. OF INLET PIPES
FT0404-P	ALL	4 x 4	4 x 4	4" SDR 35	(1) 3' x 3'	1
FT0604-P	ALL	6 x 4	6 x 4	4" SDR 35	(1) 3' x 3'	1
FT0606-P	ALL	6 x 6	6 x 6	4" SDR 35	(1) 3' x 3'	1
FT078045-P	DE, MD, NJ, PA, VA, WV ONLY	7.83 x 4.5	7.83 x 4.5	4" SDR 35	(1) 3' x 3'	1
FT0804-P	N/A DE, MD, NJ, PA, VA, WV	8 x 4	8 x 4	4" SDR 35	(1) 3' x 3'	1
FT0806-P	ALL	8 x 6	8 x 6	4" SDR 35	(1) 4' x 4'	1
FT1006-P	ALL	10 x 6	10 x 6	6" SDR 35	(1) 4' x 4'	2
FT1206-P	ALL	12 x 6	12 x 6	6" SDR 35	(2) 4' x 4'	2
FT1307-P	ALL	13 x 7	13 x 7	6" SDR 35	(2) 4' x 4'	2
FT1408-P	CALL CONTECH	14 x 8	14 x 8	6" SDR 35	(2) 4' x 4'	3
FT1509-P	CALL CONTECH	15 x 9	15 x 9	6" SDR 35	(2) 4' x 4'	3
FT1608-P	CALL CONTECH	16 x 8	16 x 8	6" SDR 35	(2) 4' x 4'	3
FT1808-P	CALL CONTECH	18 x 8	18 x 8	6" SDR 35	(2) 4' x 4'	3
FT2008-P	CALL CONTECH	20 x 8	20 x 8	6" SDR 35	(3) 4' x 4'	4
FT2208-P	CALL CONTECH	22 x 8	22 x 8	6" SDR 35	(3) 4' x 4'	4

N/A = NOT AVAILABLE

filterra®

THIS PRODUCT MAY BE PROTECTED BY ONE OR MORE OF THE FOLLOWING U.S. PATENTS: 6,277,274; 6,569,321; 7,625,485; 7,425,261; 7,833,412; RELATED FOREIGN PATENTS.

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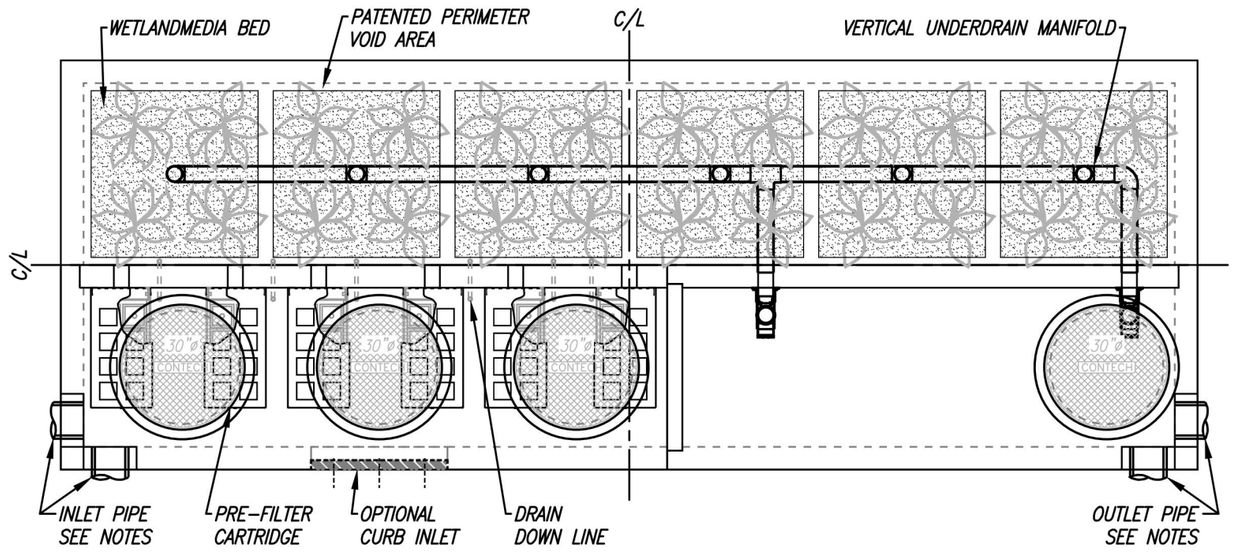
FILTERRA OFFLINE - PIPE (FT-P) CONFIGURATION DETAIL

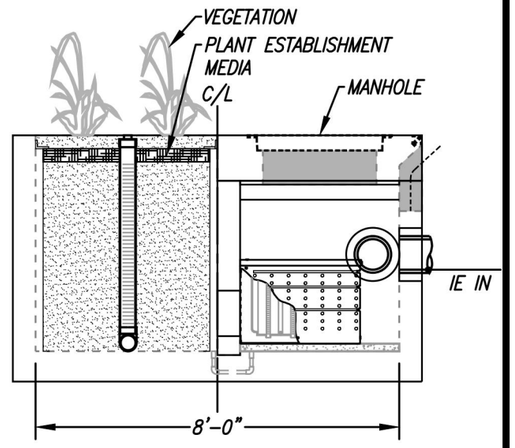
SITE SPECIFIC DATA

PROJECT NUMBER			
PROJECT NAME			
PROJECT LOCATION			
STRUCTURE ID			
TREATMENT REQUIRED			
TREATMENT FLOW (CFS)			
PRETREATMENT LOADING RATE (GPM/SF)			2.1 GPM/SF
WETLAND MEDIA LOADING RATE (GPM/SF)			1.0
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			_____ (CFS)
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1			
INLET PIPE 2			
OUTLET PIPE			
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION			
SURFACE LOAD	PEDESTRIAN		
NOTES:			

* PRELIMINARY ONLY - NOT FOR CONSTRUCTION



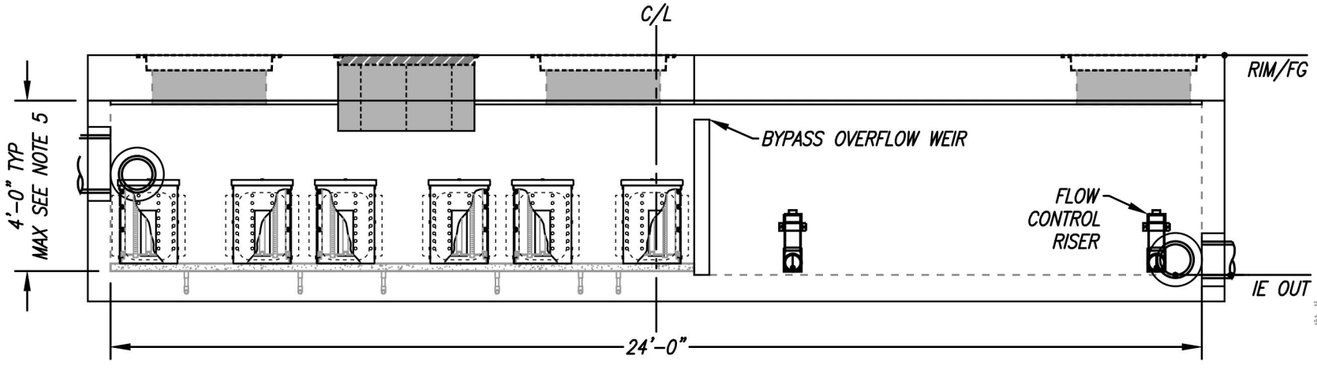
PLAN VIEW



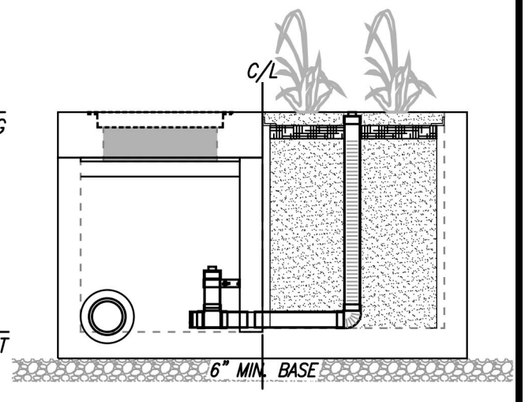
LEFT END VIEW

INSTALLATION NOTES

1. CONTRACTOR TO PROVIDE ALL LABOR, EQUIPMENT, MATERIALS AND INCIDENTALS REQUIRED TO OFFLOAD AND INSTALL THE SYSTEM AND APPURTENANCES IN ACCORDANCE WITH THIS DRAWING AND THE MANUFACTURER'S SPECIFICATIONS, UNLESS OTHERWISE STATED IN MANUFACTURER'S CONTRACT.
2. UNIT MUST BE INSTALLED ON LEVEL BASE. MANUFACTURER RECOMMENDS A MINIMUM 6" LEVEL ROCK BASE UNLESS SPECIFIED BY THE PROJECT ENGINEER. CONTRACTOR IS RESPONSIBLE FOR VERIFYING PROJECT ENGINEER'S RECOMMENDED BASE SPECIFICATIONS.
3. CONTRACTOR TO SUPPLY AND INSTALL ALL EXTERNAL CONNECTING PIPES. ALL PIPES MUST BE FLUSH WITH INSIDE SURFACE OF CONCRETE (PIPES CANNOT INTRUDE BEYOND FLUSH). INVERT OF OUTFLOW PIPE MUST BE FLUSH WITH DISCHARGE CHAMBER FLOOR. ALL PIPES SHALL BE SEALED WATERTIGHT PER MANUFACTURER'S STANDARD CONNECTION DETAIL.
4. CONTRACTOR RESPONSIBLE FOR CONTACTING CONTECH FOR ACTIVATION OF UNIT. MANUFACTURER'S WARRANTY IS VOID WITHOUT PROPER ACTIVATION BY A CONTECH REPRESENTATIVE.
5. VERTICAL HEIGHT VARIES BASED ON SITE SPECIFIC REQUIREMENTS.



ELEVATION VIEW



RIGHT END VIEW

MODULAR WETLANDS
FOR PATENT INFORMATION, GO TO www.ContechES.com/IP

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MWS-L-8-24-V
STORMWATER BIOFILTRATION SYSTEM
STANDARD DETAIL

8/14/23SCOTT.SERTICH

2.1 GPM/SF

1.0

_____ (CFS)

PEDESTRIAN

* PRELIMINARY ONLY - NOT FOR CONSTRUCTION

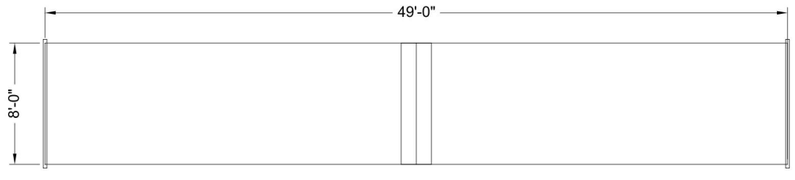
PROJECT SUMMARY

CALCULATION DETAILS
- LOADING = HS20/HS25
- APPROX. LINEAR FOOTAGE = 49 LF

STORAGE SUMMARY
- STORAGE VOLUME REQUIRED = 2,450 CF
- PIPE STORAGE VOLUME = 2,463 CF
- BACKFILL STORAGE VOLUME = 0 CF
- TOTAL STORAGE PROVIDED = 2,463 CF

PIPE DETAILS
- DIAMETER = 96"
- CORRUGATION = 5x1
- GAGE = 16
- COATING = ALT2
- WALL TYPE = SOLID
- BARREL SPACING = 36"

BACKFILL DETAILS
- WIDTH AT ENDS = 12"
- ABOVE PIPE = 0"
- WIDTH AT SIDES = 12"
- BELOW PIPE = 0"



NOTES

- ALL RISER AND STUB DIMENSIONS ARE TO CENTERLINE. ALL ELEVATIONS, DIMENSIONS, AND LOCATIONS OF RISERS AND INLETS, SHALL BE VERIFIED BY THE ENGINEER OF RECORD PRIOR TO RELEASING FOR FABRICATION.
- ALL FITTINGS AND REINFORCEMENT COMPLY WITH ASTM A998.
- ALL RISERS AND STUBS ARE $2\frac{2}{3}$" x $\frac{1}{2}$" CORRUGATION AND 16 GAGE UNLESS OTHERWISE NOTED.
- RISERS TO BE FIELD TRIMMED TO GRADE.
- QUANTITY OF PIPE SHOWN DOES NOT PROVIDE EXTRA PIPE FOR CONNECTING THE SYSTEM TO EXISTING PIPE OR DRAINAGE STRUCTURES. OUR SYSTEM AS DETAILED PROVIDES NOMINAL INLET AND/OR OUTLET PIPE STUB FOR CONNECTION TO EXISTING DRAINAGE FACILITIES. IF ADDITIONAL PIPE IS NEEDED IT IS THE RESPONSIBILITY OF THE CONTRACTOR.
- BAND TYPE TO BE DETERMINED UPON FINAL DESIGN.
- THE PROJECT SUMMARY IS REFLECTIVE OF THE DYODS DESIGN, QUANTITIES ARE APPROX. AND SHOULD BE VERIFIED UPON FINAL DESIGN AND APPROVAL. FOR EXAMPLE, TOTAL EXCAVATION DOES NOT CONSIDER ALL VARIABLES SUCH AS SHORING AND ONLY ACCOUNTS FOR MATERIAL WITHIN THE ESTIMATED EXCAVATION FOOTPRINT.
- THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES AND DO NOT REFLECT ANY LOCAL PREFERENCES OR REGULATIONS. PLEASE CONTACT YOUR LOCAL CONTECH REP FOR MODIFICATIONS.

ASSEMBLY
SCALE: 1" = 10'

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CONTECH® CMP DETENTION SYSTEMS
CONTECH **DYODS** DRAWING

DYO40560 double butte
cmp detention
Sun City, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
27750	40560	11/6/2023
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		

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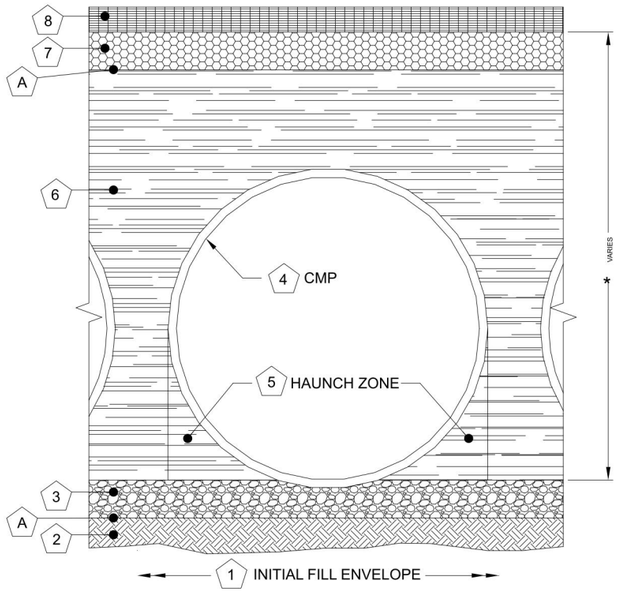


	DETENTION SYSTEMS - CMP DETENTION / CMP DRAINAGE			
	Material Location	Description	Material Designation	Designation
8	Rigid or Flexible Pavement (if applicable)			
7	Road Base (if applicable)			
A	Geotextile Layer	Non-Woven Geotextile	CONTECH C-40 or C-45	Engineer Decision for consideration to prevent soil migration into varying soil types
6	Backfill	Well graded granular material which may contain small amounts of silt or clay.	AASHTO M 145- A-1, A-2, A-3	Placed in 8" +/- loose lifts and compacted to 90% Standard Proctor Per AASHTO T 99
3	Bedding Stone	Well graded granular bedding material w/maximum particle size of 3"	AASHTO M43 - 3,357,4,467, 5, 56, 57	Engineer to determine if bedding is required. Pipe may be placed on the trench bottom of a relatively loose, native suitable well graded & granular material. For Arch pipes it is recommended to be shaped to a relatively flat bottom or fine-grade the foundation to a slight v-shape. Unsuitable material should be over-excavated and re-placed with a 4"-6" layer of well graded & granular stone per the material designation. See AASHTO 26.3.8.1 / 26.5.3 Bedding info.
A	Geotextile Layer	Non-Woven Geotextile	CONTECH C-40 or C-45	Engineer Decision for consideration to prevent soil migration into varying soil types
*	*Note: Backfill using controlled low-strength material (CLSM, "flash fill" or "flowable fill") when the spacing between the pipes will not allow for placement and adequate compaction of the backfill.*			

1 MINIMUM WIDTH DEPENDS ON SITE CONDITIONS AND ENGINEERING JUDGEMENT

FOUNDATION/BEDDING PREPARATION

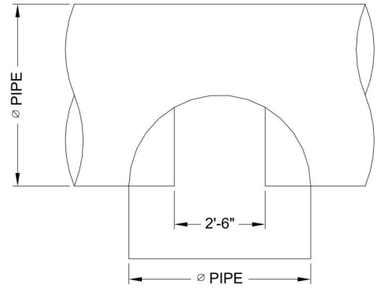
2 PRIOR TO PLACING THE BEDDING, THE FOUNDATION MUST BE CONSTRUCTED TO A UNIFORM AND STABLE GRADE. IN THE EVENT THAT UNSUITABLE FOUNDATION MATERIALS ARE ENCOUNTERED DURING EXCAVATION, THEY SHALL BE REMOVED AND BROUGHT BACK TO THE GRADE WITH A FILL MATERIAL AS APPROVED BY THE ENGINEER.

5 HAUNCH ZONE MATERIAL SHALL BE PLACED AND UNIFORMALLY COMPACTED WITHOUT SOFT SPOTS.

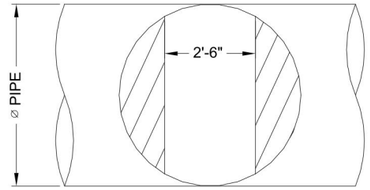
BACKFILL

WHEN PLACING THE FIRST LIFTS OF BACKFILL IT IS IMPORTANT TO MAKE SURE THAT THE BACKFILL IS PROPERLY COMPACTED UNDER AND AROUND THE PIPE HAUNCHES. BACKFILL SHALL BE PLACED SUCH THAT THERE IS NO MORE THAN A TWO LIFT (16") DIFFERENTIAL BETWEEN ANY OF THE PIPES AT ANY TIME DURING THE BACKFILL PROCESS. THE BACKFILL SHALL BE ADVANCED ALONG THE LENGTH OF THE DETENTION SYSTEM AT THE SAME RATE TO AVOID DIFFERENTIAL LOADING ON THE PIPE.

OTHER ALTERNATE BACKFILL MATERIAL MAY BE ALLOWED DEPENDING ON SITE SPECIFIC CONDITIONS, AS APPROVED BY SITE ENGINEER.



PLAN

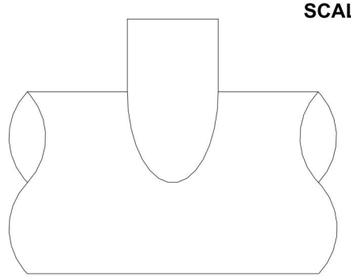


FRONT

TYPICAL MANWAY DETAIL

SCALE: N.T.S.

NOTE:
MANWAY DETAIL APPLICABLE FOR CMP SYSTEMS WITH DIAMETERS 48" AND LARGER. MANWAYS MAY BE REQUIRED ON SMALLER SYSTEMS DEPENDING ON ACTUAL SITE SPECIFIC CONDITIONS.



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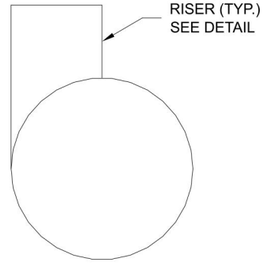
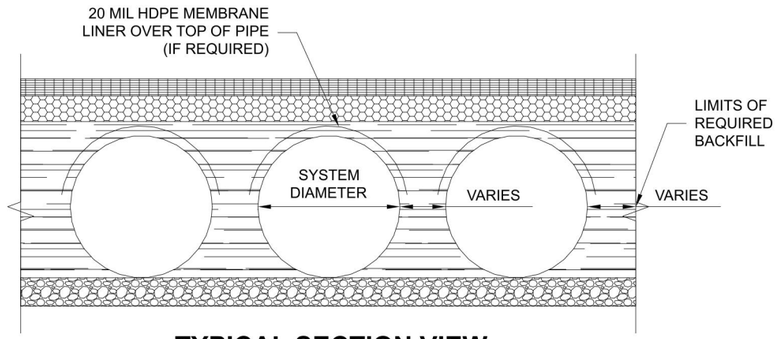


END

TYPICAL RISER DETAIL

SCALE: N.T.S.

NOTE:
LADDERS ARE OPTIONAL AND ARE NOT REQUIRED FOR ALL SYSTEMS.



TYPICAL SECTION VIEW

LINER OVER ROWS
SCALE: N.T.S.

NOTE: IF SALTING AGENTS FOR SNOW AND ICE REMOVAL ARE USED ON OR NEAR THE PROJECT, AN HDPE MEMBRANE LINER IS RECOMMENDED WITH THE SYSTEM. THE IMPERMEABLE LINER IS INTENDED TO HELP PROTECT THE SYSTEM FROM THE POTENTIAL ADVERSE EFFECTS THAT MAY RESULT FROM A CHANGE IN THE SURROUNDING ENVIRONMENT OVER A PERIOD OF TIME. PLEASE REFER TO THE CORRUGATED METAL PIPE DETENTION DESIGN GUIDE FOR ADDITIONAL INFORMATION.

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DATE	REVISION DESCRIPTION	BY

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www.ContechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CONTECH CMP DETENTION SYSTEMS

CONTECH
DYODS
DRAWING

DYO40560 double butte
cmp detention
Sun City, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
27750	40560	11/6/2023
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		

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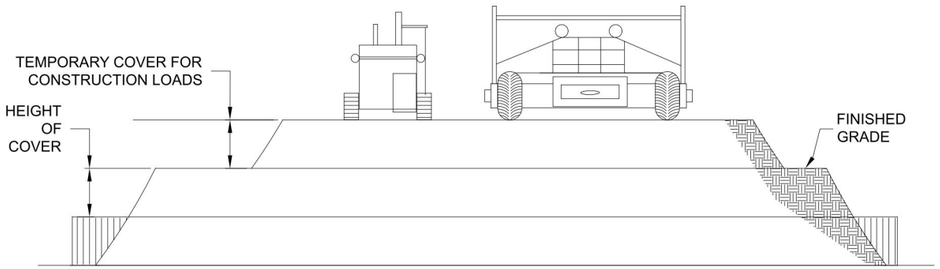


CONSTRUCTION LOADS

FOR TEMPORARY CONSTRUCTION VEHICLE LOADS, AN EXTRA AMOUNT OF COMPACTED COVER MAY BE REQUIRED OVER THE TOP OF THE PIPE. THE HEIGHT-OF-COVER SHALL MEET THE MINIMUM REQUIREMENTS SHOWN IN THE TABLE BELOW. THE USE OF HEAVY CONSTRUCTION EQUIPMENT NECESSITATES GREATER PROTECTION FOR THE PIPE THAN FINISHED GRADE COVER MINIMUMS FOR NORMAL HIGHWAY TRAFFIC.

PIPE SPAN, INCHES	AXLE LOADS (kips)			
	18-50	50-75	75-110	110-150
	MINIMUM COVER (FT)			
12-42	2.0	2.5	3.0	3.0
48-72	3.0	3.0	3.5	4.0
78-120	3.0	3.5	4.0	4.0
126-144	3.5	4.0	4.5	4.5

*MINIMUM COVER MAY VARY, DEPENDING ON LOCAL CONDITIONS. THE CONTRACTOR MUST PROVIDE THE ADDITIONAL COVER REQUIRED TO AVOID DAMAGE TO THE PIPE. MINIMUM COVER IS MEASURED FROM THE TOP OF THE PIPE TO THE TOP OF THE MAINTAINED CONSTRUCTION ROADWAY SURFACE.

CONSTRUCTION LOADING DIAGRAM

SCALE: N.T.S.

SPECIFICATION FOR DESIGNED DETENTION SYSTEM:

SCOPE
THIS SPECIFICATION COVERS THE MANUFACTURE AND INSTALLATION OF THE DESIGNED DETENTION SYSTEM DETAILED IN THE PROJECT PLANS.

MATERIAL
THE MATERIAL SHALL CONFORM TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2 STEEL COILS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-274 OR ASTM A-92.

THE GALVANIZED STEEL COILS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-218 OR ASTM A-929.

THE POLYMER COATED STEEL COILS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-246 OR ASTM A-742.

THE ALUMINUM COILS SHALL CONFORM TO THE APPLICABLE OF AASHTO M-197 OR ASTM B-744.

CONSTRUCTION LOADS
CONSTRUCTION LOADS MAY BE HIGHER THAN FINAL LOADS. FOLLOW THE MANUFACTURER'S OR NCSPA GUIDELINES.

PIPE
THE PIPE SHALL BE MANUFACTURED IN ACCORDANCE TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2: AASHTO M-36 OR ASTM A-760

GALVANIZED: AASHTO M-36 OR ASTM A-760

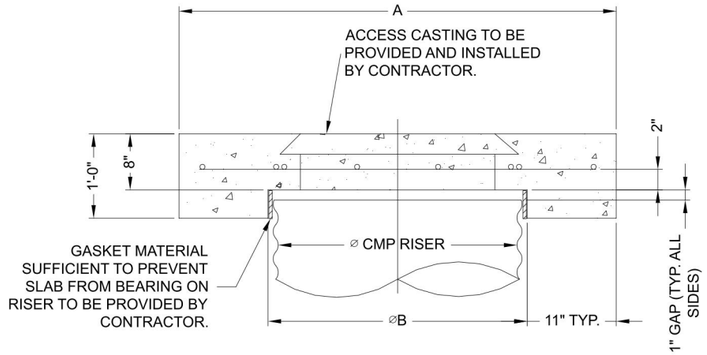
APPLICABLE POLYMER COATED: AASHTO M-245 OR ASTM A-762

ALUMINUM: AASHTO M-196 OR ASTM B-745

APPLICABLE
HANDLING AND ASSEMBLY
SHALL BE IN ACCORDANCE WITH NCSP'S (NATIONAL CORRUGATED STEEL PIPE ASSOCIATION) FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL. SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS FOR ALUMINUM PIPE.
REQUIREMENTS
INSTALLATION
SHALL BE IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, SECTION 26, DIVISION II DIVISION II OR ASTM A-798 (FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL) OR ASTM B-788 (FOR ALUMINUM PIPE) AND IN CONFORMANCE WITH THE PROJECT PLANS AND SPECIFICATIONS. IF THERE ARE ANY INCONSISTENCIES OR CONFLICTS THE CONTRACTOR SHOULD DISCUSS AND RESOLVE WITH THE SITE ENGINEER.

IT IS ALWAYS THE RESPONSIBILITY OF THE CONTRACTOR TO FOLLOW OSHA GUIDELINES FOR SAFE PRACTICES.

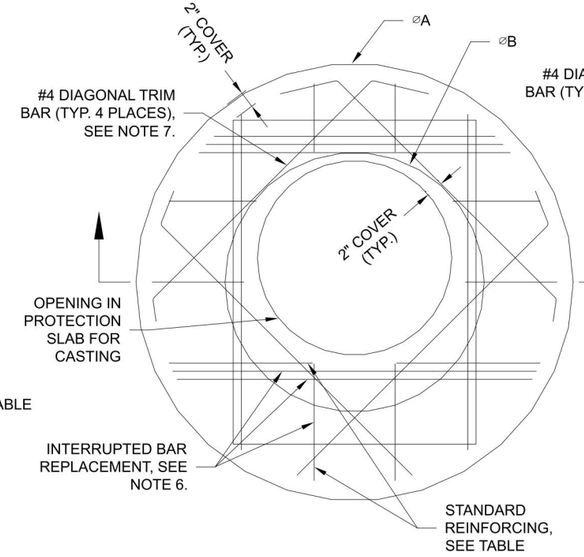
NOTE:
THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES AND DO NOT REFLECT ANY LOCAL PREFERENCES OR REGULATIONS. PLEASE CONTACT YOUR LOCAL CONTECH REP FOR MODIFICATIONS.



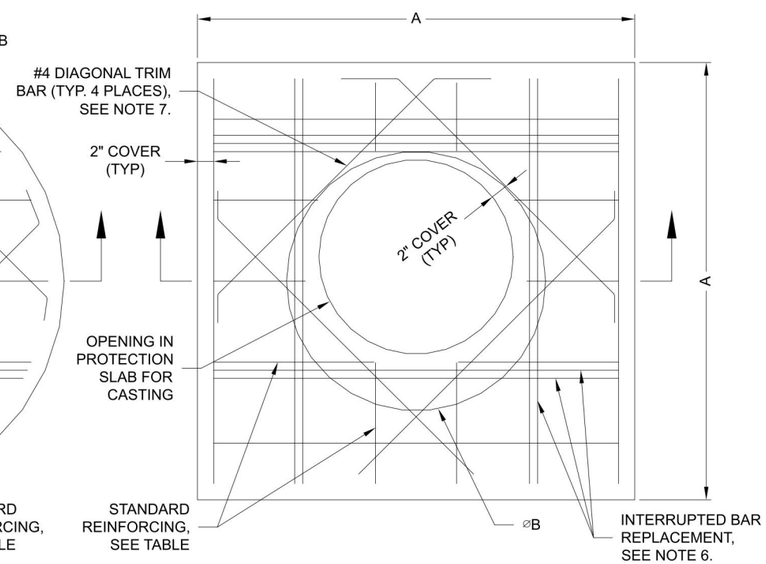
SECTION VIEW

REINFORCING TABLE				
⌀ CMP RISER	A	⌀ B	REINFORCING	**BEARING PRESSURE (PSF)
24"	⌀ 4' 4'X4'	26"	#5 @ 12" OCEW #5 @ 12" OCEW	2,410 1,780
30"	⌀ 4'-6" 4'-6" X 4'-6"	32"	#5 @ 12" OCEW #5 @ 12" OCEW	2,120 1,530
36"	⌀ 5' 5' X 5'	38"	#5 @ 10" OCEW #5 @ 10" OCEW	1,890 1,350
42"	⌀ 5'-6" 5'-6" X 5'-6"	44"	#5 @ 10" OCEW #5 @ 9" OCEW	1,720 1,210
48"	⌀ 6' 6' X 6'	50"	#5 @ 9" OCEW #5 @ 8" OCEW	1,600 1,100

** ASSUMED SOIL BEARING CAPACITY



ROUND OPTION PLAN VIEW



SQUARE OPTION PLAN VIEW

NOTES:

1. DESIGN IN ACCORDANCE WITH AASHTO, 17th EDITION.
2. DESIGN LOAD HS25.
3. EARTH COVER = 1' MAX.
4. CONCRETE STRENGTH = 3,500 psi
5. REINFORCING STEEL = ASTM A615, GRADE 60.
6. PROVIDE ADDITIONAL REINFORCING AROUND OPENINGS EQUAL TO THE BARS INTERRUPTED, HALF EACH SIDE. ADDITIONAL BARS TO BE IN THE SAME PLANE.
7. TRIM OPENING WITH DIAGONAL #4 BARS, EXTEND BARS A MINIMUM OF 12" BEYOND OPENING, BEND BARS AS REQUIRED TO MAINTAIN BAR COVER.
8. PROTECTION SLAB AND ALL MATERIALS TO BE PROVIDED AND INSTALLED BY CONTRACTOR.
9. DETAIL DESIGN BY DELTA ENGINEERING, BINGHAMTON, NY.

MANHOLE CAP DETAIL

SCALE: N.T.S.

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CONTECH CMP DETENTION SYSTEMS
CONTECH DYODS DRAWING

DYO40560 double butte
cmp detention
Sun City, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
27750	40560	11/6/2023
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		

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Appendix 7: Hydromodification

Supporting Detail Relating to Hydrologic Conditions of Concern

```
**************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-2011 Advanced Engineering Software (aes)
                    (Rational Tabling Version 18.0)
                Release Date: 07/01/2011  License ID 1499

                         Analysis prepared by:
```

```
 ************************* DESCRIPTION OF STUDY *************************
* DOUBLE BUTTE                                                          *
* EXISTING CONDITION                                                    *
* 2-YEAR                                                                *
 ************************************************************************

  FILE NAME: DB2EX.DAT
  TIME/DATE OF STUDY: 10:55 06/07/2023
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   8.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  1.870
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.900
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  3.310
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.590
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.4081456
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.4092145
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =    2.00   1-HOUR INTENSITY(INCH/HOUR) =   0.418
  SLOPE OF INTENSITY DURATION CURVE = 0.4081
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
        AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
```

```
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH GOOD COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  UPSTREAM ELEVATION(FEET) =   1455.65
  DOWNSTREAM ELEVATION(FEET) =   1450.79
  ELEVATION DIFFERENCE(FEET) =      4.86
  TC = 0.937*[(  300.00**3)/(     4.86)]**.2 =   20.935
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  0.642
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .4656
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.59
  TOTAL AREA(ACRES) =      1.98   TOTAL RUNOFF(CFS) =      0.59

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1450.79  DOWNSTREAM(FEET) =   1445.63
  CHANNEL LENGTH THRU SUBAREA(FEET) =   963.50   CHANNEL SLOPE =  0.0054
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.59
  FLOW VELOCITY(FEET/SEC) =   1.10 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =  14.63   Tc(MIN.) =   35.56
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =    1263.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  0.517
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .4170
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =   28.14   SUBAREA RUNOFF(CFS) =    6.07
  TOTAL AREA(ACRES) =       30.1   TOTAL RUNOFF(CFS) =       6.66
  TC(MIN.) =   35.56
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       30.1  TC(MIN.) =     35.56
  PEAK FLOW RATE(CFS)   =       6.66
```

==========
==========
END OF RATIONAL METHOD ANALYSIS

```
******************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-2011 Advanced Engineering Software (aes)
                    (Rational Tabling Version 18.0)
                Release Date: 07/01/2011  License ID 1499

                          Analysis prepared by:
```

```
 ************************* DESCRIPTION OF STUDY *************************
* DOUBLE BUTTE                                                          *
* PROPOSED CONDITION                                                    *
* 2-YEAR                                                                *
 ************************************************************************

  FILE NAME: DB2PR.DAT
  TIME/DATE OF STUDY: 08:22 06/07/2023
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   8.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  1.870
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.900
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  3.310
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.590
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.4081456
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.4092145
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =    2.00   1-HOUR INTENSITY(INCH/HOUR) =   0.418
  SLOPE OF INTENSITY DURATION CURVE = 0.4081
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
        AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
```

```
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS SINGLE FAMILY(1-ACRE LOTS)
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  UPSTREAM ELEVATION(FEET) =   1455.96
  DOWNSTREAM ELEVATION(FEET) =   1453.10
  ELEVATION DIFFERENCE(FEET) =      2.86
  TC = 0.469*[(  300.00**3)/(     2.86)]**.2 =   11.653
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  0.815
  SINGLE-FAMILY(1-ACRE LOT) RUNOFF COEFFICIENT = .5951
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      1.04
  TOTAL AREA(ACRES) =      2.14   TOTAL RUNOFF(CFS) =      1.04

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1453.10  DOWNSTREAM(FEET) =   1445.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1270.00   CHANNEL SLOPE =  0.0064
  CHANNEL FLOW THRU SUBAREA(CFS) =       1.04
  FLOW VELOCITY(FEET/SEC) =   1.21 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =  17.54   Tc(MIN.) =   29.20
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =    1570.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  0.560
  SINGLE-FAMILY(1/2 ACRE LOT) RUNOFF COEFFICIENT = .6210
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =   27.99   SUBAREA RUNOFF(CFS) =    9.74
  TOTAL AREA(ACRES) =       30.1   TOTAL RUNOFF(CFS) =      10.78
  TC(MIN.) =   29.20
============================================================================
```

```
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       30.1  TC(MIN.) =     29.20
  PEAK FLOW RATE(CFS)   =      10.78
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Synthetic Unit Hydrograph Method
Loss Rate Estimates

100-year
Existing Conditions

Drainage Area	Soil Group	Cover Type	Curve (RI) Number	Pervious Area Infiltration Rate (in/hr)	Land Use	Decimal Percent of Impervious Area	Adj Infiltration Rate (in/hr)	Subarea (acres)	Total Area (acres)	Subarea/Total Area	Avg Adjusted Infiltration Rate (in/hr)**	Min Loss Rate (inch/hr)	Low Loss Developed Condition = 0.9 - (0.8 x % Impervious) = *
A	C	Grass, Good Cover	88	0.06	Undeveloped	0.00	0.06	30.12	30.12	1.00	0.06	0.03	0.90

100-year
Proposed Conditions

Drainage Area	Soil Group	Cover Type	Curve (RI) Number	Pervious Area Infiltration Rate (in/hr)	Land Use	Decimal Percent of Impervious Area	Adj Infiltration Rate (in/hr)	Subarea (acres)	Total Area (acres)	Subarea/Total Area	Avg Adjusted Infiltration Rate (in/hr)**	Min Loss Rate (inch/hr)	Low Loss Developed Condition = 0.9 - (0.8 x % Impervious) = *
A	C	Grass, Good Cover	88	0.06	BESS Facility	0.30	0.04	22.86	22.86	1.00	0.04	0.02	0.66
B	C	Grass, Good Cover	88	0.06	Public Road	0.61	0.03	1.88	1.88	1.00	0.03	0.01	0.41
C	C	Grass, Good Cover	88	0.06	BESS Facility	1.00	0.01	0.89	0.89	1.00	0.01	0.00	0.10
D	C	Grass, Good Cover	88	0.06	Public Road	0.07	0.06	2.48	2.48	1.00	0.06	0.03	0.84

*Minimum low loss value in AES is 0.5; therefore, 0.5 was used for the study.

**Minimum value in AES is 0.05; therefore, 0.05 was used for the study for areas with a value less than 0.05.

```
**************************************************************************

              F L O O D    R O U T I N G    A N A L Y S I S

ACCORDING TO RIVERSIDE COUNTY FLOOD CONTORL AND WATER CONSERVATION DISTRICT
                    (RCFC&WCD) 1978 HYDROLOGY MANUAL
          (c) Copyright 1989-2011 Advanced Engineering Software (aes)
                  (Synthetic Unit Hydrograph Version 18.0)
                 Release Date: 05/01/2011  License ID 1499

                          Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* DOUBLE BUTTE                                                          *
* EXISTING CONDITION                                                    *
* 2 YR HYDROGRAPH                                                       *
 ************************************************************************

  FILE NAME: DB2EX2UH.DAT
  TIME/DATE OF STUDY: 11:18 06/08/2023


**************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    102.00 IS CODE =   1
--------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
==========================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =      30.120 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.590 HOURS
         VALLEY S-GRAPH SELECTED
         UNIFORM MEAN SOIL-LOSS(INCH/HOUR) =  0.060
         LOW SOIL-LOSS RATE PERCENT(DECIMAL) = 0.900
         MINIMUM SOIL-LOSS RATE(INCH/HOUR) =   0.030
         USER-ENTERED RAINFALL =  2.06 INCHES
         RCFC&WCD 24-Hour Storm (15-Minute period) SELECTED
         *USER SPECIFIED PRECIPITATION DEPTH-AREA ADJUSTMENT FACTOR = 1.0000


         UNIT HYDROGRAPH TIME UNIT =  15.000 MINUTES
         UNIT INTERVAL PERCENTAGE OF LAG-TIME =  42.373



==========================================================================
                      UNIT HYDROGRAPH DETERMINATION

--------------------------------------------------------------------------
    INTERVAL          "S" GRAPH          UNIT HYDROGRAPH
     NUMBER          MEAN VALUES          ORDINATES(CFS)
--------------------------------------------------------------------------
```

1	4.642	5.637
2	24.169	23.709
3	52.484	34.381
4	68.438	19.371
5	76.597	9.908
6	81.865	6.397
7	85.688	4.642
8	88.521	3.440
9	90.796	2.762
10	92.610	2.203
11	94.121	1.834
12	95.391	1.542
13	96.421	1.250
14	97.243	0.999
15	97.979	0.893
16	98.328	0.424
17	98.633	0.369
18	98.937	0.369
19	99.241	0.369
20	99.545	0.369
21	99.849	0.369
22	100.000	0.183

TOTAL STORM RAINFALL(INCHES) = 2.06
TOTAL SOIL-LOSS(INCHES) = 1.00
TOTAL EFFECTIVE RAINFALL(INCHES) = 1.06

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 2.5052
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 2.6641

==========

2 4 - H O U R S T O R M
R U N O F F H Y D R O G R A P H

==========

HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0.	2.5	5.0	7.5	10.0
0.083	0.0000	0.00	Q	.	.	.	.
0.167	0.0000	0.00	Q	.	.	.	.
0.250	0.0000	0.00	Q	.	.	.	.
0.333	0.0001	0.01	Q	.	.	.	.
0.417	0.0002	0.01	Q	.	.	.	.
0.500	0.0003	0.01	Q	.	.	.	.
0.583	0.0005	0.03	Q	.	.	.	.
0.667	0.0008	0.03	Q	.	.	.	.
0.750	0.0010	0.03	Q	.	.	.	.
0.833	0.0013	0.05	Q	.	.	.	.
0.917	0.0017	0.05	Q	.	.	.	.
1.000	0.0020	0.05	Q	.	.	.	.
1.083	0.0024	0.06	Q	.	.	.	.
1.167	0.0028	0.06	Q	.	.	.	.
1.250	0.0032	0.06	Q	.	.	.	.
1.333	0.0037	0.07	Q	.	.	.	.
1.417	0.0042	0.07	Q	.	.	.	.
1.500	0.0046	0.07	Q	.	.	.	.
1.583	0.0051	0.07	Q	.	.	.	.
1.667	0.0056	0.07	Q	.	.	.	.
1.750	0.0060	0.07	Q	.	.	.	.
1.833	0.0065	0.07	Q	.	.	.	.
1.917	0.0070	0.07	Q	.	.	.	.
2.000	0.0074	0.07	Q	.	.	.	.
2.083	0.0080	0.07	Q	.	.	.	.
2.167	0.0085	0.07	Q	.	.	.	.
2.250	0.0090	0.07	Q	.	.	.	.
2.333	0.0096	0.08	Q	.	.	.	.
2.417	0.0101	0.08	Q	.	.	.	.
2.500	0.0107	0.08	Q	.	.	.	.
2.583	0.0113	0.09	Q	.	.	.	.
2.667	0.0119	0.09	Q	.	.	.	.
2.750	0.0126	0.09	Q	.	.	.	.
2.833	0.0132	0.10	Q	.	.	.	.
2.917	0.0139	0.10	Q	.	.	.	.
3.000	0.0146	0.10	Q	.	.	.	.
3.083	0.0153	0.11	Q	.	.	.	.
3.167	0.0160	0.11	Q	.	.	.	.
3.250	0.0167	0.11	Q	.	.	.	.
3.333	0.0175	0.11	Q	.	.	.	.
3.417	0.0183	0.11	Q	.	.	.	.
3.500	0.0191	0.11	Q	.	.	.	.
3.583	0.0198	0.11	Q	.	.	.	.
3.667	0.0206	0.11	Q	.	.	.	.
3.750	0.0214	0.11	Q	.	.	.	.
3.833	0.0222	0.12	Q	.	.	.	.
3.917	0.0231	0.12	Q	.	.	.	.
4.000	0.0239	0.12	Q	.	.	.	.

4.083	0.0247	0.12	Q	.	.	.	.
4.167	0.0256	0.12	Q	.	.	.	.
4.250	0.0265	0.12	Q	.	.	.	.
4.333	0.0274	0.13	Q	.	.	.	.
4.417	0.0283	0.13	Q	.	.	.	.
4.500	0.0292	0.13	Q	.	.	.	.
4.583	0.0302	0.14	Q	.	.	.	.
4.667	0.0312	0.14	Q	.	.	.	.
4.750	0.0322	0.14	Q	.	.	.	.
4.833	0.0333	0.16	Q	.	.	.	.
4.917	0.0343	0.16	Q	.	.	.	.
5.000	0.0354	0.16	Q	.	.	.	.
5.083	0.0366	0.16	Q	.	.	.	.
5.167	0.0377	0.16	Q	.	.	.	.
5.250	0.0388	0.16	Q	.	.	.	.
5.333	0.0400	0.17	Q	.	.	.	.
5.417	0.0411	0.17	Q	.	.	.	.
5.500	0.0422	0.17	Q	.	.	.	.
5.583	0.0434	0.16	Q	.	.	.	.
5.667	0.0445	0.16	Q	.	.	.	.
5.750	0.0456	0.16	Q	.	.	.	.
5.833	0.0468	0.17	Q	.	.	.	.
5.917	0.0480	0.17	Q	.	.	.	.
6.000	0.0492	0.17	Q	.	.	.	.
6.083	0.0505	0.18	Q	.	.	.	.
6.167	0.0517	0.18	Q	.	.	.	.
6.250	0.0530	0.18	Q	.	.	.	.
6.333	0.0543	0.19	Q	.	.	.	.
6.417	0.0557	0.19	Q	.	.	.	.
6.500	0.0570	0.19	Q	.	.	.	.
6.583	0.0584	0.20	Q	.	.	.	.
6.667	0.0598	0.20	Q	.	.	.	.
6.750	0.0612	0.20	Q	.	.	.	.
6.833	0.0627	0.22	Q	.	.	.	.
6.917	0.0642	0.22	Q	.	.	.	.
7.000	0.0657	0.22	Q	.	.	.	.
7.083	0.0672	0.23	QV	.	.	.	.
7.167	0.0688	0.23	QV	.	.	.	.
7.250	0.0704	0.23	QV	.	.	.	.
7.333	0.0721	0.25	QV	.	.	.	.
7.417	0.0738	0.25	QV	.	.	.	.
7.500	0.0754	0.25	QV	.	.	.	.
7.583	0.0776	0.32	.Q	.	.	.	.
7.667	0.0798	0.32	.Q	.	.	.	.
7.750	0.0820	0.32	.Q	.	.	.	.
7.833	0.0852	0.47	.Q	.	.	.	.
7.917	0.0884	0.47	.Q	.	.	.	.
8.000	0.0916	0.47	.Q	.	.	.	.
8.083	0.0962	0.67	.VQ	.	.	.	.
8.167	0.1008	0.67	.VQ	.	.	.	.
8.250	0.1054	0.67	.VQ	.	.	.	.
8.333	0.1118	0.92	.V Q	.	.	.	.
8.417	0.1182	0.92	.V Q	.	.	.	.
8.500	0.1245	0.92	.V Q	.	.	.	.
8.583	0.1326	1.18	.V Q	.	.	.	.
8.667	0.1407	1.18	. V Q	.	.	.	.
8.750	0.1488	1.18	. V Q	.	.	.	.
8.833	0.1583	1.39	. V Q	.	.	.	.
8.917	0.1679	1.39	. V Q	.	.	.	.
9.000	0.1774	1.39	. V Q	.	.	.	.

9.083	0.1886	1.63	. V Q . . . .
9.167	0.1998	1.63	. V Q . . . .
9.250	0.2110	1.63	. V Q . . . .
9.333	0.2243	1.92	. V Q . . . .
9.417	0.2375	1.92	. V Q . . . .
9.500	0.2507	1.92	. V Q . . . .
9.583	0.2662	2.25	. V Q . . . .
9.667	0.2817	2.25	. V Q . . . .
9.750	0.2972	2.25	. V Q . . . .
9.833	0.3147	2.55	. V Q . . . .
9.917	0.3323	2.55	. V Q . . . .
10.000	0.3498	2.55	. V Q . . . .
10.083	0.3687	2.74	. V Q . . . .
10.167	0.3876	2.74	. V Q . . . .
10.250	0.4065	2.74	. V Q . . . .
10.333	0.4245	2.62	. V Q . . . .
10.417	0.4426	2.62	. V Q . . . .
10.500	0.4606	2.62	. V Q . . . .
10.583	0.4766	2.33	. V Q. . . . .
10.667	0.4927	2.33	. V Q. . . . .
10.750	0.5087	2.33	. V Q. . . . .
10.833	0.5253	2.40	. V Q. . . . .
10.917	0.5418	2.40	. VQ. . . . .
11.000	0.5584	2.40	. VQ. . . . .
11.083	0.5769	2.69	. V Q . . . .
11.167	0.5954	2.69	. V Q . . . .
11.250	0.6140	2.69	. VQ . . . .
11.333	0.6334	2.82	. V.Q . . . .
11.417	0.6528	2.82	. V.Q . . . .
11.500	0.6722	2.82	. VQ . . . .
11.583	0.6917	2.83	. VQ . . . .
11.667	0.7112	2.83	. VQ . . . .
11.750	0.7306	2.83	. VQ . . . .
11.833	0.7497	2.77	. .Q . . . .
11.917	0.7688	2.77	. .Q . . . .
12.000	0.7879	2.77	. .Q . . . .
12.083	0.8072	2.80	. .QV . . . .
12.167	0.8265	2.80	. .QV . . . .
12.250	0.8457	2.80	. .QV . . . .
12.333	0.8676	3.18	. . QV . . . .
12.417	0.8895	3.18	. . QV . . . .
12.500	0.9114	3.18	. . QV . . . .
12.583	0.9375	3.78	. . VQ . . . .
12.667	0.9635	3.78	. . VQ . . . .
12.750	0.9896	3.78	. . VQ . . . .
12.833	1.0190	4.27	. . V Q . . . .
12.917	1.0484	4.27	. . V Q . . . .
13.000	1.0777	4.27	. . VQ . . . .
13.083	1.1103	4.72	. . V Q . . . .
13.167	1.1428	4.72	. . VQ . . . .
13.250	1.1753	4.72	. . VQ . . . .
13.333	1.2115	5.26	. . V .Q . . .
13.417	1.2477	5.26	. . V .Q . . .
13.500	1.2839	5.26	. . V.Q . . .
13.583	1.3229	5.66	. . V. Q . . .
13.667	1.3619	5.66	. . V Q . . .
13.750	1.4009	5.66	. . VQ . . .
13.833	1.4385	5.46	. . .Q . . .
13.917	1.4762	5.46	. . .QV . . .
14.000	1.5138	5.46	. . .QV . . .

14.083	1.5477	4.94	. . Q. V . .
14.167	1.5817	4.94	. . Q. V . .
14.250	1.6157	4.94	. . Q. V . .
14.333	1.6490	4.83	. . Q. V . .
14.417	1.6822	4.83	. . Q. V . .
14.500	1.7155	4.83	. . Q. V . .
14.583	1.7496	4.96	. . Q. V . .
14.667	1.7838	4.96	. . Q. V . .
14.750	1.8179	4.96	. . Q. V . .
14.833	1.8522	4.99	. . Q. V . .
14.917	1.8866	4.99	. . Q. V . .
15.000	1.9209	4.99	. . Q. V . .
15.083	1.9549	4.94	. . Q. V. .
15.167	1.9890	4.94	. . Q. V. .
15.250	2.0230	4.94	. . Q. V .
15.333	2.0563	4.84	. . Q. V .
15.417	2.0897	4.84	. . Q. V .
15.500	2.1230	4.84	. . Q. V .
15.583	2.1551	4.66	. . Q . . V .
15.667	2.1872	4.66	. . Q . . V .
15.750	2.2193	4.66	. . Q . . V .
15.833	2.2493	4.36	. . Q . . V .
15.917	2.2793	4.36	. . Q . . V .
16.000	2.3093	4.36	. . Q . . V .
16.083	2.3360	3.87	. . Q . . V .
16.167	2.3626	3.87	. . Q . . V .
16.250	2.3892	3.87	. . Q . . V .
16.333	2.4101	3.03	. . Q . . V .
16.417	2.4309	3.03	. . Q . . V .
16.500	2.4518	3.03	. . Q . . V .
16.583	2.4655	1.99	. Q . . . V .
16.667	2.4792	1.99	. Q . . . V .
16.750	2.4929	1.99	. Q . . . V .
16.833	2.5025	1.39	. Q . . . V .
16.917	2.5120	1.39	. Q . . . V .
17.000	2.5216	1.39	. Q . . . V .
17.083	2.5289	1.06	. Q . . . V .
17.167	2.5362	1.06	. Q . . . V .
17.250	2.5435	1.06	. Q . . . V .
17.333	2.5494	0.86	. Q . . . V .
17.417	2.5554	0.86	. Q . . . V .
17.500	2.5613	0.86	. Q . . . V .
17.583	2.5663	0.72	. Q . . . V .
17.667	2.5712	0.72	. Q . . . V .
17.750	2.5762	0.72	. Q . . . V .
17.833	2.5803	0.60	. Q . . . V .
17.917	2.5845	0.60	. Q . . . V .
18.000	2.5886	0.60	. Q . . . V .
18.083	2.5921	0.50	. Q . . . V .
18.167	2.5956	0.50	. Q . . . V .
18.250	2.5991	0.50	. Q . . . V.
18.333	2.6019	0.42	.Q . . . V.
18.417	2.6048	0.42	.Q . . . V.
18.500	2.6077	0.42	.Q . . . V.
18.583	2.6100	0.34	.Q . . . V.
18.667	2.6124	0.34	.Q . . . V.
18.750	2.6148	0.34	.Q . . . V.
18.833	2.6167	0.28	.Q . . . V.
18.917	2.6187	0.28	.Q . . . V.
19.000	2.6206	0.28	.Q . . . V.

19.083	2.6222	0.23	Q	.	.	.	V.
19.167	2.6238	0.23	Q	.	.	.	V.
19.250	2.6253	0.23	Q	.	.	.	V.
19.333	2.6267	0.19	Q	.	.	.	V.
19.417	2.6280	0.19	Q	.	.	.	V.
19.500	2.6293	0.19	Q	.	.	.	V.
19.583	2.6305	0.17	Q	.	.	.	V.
19.667	2.6316	0.17	Q	.	.	.	V.
19.750	2.6328	0.17	Q	.	.	.	V.
19.833	2.6338	0.15	Q	.	.	.	V.
19.917	2.6349	0.15	Q	.	.	.	V.
20.000	2.6359	0.15	Q	.	.	.	V.
20.083	2.6368	0.13	Q	.	.	.	V.
20.167	2.6377	0.13	Q	.	.	.	V.
20.250	2.6386	0.13	Q	.	.	.	V.
20.333	2.6394	0.11	Q	.	.	.	V.
20.417	2.6402	0.11	Q	.	.	.	V.
20.500	2.6410	0.11	Q	.	.	.	V.
20.583	2.6417	0.10	Q	.	.	.	V.
20.667	2.6424	0.10	Q	.	.	.	V.
20.750	2.6430	0.10	Q	.	.	.	V.
20.833	2.6437	0.09	Q	.	.	.	V.
20.917	2.6443	0.09	Q	.	.	.	V.
21.000	2.6449	0.09	Q	.	.	.	V.
21.083	2.6454	0.08	Q	.	.	.	V.
21.167	2.6459	0.08	Q	.	.	.	V.
21.250	2.6465	0.08	Q	.	.	.	V.
21.333	2.6469	0.07	Q	.	.	.	V.
21.417	2.6474	0.07	Q	.	.	.	V.
21.500	2.6479	0.07	Q	.	.	.	V.
21.583	2.6483	0.07	Q	.	.	.	V.
21.667	2.6488	0.07	Q	.	.	.	V.
21.750	2.6492	0.07	Q	.	.	.	V.
21.833	2.6497	0.07	Q	.	.	.	V.
21.917	2.6501	0.07	Q	.	.	.	V.
22.000	2.6506	0.07	Q	.	.	.	V.
22.083	2.6510	0.07	Q	.	.	.	V.
22.167	2.6515	0.07	Q	.	.	.	V.
22.250	2.6519	0.07	Q	.	.	.	V.
22.333	2.6524	0.06	Q	.	.	.	V.
22.417	2.6528	0.06	Q	.	.	.	V.
22.500	2.6532	0.06	Q	.	.	.	V.
22.583	2.6537	0.06	Q	.	.	.	V.
22.667	2.6541	0.06	Q	.	.	.	V.
22.750	2.6545	0.06	Q	.	.	.	V.
22.833	2.6550	0.06	Q	.	.	.	V.
22.917	2.6554	0.06	Q	.	.	.	V.
23.000	2.6558	0.06	Q	.	.	.	V.
23.083	2.6561	0.06	Q	.	.	.	V.
23.166	2.6565	0.06	Q	.	.	.	V.
23.250	2.6569	0.06	Q	.	.	.	V.
23.333	2.6573	0.05	Q	.	.	.	V.
23.416	2.6576	0.05	Q	.	.	.	V.
23.500	2.6580	0.05	Q	.	.	.	V.
23.583	2.6584	0.05	Q	.	.	.	V.
23.666	2.6587	0.05	Q	.	.	.	V.
23.750	2.6591	0.05	Q	.	.	.	V.
23.833	2.6595	0.05	Q	.	.	.	V.
23.916	2.6598	0.05	Q	.	.	.	V.
24.000	2.6602	0.05	Q	.	.	.	V.

24.083	2.6605	0.05	Q	.	.	.	V.
24.166	2.6609	0.05	Q	.	.	.	V.
24.250	2.6612	0.05	Q	.	.	.	V.
24.333	2.6615	0.04	Q	.	.	.	V.
24.416	2.6618	0.04	Q	.	.	.	V.
24.500	2.6620	0.04	Q	.	.	.	V.
24.583	2.6622	0.02	Q	.	.	.	V.
24.666	2.6624	0.02	Q	.	.	.	V.
24.750	2.6625	0.02	Q	.	.	.	V.
24.833	2.6627	0.02	Q	.	.	.	V.
24.916	2.6628	0.02	Q	.	.	.	V.
25.000	2.6629	0.02	Q	.	.	.	V.
25.083	2.6630	0.01	Q	.	.	.	V.
25.166	2.6631	0.01	Q	.	.	.	V.
25.250	2.6631	0.01	Q	.	.	.	V.
25.333	2.6632	0.01	Q	.	.	.	V.
25.416	2.6633	0.01	Q	.	.	.	V.
25.500	2.6633	0.01	Q	.	.	.	V.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1530.0
10%	600.0
20%	510.0
30%	450.0
40%	405.0
50%	255.0
60%	225.0
70%	195.0
80%	165.0
90%	45.0

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END OF FLOODSCx ROUTING ANALYSIS

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              F L O O D   R O U T I N G   A N A L Y S I S

ACCORDING TO RIVERSIDE COUNTY FLOOD CONTORL AND WATER CONSERVATION DISTRICT
                    (RCFC&WCD) 1978 HYDROLOGY MANUAL
         (c) Copyright 1989-2011 Advanced Engineering Software (aes)
                 (Synthetic Unit Hydrograph Version 18.0)
                 Release Date: 05/01/2011  License ID 1499

                           Analysis prepared by:




 ************************** DESCRIPTION OF STUDY **************************
* DOUBLE BUTTE                                                             *
* PROPOSED CONDITION                                                       *
* 2 YR HYDROGRAPH                                                          *
 **************************************************************************

  FILE NAME: DB2PRUH.DAT
  TIME/DATE OF STUDY: 11:44 06/08/2023


****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    102.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
============================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =      30.120 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.490 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         VALLEY S-GRAPH SELECTED
         UNIFORM MEAN SOIL-LOSS(INCH/HOUR) =  0.050
         LOW SOIL-LOSS RATE PERCENT(DECIMAL) = 0.680
         MINIMUM SOIL-LOSS RATE(INCH/HOUR) =   0.025
         USER-ENTERED RAINFALL =  2.06 INCHES
         RCFC&WCD 24-Hour Storm (15-Minute period) SELECTED
         *USER SPECIFIED PRECIPITATION DEPTH-AREA ADJUSTMENT FACTOR = 1.0000


         UNIT HYDROGRAPH TIME UNIT =  15.000 MINUTES
         UNIT INTERVAL PERCENTAGE OF LAG-TIME =  51.020



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                      UNIT HYDROGRAPH DETERMINATION

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INTERVAL NUMBER	"S" GRAPH MEAN VALUES	UNIT HYDROGRAPH ORDINATES(CFS)
1	6.140	7.456
2	33.136	32.778
3	62.036	35.091
4	74.596	15.251
5	81.475	8.352
6	86.066	5.575
7	89.307	3.936
8	91.799	3.025
9	93.738	2.355
10	95.314	1.913
11	96.538	1.486
12	97.529	1.203
13	98.192	0.806
14	98.558	0.445
15	98.924	0.445
16	99.290	0.445
17	99.657	0.445
18	100.000	0.417

TOTAL STORM RAINFALL(INCHES) = 2.06
TOTAL SOIL-LOSS(INCHES) = 0.79
TOTAL EFFECTIVE RAINFALL(INCHES) = 1.27

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 1.9917
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 3.1772

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2 4 - H O U R S T O R M
R U N O F F H Y D R O G R A P H

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HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0.	2.5	5.0	7.5	10.0
0.083	0.0001	0.01	Q	.	.	.	.
0.167	0.0001	0.01	Q	.	.	.	.
0.250	0.0002	0.01	Q	.	.	.	.
0.333	0.0006	0.06	Q	.	.	.	.
0.417	0.0010	0.06	Q	.	.	.	.
0.500	0.0014	0.06	Q	.	.	.	.
0.583	0.0023	0.13	Q	.	.	.	.
0.667	0.0031	0.13	Q	.	.	.	.
0.750	0.0040	0.13	Q	.	.	.	.
0.833	0.0052	0.17	Q	.	.	.	.
0.917	0.0064	0.17	Q	.	.	.	.
1.000	0.0076	0.17	Q	.	.	.	.
1.083	0.0091	0.21	Q	.	.	.	.
1.167	0.0105	0.21	Q	.	.	.	.
1.250	0.0120	0.21	Q	.	.	.	.
1.333	0.0135	0.23	Q	.	.	.	.
1.417	0.0151	0.23	Q	.	.	.	.
1.500	0.0166	0.23	Q	.	.	.	.
1.583	0.0182	0.22	Q	.	.	.	.
1.667	0.0197	0.22	Q	.	.	.	.
1.750	0.0212	0.22	Q	.	.	.	.
1.833	0.0228	0.23	Q	.	.	.	.
1.917	0.0244	0.23	Q	.	.	.	.
2.000	0.0260	0.23	Q	.	.	.	.
2.083	0.0277	0.25	VQ	.	.	.	.
2.167	0.0295	0.25	VQ	.	.	.	.
2.250	0.0312	0.25	VQ	.	.	.	.
2.333	0.0331	0.28	VQ	.	.	.	.
2.417	0.0351	0.28	VQ	.	.	.	.
2.500	0.0370	0.28	VQ	.	.	.	.
2.583	0.0390	0.30	VQ	.	.	.	.
2.667	0.0411	0.30	VQ	.	.	.	.
2.750	0.0431	0.30	VQ	.	.	.	.
2.833	0.0454	0.33	VQ	.	.	.	.
2.917	0.0476	0.33	VQ	.	.	.	.
3.000	0.0499	0.33	VQ	.	.	.	.
3.083	0.0523	0.36	VQ	.	.	.	.
3.167	0.0548	0.36	VQ	.	.	.	.
3.250	0.0572	0.36	VQ	.	.	.	.
3.333	0.0597	0.37	VQ	.	.	.	.
3.417	0.0623	0.37	VQ	.	.	.	.
3.500	0.0648	0.37	VQ	.	.	.	.
3.583	0.0674	0.38	VQ	.	.	.	.
3.667	0.0700	0.38	VQ	.	.	.	.
3.750	0.0726	0.38	VQ	.	.	.	.
3.833	0.0753	0.39	VQ	.	.	.	.
3.917	0.0779	0.39	VQ	.	.	.	.
4.000	0.0806	0.39	Q	.	.	.	.

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4.083      0.0835      0.41  .Q        .         .         .         .
4.167      0.0863      0.41  .Q        .         .         .         .
4.250      0.0892      0.41  .Q        .         .         .         .
4.333      0.0922      0.45  .Q        .         .         .         .
4.417      0.0953      0.45  .Q        .         .         .         .
4.500      0.0984      0.45  .Q        .         .         .         .
4.583      0.1017      0.48  .Q        .         .         .         .
4.667      0.1050      0.48  .Q        .         .         .         .
4.750      0.1083      0.48  .Q        .         .         .         .
4.833      0.1118      0.52  .VQ       .         .         .         .
4.917      0.1154      0.52  .VQ       .         .         .         .
5.000      0.1189      0.52  .VQ       .         .         .         .
5.083      0.1226      0.54  .VQ       .         .         .         .
5.167      0.1264      0.54  .VQ       .         .         .         .
5.250      0.1301      0.54  .VQ       .         .         .         .
5.333      0.1338      0.54  .VQ       .         .         .         .
5.417      0.1375      0.54  .VQ       .         .         .         .
5.500      0.1412      0.54  .VQ       .         .         .         .
5.583      0.1448      0.53  .VQ       .         .         .         .
5.667      0.1485      0.53  .VQ       .         .         .         .
5.750      0.1522      0.53  .VQ       .         .         .         .
5.833      0.1561      0.57  .VQ       .         .         .         .
5.917      0.1600      0.57  . Q       .         .         .         .
6.000      0.1639      0.57  . Q       .         .         .         .
6.083      0.1680      0.60  . Q       .         .         .         .
6.167      0.1722      0.60  . Q       .         .         .         .
6.250      0.1763      0.60  . Q       .         .         .         .
6.333      0.1807      0.64  . Q       .         .         .         .
6.417      0.1851      0.64  . Q       .         .         .         .
6.500      0.1895      0.64  . Q       .         .         .         .
6.583      0.1941      0.67  . Q       .         .         .         .
6.667      0.1988      0.67  . Q       .         .         .         .
6.750      0.2034      0.67  . Q       .         .         .         .
6.833      0.2083      0.71  . Q       .         .         .         .
6.917      0.2132      0.71  . Q       .         .         .         .
7.000      0.2181      0.71  . Q       .         .         .         .
7.083      0.2232      0.74  . Q       .         .         .         .
7.167      0.2283      0.74  . Q       .         .         .         .
7.250      0.2335      0.74  . Q       .         .         .         .
7.333      0.2387      0.77  .  Q      .         .         .         .
7.417      0.2440      0.77  .  Q      .         .         .         .
7.500      0.2493      0.77  .  Q      .         .         .         .
7.583      0.2549      0.82  .  Q      .         .         .         .
7.667      0.2605      0.82  .  Q      .         .         .         .
7.750      0.2662      0.82  .  Q      .         .         .         .
7.833      0.2727      0.95  .  Q      .         .         .         .
7.917      0.2792      0.95  .  Q      .         .         .         .
8.000      0.2857      0.95  .  Q      .         .         .         .
8.083      0.2936      1.15  .  VQ     .         .         .         .
8.167      0.3015      1.15  .  VQ     .         .         .         .
8.250      0.3095      1.15  .  VQ     .         .         .         .
8.333      0.3192      1.42  .   VQ    .         .         .         .
8.417      0.3290      1.42  .   VQ    .         .         .         .
8.500      0.3388      1.42  .   VQ    .         .         .         .
8.583      0.3501      1.65  .   V Q   .         .         .         .
8.667      0.3615      1.65  .   V Q   .         .         .         .
8.750      0.3729      1.65  .   V Q   .         .         .         .
8.833      0.3857      1.86  .   V  Q  .         .         .         .
8.917      0.3985      1.86  .    V Q  .         .         .         .
9.000      0.4113      1.86  .    V Q  .         .         .         .
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9.083	0.4258	2.11	.	V Q	.	.	.	.
9.167	0.4403	2.11	.	V Q	.	.	.	.
9.250	0.4548	2.11	.	V Q	.	.	.	.
9.333	0.4715	2.42	.	V Q	.	.	.	.
9.417	0.4882	2.42	.	V Q	.	.	.	.
9.500	0.5049	2.42	.	V Q	.	.	.	.
9.583	0.5238	2.75	.	V .Q	.	.	.	.
9.667	0.5428	2.75	.	V .Q	.	.	.	.
9.750	0.5617	2.75	.	V .Q	.	.	.	.
9.833	0.5827	3.05	.	V . Q	.	.	.	.
9.917	0.6037	3.05	.	V . Q	.	.	.	.
10.000	0.6246	3.05	.	V . Q	.	.	.	.
10.083	0.6467	3.20	.	V . Q	.	.	.	.
10.167	0.6688	3.20	.	V . Q	.	.	.	.
10.250	0.6908	3.20	.	V . Q	.	.	.	.
10.333	0.7110	2.93	.	V .Q	.	.	.	.
10.417	0.7312	2.93	.	V.Q	.	.	.	.
10.500	0.7513	2.93	.	V.Q	.	.	.	.
10.583	0.7694	2.62	.	VQ	.	.	.	.
10.667	0.7874	2.62	.	VQ	.	.	.	.
10.750	0.8054	2.62	.	Q	.	.	.	.
10.833	0.8249	2.83	.	VQ	.	.	.	.
10.917	0.8444	2.83	.	VQ	.	.	.	.
11.000	0.8638	2.83	.	VQ	.	.	.	.
11.083	0.8853	3.12	.	.VQ	.	.	.	.
11.167	0.9068	3.12	.	.VQ	.	.	.	.
11.250	0.9283	3.12	.	.VQ	.	.	.	.
11.333	0.9503	3.19	.	.VQ	.	.	.	.
11.417	0.9723	3.19	.	. Q	.	.	.	.
11.500	0.9943	3.19	.	. Q	.	.	.	.
11.583	1.0161	3.17	.	. Q	.	.	.	.
11.667	1.0379	3.17	.	. QV	.	.	.	.
11.750	1.0597	3.17	.	. QV	.	.	.	.
11.833	1.0809	3.08	.	. QV	.	.	.	.
11.917	1.1021	3.08	.	. QV	.	.	.	.
12.000	1.1233	3.08	.	. Q V	.	.	.	.
12.083	1.1449	3.14	.	. Q V	.	.	.	.
12.167	1.1665	3.14	.	. Q V	.	.	.	.
12.250	1.1881	3.14	.	. Q V	.	.	.	.
12.333	1.2133	3.66	.	. QV	.	.	.	.
12.417	1.2385	3.66	.	. QV	.	.	.	.
12.500	1.2637	3.66	.	. QV	.	.	.	.
12.583	1.2933	4.29	.	. VQ	.	.	.	.
12.667	1.3228	4.29	.	. VQ	.	.	.	.
12.750	1.3523	4.29	.	. Q	.	.	.	.
12.833	1.3850	4.75	.	. VQ	.	.	.	.
12.917	1.4177	4.75	.	. VQ	.	.	.	.
13.000	1.4504	4.75	.	. Q	.	.	.	.
13.083	1.4863	5.21	.	. V Q	.	.	.	.
13.167	1.5221	5.21	.	. VQ	.	.	.	.
13.250	1.5580	5.21	.	. VQ	.	.	.	.
13.333	1.5980	5.80	.	. V Q	.	.	.	.
13.417	1.6379	5.80	.	. V Q	.	.	.	.
13.500	1.6779	5.80	.	. V Q	.	.	.	.
13.583	1.7202	6.15	.	. .V Q	.	.	.	.
13.667	1.7626	6.15	.	. . V Q	.	.	.	.
13.750	1.8049	6.15	.	. . V Q	.	.	.	.
13.833	1.8440	5.67	.	. . QV	.	.	.	.
13.917	1.8830	5.67	.	. . QV	.	.	.	.
14.000	1.9220	5.67	.	. . Q V	.	.	.	.

14.083	1.9572	5.10	. . Q V . .
14.167	1.9923	5.10	. . Q V . .
14.250	2.0275	5.10	. . Q V . .
14.333	2.0629	5.14	. . Q V . .
14.417	2.0983	5.14	. . Q V . .
14.500	2.1337	5.14	. . Q V . .
14.583	2.1700	5.28	. . .Q V . .
14.667	2.2064	5.28	. . .Q V . .
14.750	2.2427	5.28	. . .Q V . .
14.833	2.2790	5.27	. . .Q V . .
14.917	2.3153	5.27	. . .Q V. .
15.000	2.3517	5.27	. . .Q V. .
15.083	2.3875	5.21	. . Q V .
15.167	2.4234	5.21	. . Q V .
15.250	2.4592	5.21	. . Q V .
15.333	2.4941	5.06	. . Q .V .
15.417	2.5290	5.06	. . Q .V .
15.500	2.5638	5.06	. . Q . V .
15.583	2.5972	4.84	. . Q. . V .
15.667	2.6306	4.84	. . Q. . V .
15.750	2.6639	4.84	. . Q. . V .
15.833	2.6947	4.47	. . Q . . V .
15.917	2.7254	4.47	. . Q . . V .
16.000	2.7562	4.47	. . Q . . V .
16.083	2.7833	3.93	. . Q . . V .
16.167	2.8104	3.93	. . Q . . V .
16.250	2.8374	3.93	. . Q . . V .
16.333	2.8573	2.88	. .Q . . V .
16.417	2.8771	2.88	. .Q . . V .
16.500	2.8970	2.88	. .Q . . V .
16.583	2.9096	1.83	. Q . . . V .
16.667	2.9222	1.83	. Q . . . V .
16.750	2.9348	1.83	. Q . . . V .
16.833	2.9441	1.34	. Q . . . V .
16.917	2.9533	1.34	. Q . . . V .
17.000	2.9625	1.34	. Q . . . V .
17.083	2.9697	1.05	. Q . . . V .
17.167	2.9770	1.05	. Q . . . V .
17.250	2.9842	1.05	. Q . . . V .
17.333	2.9904	0.90	. Q . . . V .
17.417	2.9966	0.90	. Q . . . V .
17.500	3.0027	0.90	. Q . . . V .
17.583	3.0082	0.79	. Q . . . V .
17.667	3.0137	0.79	. Q . . . V .
17.750	3.0191	0.79	. Q . . . V .
17.833	3.0239	0.70	. Q . . . V .
17.917	3.0287	0.70	. Q . . . V .
18.000	3.0335	0.70	. Q . . . V .
18.083	3.0377	0.60	. Q . . . V .
18.167	3.0418	0.60	. Q . . . V .
18.250	3.0460	0.60	. Q . . . V .
18.333	3.0496	0.52	. Q . . . V .
18.417	3.0532	0.52	. Q . . . V .
18.500	3.0568	0.52	. Q . . . V .
18.583	3.0600	0.46	.Q . . . V .
18.667	3.0632	0.46	.Q . . . V .
18.750	3.0664	0.46	.Q . . . V .
18.833	3.0691	0.39	.Q . . . V .
18.917	3.0718	0.39	.Q . . . V .
19.000	3.0745	0.39	.Q . . . V .

19.083	3.0768	0.33	.Q	.	.	.	V .
19.167	3.0790	0.33	.Q	.	.	.	V .
19.250	3.0813	0.33	.Q	.	.	.	V .
19.333	3.0833	0.30	.Q	.	.	.	V .
19.417	3.0854	0.30	.Q	.	.	.	V .
19.500	3.0875	0.30	.Q	.	.	.	V .
19.583	3.0896	0.31	.Q	.	.	.	V .
19.667	3.0917	0.31	.Q	.	.	.	V .
19.750	3.0938	0.31	.Q	.	.	.	V .
19.833	3.0958	0.29	.Q	.	.	.	V .
19.917	3.0978	0.29	.Q	.	.	.	V.
20.000	3.0998	0.29	.Q	.	.	.	V.
20.083	3.1015	0.25	Q	.	.	.	V.
20.167	3.1032	0.25	Q	.	.	.	V.
20.250	3.1049	0.25	Q	.	.	.	V.
20.333	3.1065	0.23	Q	.	.	.	V.
20.417	3.1081	0.23	Q	.	.	.	V.
20.500	3.1096	0.23	Q	.	.	.	V.
20.583	3.1113	0.24	Q	.	.	.	V.
20.667	3.1129	0.24	Q	.	.	.	V.
20.750	3.1145	0.24	Q	.	.	.	V.
20.833	3.1161	0.23	Q	.	.	.	V.
20.917	3.1178	0.23	Q	.	.	.	V.
21.000	3.1194	0.23	Q	.	.	.	V.
21.083	3.1209	0.22	Q	.	.	.	V.
21.167	3.1224	0.22	Q	.	.	.	V.
21.250	3.1239	0.22	Q	.	.	.	V.
21.333	3.1254	0.21	Q	.	.	.	V.
21.417	3.1268	0.21	Q	.	.	.	V.
21.500	3.1283	0.21	Q	.	.	.	V.
21.583	3.1297	0.21	Q	.	.	.	V.
21.667	3.1312	0.21	Q	.	.	.	V.
21.750	3.1326	0.21	Q	.	.	.	V.
21.833	3.1340	0.21	Q	.	.	.	V.
21.917	3.1355	0.21	Q	.	.	.	V.
22.000	3.1369	0.21	Q	.	.	.	V.
22.083	3.1383	0.20	Q	.	.	.	V.
22.167	3.1397	0.20	Q	.	.	.	V.
22.250	3.1411	0.20	Q	.	.	.	V.
22.333	3.1425	0.20	Q	.	.	.	V.
22.417	3.1439	0.20	Q	.	.	.	V.
22.500	3.1453	0.20	Q	.	.	.	V.
22.583	3.1467	0.20	Q	.	.	.	V.
22.667	3.1481	0.20	Q	.	.	.	V.
22.750	3.1494	0.20	Q	.	.	.	V.
22.833	3.1507	0.18	Q	.	.	.	V.
22.917	3.1519	0.18	Q	.	.	.	V.
23.000	3.1531	0.18	Q	.	.	.	V.
23.083	3.1543	0.17	Q	.	.	.	V.
23.166	3.1555	0.17	Q	.	.	.	V.
23.250	3.1567	0.17	Q	.	.	.	V.
23.333	3.1579	0.17	Q	.	.	.	V.
23.416	3.1591	0.17	Q	.	.	.	V.
23.500	3.1602	0.17	Q	.	.	.	V.
23.583	3.1614	0.17	Q	.	.	.	V.
23.666	3.1625	0.17	Q	.	.	.	V.
23.750	3.1637	0.17	Q	.	.	.	V.
23.833	3.1648	0.17	Q	.	.	.	V.
23.916	3.1660	0.17	Q	.	.	.	V.
24.000	3.1671	0.17	Q	.	.	.	V.

24.083	3.1682	0.15	Q	.	.	.	V.
24.166	3.1692	0.15	Q	.	.	.	V.
24.250	3.1703	0.15	Q	.	.	.	V.
24.333	3.1710	0.11	Q	.	.	.	V.
24.416	3.1718	0.11	Q	.	.	.	V.
24.500	3.1726	0.11	Q	.	.	.	V.
24.583	3.1730	0.06	Q	.	.	.	V.
24.666	3.1734	0.06	Q	.	.	.	V.
24.750	3.1739	0.06	Q	.	.	.	V.
24.833	3.1742	0.04	Q	.	.	.	V.
24.916	3.1744	0.04	Q	.	.	.	V.
25.000	3.1747	0.04	Q	.	.	.	V.
25.083	3.1749	0.03	Q	.	.	.	V.
25.166	3.1752	0.03	Q	.	.	.	V.
25.250	3.1754	0.03	Q	.	.	.	V.
25.333	3.1755	0.02	Q	.	.	.	V.
25.416	3.1757	0.02	Q	.	.	.	V.
25.500	3.1758	0.02	Q	.	.	.	V.
25.583	3.1760	0.02	Q	.	.	.	V.
25.666	3.1761	0.02	Q	.	.	.	V.
25.750	3.1762	0.02	Q	.	.	.	V.
25.833	3.1763	0.01	Q	.	.	.	V.
25.916	3.1764	0.01	Q	.	.	.	V.
26.000	3.1765	0.01	Q	.	.	.	V.
26.083	3.1766	0.01	Q	.	.	.	V.
26.166	3.1766	0.01	Q	.	.	.	V.
26.250	3.1767	0.01	Q	.	.	.	V.
26.333	3.1768	0.01	Q	.	.	.	V.
26.416	3.1768	0.01	Q	.	.	.	V.
26.500	3.1769	0.01	Q	.	.	.	V.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1590.0
10%	705.0
20%	525.0
30%	465.0
40%	420.0
50%	330.0
60%	225.0
70%	195.0
80%	150.0
90%	45.0

END OF FLOODSCx ROUTING ANALYSIS

Detention Results

Storm	Existing Condition Qp (CFS)	Proposed Condition Qp (CFS)	Prop-Ex (%)
100-yr, 1-hr	50.14	49.96	-0.4%
100-yr, 24-hr	5.66	5.64	-0.4%

POND - Results

Storm	Inflow Qp (CFS)	Outflow Qp (CFS)	Peak Storage (AC-FT)	Peak WSEL (FT)
100-yr, 1-hr	58.58	49.96	1.158	1446.23
2-yr, 24-hr	6.15	5.64	0.217	1442.55

POND

Pond EL	Area SF	Area AC	Volume (AC-FT)	Cumulative Volume (AC-FT)
1441	4709	0.1081	0	0
1442	6509	0.1494	0.129	0.129
1443	8381	0.1924	0.171	0.300
1444	10325	0.2370	0.215	0.514
1445	12341	0.2833	0.260	0.775
1446	14429	0.3312	0.307	1.082
1446.5	15500	0.3558	0.172	1.254

Appendix 8: Source Control

Pollutant Sources/Source Control Checklist

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

How to use this worksheet (also see instructions in Section G of the WQMP Template):

1. Review Column 1 and identify which of these potential sources of stormwater pollutants apply to your site. Check each box that applies.
2. Review Column 2 and incorporate all of the corresponding applicable BMPs in your WQMP Exhibit.
3. Review Columns 3 and 4 and incorporate all of the corresponding applicable permanent controls and operational BMPs in your WQMP. Use the format shown in Table G.1on page 23 of this WQMP Template. Describe your specific BMPs in an accompanying narrative, and explain any special conditions or situations that required omitting BMPs or substituting alternative BMPs for those shown here.

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
☒ A. **On-site storm drain inlets**	☒ **Locations of inlets.**	☒ **Mark all inlets with the words "Only Rain Down the Storm Drain" or similar. Catch Basin Markers may be available from the Riverside County Flood Control and Water Conservation District, call 951.955.1200 to verify.**	☒ **Maintain and periodically repaint or replace inlet markings.** ☒ **Provide stormwater pollution prevention information to new site owners, lessees, or operators.** ☒ **See applicable operational BMPs in Fact Sheet SC-44, "Drainage System Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com** ☒ **Include the following in lease agreements: "Tenant shall not allow anyone to discharge anything to storm drains or to store or deposit materials so as to create a potential discharge to storm drains."**
☐ B. **Interior floor drains and elevator shaft sump pumps**		☐ **State that interior floor drains and elevator shaft sump pumps will be plumbed to sanitary sewer.**	☐ **Inspect and maintain drains to prevent blockages and overflow.**
☐ C. **Interior parking garages**		☐ **State that parking garage floor drains will be plumbed to the sanitary sewer.**	☐ **Inspect and maintain drains to prevent blockages and overflow.**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ D1. **Need for future indoor & structural pest control**		❑ **Note building design features that discourage entry of pests.**	❑ **Provide Integrated Pest Management information to owners, lessees, and operators.**
❑ D2. **Landscape/ Outdoor Pesticide Use**	❑ **Show locations of native trees or areas of shrubs and ground cover to be undisturbed and retained.** ❑ **Show self-retaining landscape areas, if any.** ❑ **Show stormwater treatment and hydrograph modification management BMPs. (See instructions in Chapter 3, Step 5 and guidance in Chapter 5.)**	**State that final landscape plans will accomplish all of the following.** ❑ **Preserve existing native trees, shrubs, and ground cover to the maximum extent possible.** ❑ **Design landscaping to minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to stormwater pollution.** ❑ **Where landscaped areas are used to retain or detain stormwater, specify plants that are tolerant of saturated soil conditions.** ❑ **Consider using pest-resistant plants, especially adjacent to hardscape.** **To insure successful establishment, select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions.**	❑ **Maintain landscaping using minimum or no pesticides.** ❑ **See applicable operational BMPs in "What you should know for…..Landscape and Gardening"** at http://rcflood.org/stormwater/**Error! Hyperlink reference not valid.** ❑ **Provide IPM information to new owners, lessees and operators.**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ E. **Pools, spas, ponds, decorative fountains, and other water features.**	❑ **Show location of water feature and a sanitary sewer cleanout in an accessible area within 10 feet. (Exception: Public pools must be plumbed according to County Department of Environmental Health Guidelines.)**	**If the Co-Permittee requires pools to be plumbed to the sanitary sewer, place a note on the plans and state in the narrative that this connection will be made according to local requirements.**	❑ **See applicable operational BMPs in** "Guidelines for Maintaining Your Swimming Pool, Jacuzzi and Garden Fountain" at http://rcflood.org/stormwater/
❑ F. **Food service**	❑ **For restaurants, grocery stores, and other food service operations, show location (indoors or in a covered area outdoors) of a floor sink or other area for cleaning floor mats, containers, and equipment.** ❑ **On the drawing, show a note that this drain will be connected to a grease interceptor before discharging to the sanitary sewer.**	❑ **Describe the location and features of the designated cleaning area.** ❑ **Describe the items to be cleaned in this facility and how it has been sized to insure that the largest items can be accommodated.**	❑ **See the brochure, "**The Food Service Industry Best Management Practices for: Restaurants, Grocery Stores, Delicatessens and Bakeries" at http://rcflood.org/stormwater/ **Provide this brochure to new site owners, lessees, and operators.**
❑ G. **Refuse areas**	❑ **Show where site refuse and recycled materials will be handled and stored for pickup. See local municipal requirements for sizes and other details of refuse areas.** ❑ **If dumpsters or other receptacles are outdoors, show how the designated area will be covered, graded, and paved to prevent run-on and show locations of berms to prevent runoff from the area.** ❑ **Any drains from dumpsters, compactors, and tallow bin areas shall be connected to a grease removal device before discharge to sanitary sewer.**	❑ **State how site refuse will be handled and provide supporting detail to what is shown on plans.** ❑ **State that signs will be posted on or near dumpsters with the words "Do not dump hazardous materials here" or similar.**	❑ **State how the following will be implemented:** **Provide adequate number of receptacles. Inspect receptacles regularly; repair or replace leaky receptacles. Keep receptacles covered. Prohibit/prevent dumping of liquid or hazardous wastes. Post "no hazardous materials" signs. Inspect and pick up litter daily and clean up spills immediately. Keep spill control materials available on-site. See Fact Sheet SC-34, "Waste Handling and Disposal" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ H. **Industrial processes.**	❑ **Show process area.**	❑ **If industrial processes are to be located on site, state: "All process activities to be performed indoors. No processes to drain to exterior or to storm drain system."**	❑ **See Fact Sheet SC-10, "Non-Stormwater Discharges" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com** See the brochure "Industrial & Commercial Facilities Best Management Practices for: Industrial, Commercial Facilities" at http://rcflood.org/stormwater/

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ I. **Outdoor storage of equipment or materials. (See rows J and K for source control measures for vehicle cleaning, repair, and maintenance.)**	❑ **Show any outdoor storage areas, including how materials will be covered. Show how areas will be graded and bermed to prevent run-on or run-off from area.** ❑ **Storage of non-hazardous liquids shall be covered by a roof and/or drain to the sanitary sewer system, and be contained by berms, dikes, liners, or vaults.** ❑ **Storage of hazardous materials and wastes must be in compliance with the local hazardous materials ordinance and a Hazardous Materials Management Plan for the site.**	**Include a detailed description of materials to be stored, storage areas, and structural features to prevent pollutants from entering storm drains.** **Where appropriate, reference documentation of compliance with the requirements of Hazardous Materials Programs for:** ▪ **Hazardous Waste Generation** ▪ **Hazardous Materials Release Response and Inventory** ▪ **California Accidental Release (CalARP)** ▪ **Aboveground Storage Tank** ▪ **Uniform Fire Code Article 80 Section 103(b) & (c) 1991** ▪ **Underground Storage Tank** **www.cchealth.org/groups/hazmat/**	❑ **See the Fact Sheets SC-31, "Outdoor Liquid Container Storage" and SC-33, "Outdoor Storage of Raw Materials " in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ J. **Vehicle and Equipment Cleaning**	❑ **Show on drawings as appropriate:** **(1) Commercial/industrial facilities having vehicle/equipment cleaning needs shall either provide a covered, bermed area for washing activities or discourage vehicle/equipment washing by removing hose bibs and installing signs prohibiting such uses.** **(2) Multi-dwelling complexes shall have a paved, bermed, and covered car wash area (unless car washing is prohibited on-site and hoses are provided with an automatic shut-off to discourage such use).** **(3) Washing areas for cars, vehicles, and equipment shall be paved, designed to prevent run-on to or runoff from the area, and plumbed to drain to the sanitary sewer.** **(4) Commercial car wash facilities shall be designed such that no runoff from the facility is discharged to the storm drain system. Wastewater from the facility shall discharge to the sanitary sewer, or a wastewater reclamation system shall be installed.**	❑ **If a car wash area is not provided, describe any measures taken to discourage on-site car washing and explain how these will be enforced.**	**Describe operational measures to implement the following (if applicable):** ❑ **Washwater from vehicle and equipment washing operations shall not be discharged to the storm drain system.** Refer to "Outdoor Cleaning Activities and Professional Mobile Service Providers" for many of the Potential Sources of Runoff Pollutants categories below. Brochure can be found at http://rcflood.org/stormwater/ ❑ **Car dealerships and similar may rinse cars with water only.**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ K. **Vehicle/Equipment Repair and Maintenance**	❑ **Accommodate all vehicle equipment repair and maintenance indoors. Or designate an outdoor work area and design the area to prevent run-on and runoff of stormwater.** ❑ **Show secondary containment for exterior work areas where motor oil, brake fluid, gasoline, diesel fuel, radiator fluid, acid-containing batteries or other hazardous materials or hazardous wastes are used or stored. Drains shall not be installed within the secondary containment areas.** ❑ **Add a note on the plans that states either (1) there are no floor drains, or (2) floor drains are connected to wastewater pretreatment systems prior to discharge to the sanitary sewer and an industrial waste discharge permit will be obtained.**	❑ **State that no vehicle repair or maintenance will be done outdoors, or else describe the required features of the outdoor work area.** ❑ **State that there are no floor drains or if there are floor drains, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements.** ❑ **State that there are no tanks, containers or sinks to be used for parts cleaning or rinsing or, if there are, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements.**	**In the Stormwater Control Plan, note that all of the following restrictions apply to use the site:** ❑ **No person shall dispose of, nor permit the disposal, directly or indirectly of vehicle fluids, hazardous materials, or rinsewater from parts cleaning into storm drains.** ❑ **No vehicle fluid removal shall be performed outside a building, nor on asphalt or ground surfaces, whether inside or outside a building, except in such a manner as to ensure that any spilled fluid will be in an area of secondary containment. Leaking vehicle fluids shall be contained or drained from the vehicle immediately.** ❑ **No person shall leave unattended drip parts or other open containers containing vehicle fluid, unless such containers are in use or in an area of secondary containment.** Refer to "Automotive Maintenance & Car Care Best Management Practices for Auto Body Shops, Auto Repair Shops, Car Dealerships, Gas Stations and Fleet Service Operations". Brochure can be found at http://rcflood.org/stormwater/ Refer to Outdoor Cleaning Activities and Professional Mobile Service Providers for many of the Potential Sources of Runoff Pollutants categories below. Brochure can be found at http://rcflood.org/stormwater/

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ L. **Fuel Dispensing Areas**	❑ **Fueling areas[6] shall have impermeable floors (i.e., portland cement concrete or equivalent smooth impervious surface) that are: a) graded at the minimum slope necessary to prevent ponding; and b) separated from the rest of the site by a grade break that prevents run-on of stormwater to the maximum extent practicable.** ❑ **Fueling areas shall be covered by a canopy that extends a minimum of ten feet in each direction from each pump. [Alternative: The fueling area must be covered and the cover's minimum dimensions must be equal to or greater than the area within the grade break or fuel dispensing area[1].] The canopy [or cover] shall not drain onto the fueling area.**		❑ **The property owner shall dry sweep the fueling area routinely.** ❑ **See the Fact Sheet SD-30 , "Fueling Areas" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**

[6] **The fueling area shall be defined as the area extending a minimum of 6.5 feet from the corner of each fuel dispenser or the length at which the hose and nozzle assembly may be operated plus a minimum of one foot, whichever is greater.**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ M. **Loading Docks**	❑ **Show a preliminary design for the loading dock area, including roofing and drainage. Loading docks shall be covered and/or graded to minimize run-on to and runoff from the loading area. Roof downspouts shall be positioned to direct stormwater away from the loading area. Water from loading dock areas shall be drained to the sanitary sewer, or diverted and collected for ultimate discharge to the sanitary sewer.** ❑ **Loading dock areas draining directly to the sanitary sewer shall be equipped with a spill control valve or equivalent device, which shall be kept closed during periods of operation.** ❑ **Provide a roof overhang over the loading area or install door skirts (cowling) at each bay that enclose the end of the trailer.**		❑ **Move loaded and unloaded items indoors as soon as possible.** ❑ **See Fact Sheet SC-30, "Outdoor Loading and Unloading," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ N. **Fire Sprinkler Test Water**		❑ **Provide a means to drain fire sprinkler test water to the sanitary sewer.**	❑ **See the note in Fact Sheet SC-41, "Building and Grounds Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**
O. **Miscellaneous Drain or Wash Water or Other Sources** ❑ **Boiler drain lines** ❑ **Condensate drain lines** ❑ **Rooftop equipment** ❑ **Drainage sumps** ❑ **Roofing, gutters, and trim.** ❑ **Other sources**		❑ **Boiler drain lines shall be directly or indirectly connected to the sanitary sewer system and may not discharge to the storm drain system.** ❑ **Condensate drain lines may discharge to landscaped areas if the flow is small enough that runoff will not occur. Condensate drain lines may not discharge to the storm drain system.** ❑ **Rooftop equipment with potential to produce pollutants shall be roofed and/or have secondary containment.** ❑ **Any drainage sumps on-site shall feature a sediment sump to reduce the quantity of sediment in pumped water.** ❑ **Avoid roofing, gutters, and trim made of copper or other unprotected metals that may leach into runoff.** **Include controls for other sources as specified by local reviewer.**	

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
☒ P. **Plazas, sidewalks, and parking lots.**			☒ **Sweep plazas, sidewalks, and parking lots regularly to prevent accumulation of litter and debris. Collect debris from pressure washing to prevent entry into the storm drain system. Collect washwater containing any cleaning agent or degreaser and discharge to the sanitary sewer not to a storm drain.**

Appendix 9: O&M

Operation and Maintenance Plan and Documentation of Finance, Maintenance and Recording Mechanisms

Double Butte
Operation and Maintenance Plan

I. Inspection and Maintenance Log

BMP INSPECTION & MAINTENANCE LOG
THE HOMESTEAD

Today's Date: _____

Name of Person Performing Activity (Printed): _____

Signature: _____

BMP Name (As Shown in O&M Plan)	Brief Description of Implementation, Maintenance, and Inspection Activity Performed	Date
Biofiltration Basin (BIO-1)		
Filterra System 1 (FIL-1)		
Filterra System 2 (FIL-2)		
Filterra System 3 (FIL-3)		
Modular Wetland System 1 (MWS-1)		
Modular Wetland System 2 (MWS-2)		

II. Updates, Revisions, and Errata

This page is left intentionally blank to allow for updates and revisions to be added.

III. Responsibility of Maintenance

A. General

A copy of the operation and maintenance agreement has been included as an attachment to the Operation and Maintenance (O&M) Plan:

The following party is responsible for the operation and maintenance of all LID BMPs and source control BMPs within the private property at The Double Butte Project:

Blue Sky Endeavors, LLC
2180 South 1300 East, Suite 600
Salt Lake City, Utah 84106

The responsible party shall serve or designate a corporate officer authorized to negotiate and execute any contracts that might be necessary for future changes to operation and maintenance of the LID BMPs or implement remedial measures if problems occur.

Employees or contractors who will report to the designated contact and are responsible for conducting Stormwater BMP operation and maintenance procedures within this document. All pertinent forms of educational materials for those personnel that will be maintaining the proposed BMPs have been included in Appendix 9.

Designated Respondent in case of off-hours maintenance problem:

_____
Designated Respondent Printed Name/Title

_____
Phone Number

Note: Updated contact information must be provided to the Permittee immediately whenever a property is sold or transferred and whenever designated individuals or contractors change.

WQMP Implementation and Funding Responsibility

This project-specific WQMP has been prepared for Blue Sky by Kimley-Horn and Associates, Inc. for the Double Butte project. This document is intended to provide guidance for proper BMP implementation and on-going maintenance for the Project BMP facilities.

The undersigned shall be responsible for the implementation of this O&M Plan and ensure that this document is amended as appropriate to reflect up-to-date conditions at the site. The O&M plan will be reviewed by maintenance and service employees, outside contractors, or any other persons having responsibility from implementation portions of the O&M plan. At least one copy of this O&M Plan and WQMP will be maintained at the project site or project office in perpetuity.

The undersigned is authorized to certify and to approve implementation of this O&M Plan and WQMP. The undersigned is aware that implementation of this O&M Plan and WQMP is enforceable under the City of Riverside Water Quality Ordinance. If the undersigned transfers interest in the subject property, the undersigned shall notify the successor their responsibility to implement the O&M Plan and WQMP. It is still the responsibility of the owner to maintain the LID BMPs in accordance with the O&M Plan until that responsibility is formally transferred.

The funding source for operation and maintenance of each BMP identified in the project-specific WQMP shall be the responsibility of Blue Sky until responsibility is transferred. The owner/operator recognizes that a source of funding is required to support the ongoing operation and maintenance of BMPs, and that funding will continue for the life of the project. By certifying the final project specific WQMP, the Project applicant is certifying that the funding responsibilities have been addressed and will be transferred to future owners as deemed necessary.

_____

Owner's /Responsible Party Signature

_____

Owner's /Responsible Party Printed Name

_____

Owner's /Responsible Party Title or Position

_____Date

B. Staff Training Program

All staff will undergo training to learn about the stormwater treatment mechanism and proper maintenance of the LID BMPs. Training will be required for all persons responsible for maintenance of the roadside BMPs. Due to the location of the BMPs along the roadway, safety training for maintenance personnel will be required. Documentation and records of each staff (contractor or personal) member who has received training shall be recorded in the log below.

BMP STAFF TRAINING
DOUBLE BUTTE

Today's Date: _____

Name of Person Performing Activity (Printed): _____

Signature: _____

Staff Name	Date	Brief Description of training received

IV. Summary of Drainage Management Areas and BMPs

The project will drain to the south/southwest to a proposed biofiltration basin at the south end of the site. High flows will overtop the water quality BMP and into the detention basin immediately adjacent. The detention basin is designed to mitigate the 2-year and 100-year peak flows for HCOC and high flow mitigation. High flows will be ultimately conveyed via pipe or surface flow to the detention basin in the southwest corner of the site. Some offsite flows may be directed to the onsite Biofiltration basin, where feasible.

Offsite flows that are not diverted through the Biofiltration Basin will be treated through the use of Filterra Systems, Modular Wetland Systems, or both. These systems will be placed in the proper downstream locations so to capture and treat all flow not treated by other means.

After treatment, all flows will discharge in the RCFCD channel running westerly along the southern border of the site.

V. Stormwater BMP Design Documentation

This section of the O&M Manual is designated for As-Builts of each stormwater BMP and Manufacturer's data, manuals and maintenance requirements.

VI. Maintenance Schedule or Matrix

A. Maintenance Schedule for each Facility with Specific requirements

Pervious/Landscaped Areas: Open space areas shall be kept free of trash and debris. All trimming, pruning, and removal of fallen organic material from plants, shrubs, and trees are to be collected per an established landscape maintenance plan and disposed in the appropriate location or transported to a green-waste collection facility. The planting materials are to remain as indicated on the approved set of landscape planting plans. Additional actions should be taken to ensure that the surface flow paths, storm drain outlet and inlet in the area are cleared of debris or vegetation obstructions.

Pavement: Impervious areas draining to the project BMPs shall be kept free of trash, debris, and other environmentally hazardous material at all times. Remove and dispose of these materials immediately.

Irrigation Systems: Water conservation is to be maintained at all times per the approved irrigation plans. Monitoring of the irrigation system should be provided at least twice monthly or as necessary to ensure that appropriate watering levels are maintained as well as to verify that no piping or irrigation heads are leaking. Any debris, sediment, mineral and grit deposits should be removed from the irrigation system at regular intervals to provide consistent watering.

Storm Drain System: Inlets, outlets, cleanouts, manholes, and pipelines are to be inspected quarterly and after each storm event or according to an existing maintenance program. All parts of the system are to be periodically cleaned to ensure that the system works properly during any storm event. All hardscape, landscape, parking, and driveway areas shall be kept clean, sanitary and free from any accumulation of debris, sediments and waste materials that could enter the storm drain system.

Bioretention facility: The Bioretention Facility area shall be inspected for erosion, dead vegetation, soggy soils, or standing water. The use of fertilizers and pesticides on the plants inside the Infiltration Facility should be minimized. Keep adjacent landscape areas maintained, remove clippings from landscape maintenance activities, remove trash and debris, replace damaged grass and/or plants, and replace surface mulch/cobble as needed to maintain a 2 to 3-inch soil cover. Facilities should be inspected for ponding after storm events.

BMP Maintenance Matrix

BMP Requiring Maintenance	Responsible Party	Visual Inspection Frequency	Inspection Location	Maintenance Frequency	Maintenance Requirements
Pervious/Landscaped Areas	Owner	Twice Monthly or according to an established maintenance schedule.	Throughout the pervious cover areas.	At least twice monthly or according to the established maintenance schedule	(See above)
Irrigation Systems	Owner	Twice Monthly or according to an established maintenance schedule.	Throughout the landscaped areas within site.	As necessary based on observations made during inspection or per maintenance schedule.	(See above)
Storm Drain System	Owner	Quarterly and after storms.	Locations are identified in the WQMP Appendix 2.	As necessary based on observations made during inspection.	(See above)
Pavement	Owner	Weekly or according to an established maintenance schedule.	Parking Lot.	At least twice monthly or immediately following the visual observation of any adverse conditions.	(See above)
Biofiltration Facility	Owner	Twice Monthly and after storm events, or according to an established maintenance schedule.	Location shown on the WQMP site plan in Appendix 1.	Twice Monthly and after storm events, or according to an established maintenance schedule.	(See above)
Modular Wetland System	Owner	Twice Monthly and after storm events, or according to an established maintenance schedule.	Location shown on the WQMP site plan in Appendix 1.	Twice Monthly and after storm events, or according to an established maintenance schedule.	(See above)
Filterra System	Owner	Twice Monthly and after storm events, or according to an established maintenance schedule.	Location shown on the WQMP site plan in Appendix 1.	Twice Monthly and after storm events, or according to an established maintenance schedule.	(See above)

Appendix 10: Educational Materials

BMP Fact Sheets, Maintenance Guidelines and Other End-User BMP Information

After the Storm

A Citizen's Guide to Understanding Stormwater

For more information contact:

or visit
www.epa.gov/npdes/stormwater
www.epa.gov/nps

EPA United States Environmental Protection Agency

EPA 833-B-03-002

January 2003

THE YEAR OF CLEAN WATER
Celebration & Recommitment

Internet Address (URL) • HTTP://www.epa.gov
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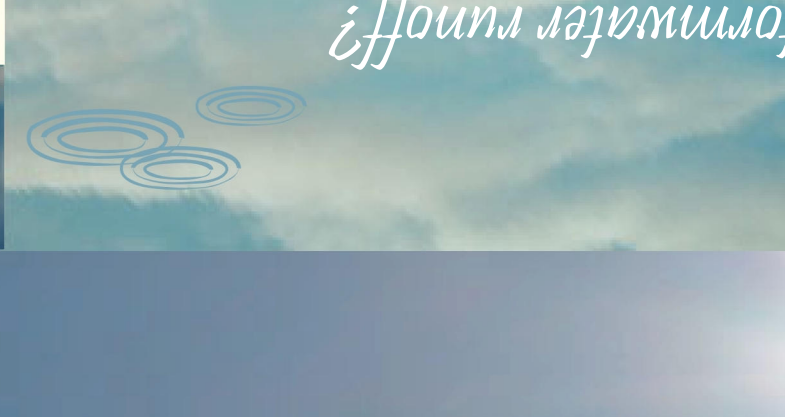
WHEN IT RAINS IT DRAINS

What is stormwater runoff?

Stormwater runoff occurs when precipitation from rain or snowmelt flows over the ground. Impervious surfaces like driveways, sidewalks, and streets prevent stormwater from naturally soaking into the ground.



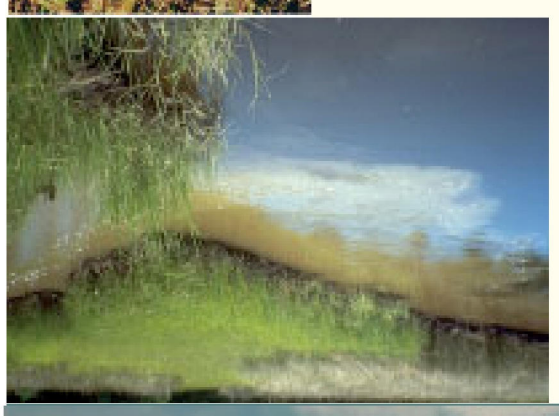
Stormwater can pick up debris, chemicals, dirt, and other pollutants and flow into a storm sewer system or directly to a lake, stream, river, wetland, or coastal water. Anything that enters a storm sewer system is discharged untreated into the waterbodies we use for swimming, fishing, and providing drinking water.

Why is stormwater runoff a problem?

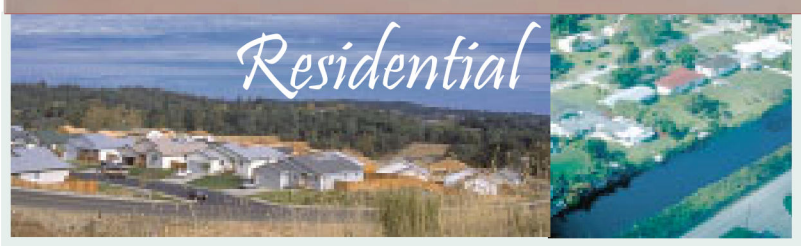
The effects of pollution

Polluted stormwater runoff can have many adverse effects on plants, fish, animals, and people.

- Sediment can cloud the water and make it difficult or impossible for aquatic plants to grow. Sediment also can destroy aquatic habitats.
- Excess nutrients can cause algae blooms. When algae die, they sink to the bottom and decompose in a process that removes oxygen from the water. Fish and other aquatic organisms can't exist in water with low dissolved oxygen levels.
- Bacteria and other pathogens can wash into swimming areas and create health hazards, often making beach closures necessary.
- Debris—plastic bags, six-pack rings, bottles, and cigarette butts—washed into waterbodies can choke, suffocate, or disable aquatic life like ducks, fish, turtles, and birds.
- Household hazardous wastes like insecticides, pesticides, paint, solvents, used motor oil, and other auto fluids can poison aquatic life. Land animals and people can become sick or die from eating diseased fish and shellfish or ingesting polluted water.
- Polluted stormwater often affects drinking water sources. This, in turn, can affect human health and increase drinking water treatment costs.



Stormwater Pollution Solutions



Recycle or properly dispose of household products that contain chemicals, such as insecticides, pesticides, paint, solvents, and used motor oil and other auto fluids. Don't pour them onto the ground or into storm drains.

Lawn care

Excess fertilizers and pesticides applied to lawns and gardens wash off and pollute streams. In addition, yard clippings and leaves can wash into storm drains and contribute nutrients and organic matter to streams.

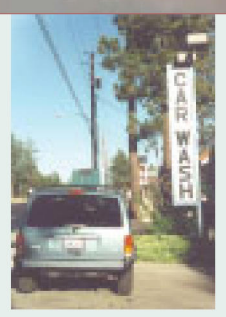
- Don't overwater your lawn. Consider using a soaker hose instead of a sprinkler.
- Use pesticides and fertilizers sparingly. When use is necessary, use these chemicals in the recommended amounts. Use organic mulch or safer pest control methods whenever possible.
- Compost or mulch yard waste. Don't leave it in the street or sweep it into storm drains or streams.
- Cover piles of dirt or mulch being used in landscaping projects.

Septic systems

Leaking and poorly maintained septic systems release nutrients and pathogens (bacteria and viruses) that can be picked up by stormwater and discharged into nearby waterbodies. Pathogens can cause public health problems and environmental concerns.

- Inspect your system every 3 years and pump your tank as necessary (every 3 to 5 years).
- Don't dispose of household hazardous waste in sinks or toilets.

Auto care



Washing your car and degreasing auto parts at home can send detergents and other contaminants through the storm sewer system. Dumping automotive fluids into storm drains has the same result as dumping the materials directly into a waterbody.

- Use a commercial car wash that treats or recycles its wastewater, or wash your car on your yard so the water infiltrates into the ground.
- Repair leaks and dispose of used auto fluids and batteries at designated drop-off or recycling locations.

Pet waste

Pet waste can be a major source of bacteria and excess nutrients in local waters.

- When walking your pet, remember to pick up the waste and dispose of it properly. Flushing pet waste is the best disposal method. Leaving pet waste on the ground increases public health risks by allowing harmful bacteria and nutrients to wash into the storm drain and eventually into local waterbodies.

Education is essential to changing people's behavior. Signs and markers near storm drains warn residents that pollutants entering the drains will be carried untreated into a local waterbody.

Residential landscaping

Permeable Pavement—Traditional concrete and asphalt don't allow water to soak into the ground. Instead these surfaces rely on storm drains to divert unwanted water. Permeable pavement systems allow rain and snowmelt to soak through, decreasing stormwater runoff.

Rain Barrels—You can collect rainwater from rooftops in mosquito-proof containers. The water can be used later on lawn or garden areas.

Rain Gardens and Grassy Swales—Specially designed areas planted with native plants can provide natural places for rainwater to collect and soak into the ground. Rain from rooftop areas or paved areas can be diverted into these areas rather than into storm drains.

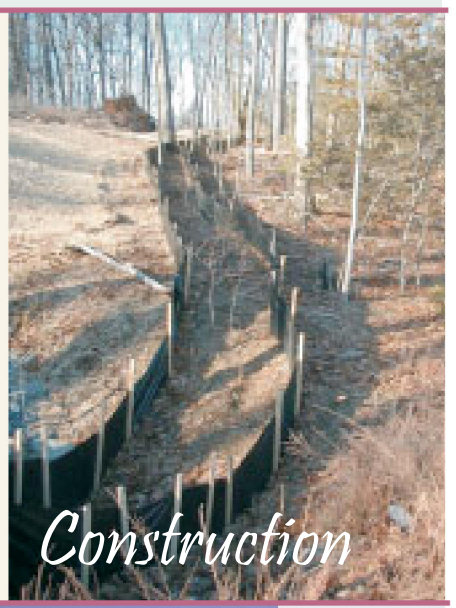
Vegetated Filter Strips—Filter strips are areas of native grass or plants created along roadways or streams. They trap the pollutants stormwater picks up as it flows across driveways and streets.

Dirt, oil, and debris that collect in parking lots and paved areas can be washed into the storm sewer system and eventually enter local waterbodies.

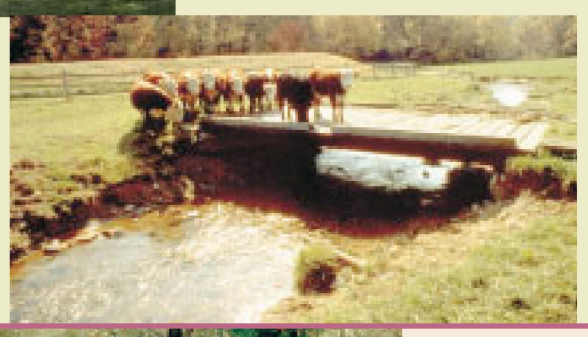
- Sweep up litter and debris from sidewalks, driveways and parking lots, especially around storm drains.
- Cover grease storage and dumpsters and keep them clean to avoid leaks.
- Report any chemical spill to the local hazardous waste cleanup team. They'll know the best way to keep spills from harming the environment.

Erosion controls that aren't maintained can cause excessive amounts of sediment and debris to be carried into the stormwater system. Construction vehicles can leak fuel, oil, and other harmful fluids that can be picked up by stormwater and deposited into local waterbodies.

- Divert stormwater away from disturbed or exposed areas of the construction site.
- Install silt fences, vehicle mud removal areas, vegetative cover, and other sediment and erosion controls and properly maintain them, especially after rainstorms.
- Prevent soil erosion by minimizing disturbed areas during construction projects, and seed and mulch bare areas as soon as possible.



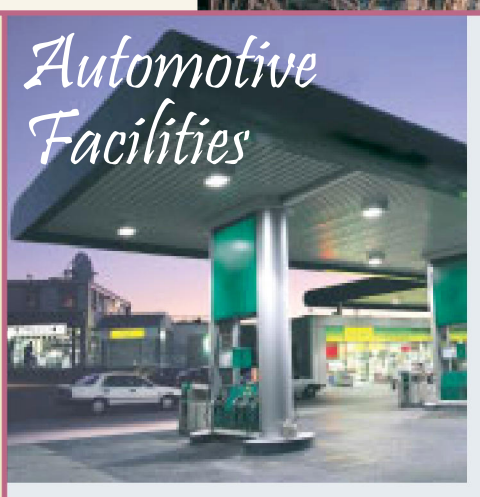
Lack of vegetation on streambanks can lead to erosion. Overgrazed pastures can also contribute excessive amounts of sediment to local waterbodies. Excess fertilizers and pesticides can poison aquatic animals and lead to destructive algae blooms. Livestock in streams can contaminate waterways with bacteria, making them unsafe for human contact.



- Keep livestock away from streambanks and provide them a water source away from waterbodies.
- Store and apply manure away from waterbodies and in accordance with a nutrient management plan.
- Vegetate riparian areas along waterways.
- Rotate animal grazing to prevent soil erosion in fields.
- Apply fertilizers and pesticides according to label instructions to save money and minimize pollution.

Improperly managed logging operations can result in erosion and sedimentation.

- Conduct preharvest planning to prevent erosion and lower costs.
- Use logging methods and equipment that minimize soil disturbance.
- Plan and design skid trails, yard areas, and truck access roads to minimize stream crossings and avoid disturbing the forest floor.
- Construct stream crossings so that they minimize erosion and physical changes to streams.
- Expedite revegetation of cleared areas.



Uncovered fueling stations allow spills to be washed into storm drains. Cars waiting to be repaired can leak fuel, oil, and other harmful fluids that can be picked up by stormwater.

- Clean up spills immediately and properly dispose of cleanup materials.
- Provide cover over fueling stations and design or retrofit facilities for spill containment.
- Properly maintain fleet vehicles to prevent oil, gas, and other discharges from being washed into local waterbodies.
- Install and maintain oil/water separators.

Riverside County Stormwater Program Members

City of Banning
(951) 922-3105

City of Beaumont
(951) 769-8520

City of Calimesa
(909) 795-9801

City of Canyon Lake
(951) 244-2955

City of Cathedral City
(760) 770-0340

City of Coachella
(760) 398-3502

City of Corona
(951) 736-2447

City of Desert Hot Springs
(760) 329-6411

City of Eastvale
(951) 361-0900

City of Hemet
(951) 765-2300

City of Indian Wells
(760) 346-2489

City of Indio
(760) 391-4000

City of Jurupa Valley
(951) 332-6464

City of Lake Elsinore
(951) 674-3124

City of La Quinta
(760) 777-7000

City of Menifee
(951) 672-6777

City of Moreno Valley
(951) 413-3000

City of Murrieta
(951) 304-2489

City of Norco
(951) 270-5607

City of Palm Desert
(760) 346-0611

City of Palm Springs
(760) 323-8299

City of Perris
(951) 943-6100

City of Rancho Mirage
(760) 324-4511

City of Riverside
(951) 826-5311

City of San Jacinto
(951) 487-7330

City of Temecula
(951) 694-6444

City of Wildomar
(951) 677-7751

Coachella Valley Water District
(760) 398-2651

County of Riverside
(951) 955-1000

Riverside County Flood Control District
(951) 955-1200

YOU can prevent Stormwater Pollution following these practices...

Industrial and Commercial Facilities

The Riverside County Stormwater Program has identified a number of Best Management Practices (BMPs) for Industrial and Commercial Facilities. These BMPs control and reduce stormwater pollutants from reaching our storm drain system and ultimately our local water bodies. City and County ordinances require businesses to use these BMPs to protect our water quality. Local cities and the County are required to verify implementation of these BMPs by performing regular facility inspections.

Prohibited Discharges

Discontinue all non-stormwater discharges to the storm drain system. It is *prohibited* to discharge any chemicals, paints, debris, wastes or wastewater into the gutter, street or storm drain.

Outdoor Storage BMPs

- Install covers and secondary containment areas for all hazardous materials and wastes stored outdoors in accordance with County and/or City standards.
- Keep all temporary waste containers covered, at all times when not in use.
- Sweep outdoor areas instead of using a hose or pressure washer.
- Move all process operations including vehicle/equipment maintenance inside of the building or under a covered and contained area.
- Wash equipment and vehicles in a contained and covered wash bay which is closed-loop or connected to a clarifier sized to local standards and discharged to a sanitary sewer or take them to a commercial car wash.

Spills and Clean Up BMPs

- Keep the work site clean and orderly. Remove debris in a timely fashion. Sweep up the area.
- Clean up spills immediately when they occur, using dry clean up methods such as absorbent materials or sweep followed by proper disposal of materials.
- Always have a spill kit available near chemical loading dock doors and vehicle maintenance and fueling areas.
- Follow your Business Emergency Plan, as filed with the local Fire Department.
- Report all prohibited discharges and non-implementation of BMPs to your local Stormwater Coordinator as listed on the back of this pamphlet.
- Report hazardous materials spills to 951-358-5055 or call after hours to 951-782-2973 or, if an emergency, call the Fire Department's Haz Mat Team at 911.

Plastic Manufacturing Facilities BMPs

AB 258 requires plastic product manufacturers to use BMPs, such as safe storage and clean-up procedures to prevent plastic pellets (nurdles) from entering the waterway. The plastic pellets are released into the environment during transporting, packaging and processing and migrate to waterways through the storm drain system. AB 258 will help protect fish and wildlife from the hazards of plastic pollution.

Training BMPs

As prescribed by your City and County Stormwater Ordinance(s), train employees in spill procedures and prohibit non-stormwater discharges to the storm drain system. Applicable BMP examples can be found at www.cabmphandbooks.com.

Permitting

Stormwater discharges associated with specific categories for industrial facilities are regulated by the State Water Resources Control Board through an Industrial Stormwater General Permit. A copy of this General Permit and application forms are available at: www.waterboards.ca.gov, select stormwater then the industrial quick link.

To report illegal dumping or for more information on stormwater pollution prevention call: 1-800-506-2555 or e-mail us at: fcnpdes@rcflood.org.

Landscaping and garden maintenance activities can be major contributors to water pollution. Soils, yard wastes, over-watering and garden chemicals become part of the urban runoff mix that winds its way through streets, gutters and storm drains before entering lakes, rivers, streams, etc. Urban runoff pollution contaminates water and harms aquatic life!

In Riverside County, report illegal discharges into the storm drain, call
1-800-506-2555
"Only Rain Down the Storm Drain"

Important Links:

Riverside County Household Hazardous Waste Collection Information
1-800-304-2226 or www.rivcowm.org

Riverside County Backyard Composting Program
1-800-366-SAVE

Integrated Pest Management (IPM) Solutions
www.ipm.ucdavis.edu

California Master Gardener Programs
www.mastergardeners.org
www.camastergardeners.ucdavis.edu

California Native Plant Society
www.cnps.org

The Riverside County "Only Rain Down the Storm Drain" Pollution Prevention Program gratefully acknowledges Orange County's Storm Water Program for their contribution to this brochure.

...Only Rain Down ...the Storm Drain

What you should know for... Landscape and Gardening

Best Management tips for:

- Professionals
- Novices
- Landscapers
- Gardeners
- Cultivators

Tips for Landscape & Gardening

This brochure will help you to get the most of your lawn and gardening efforts and keep our waterways clean. Clean waterways provide recreation, establish thriving fish habitats, secure safe sanctuaries for wildlife, and add beauty to our communities. NEVER allow gardening products or waste water to enter the street, gutter or storm drain.

General Landscaping Tips

- Protect stockpiles and materials from wind and rain by storing them under tarps or secured plastic sheeting.
- Prevent erosion of slopes by planting fast-growing, dense ground covering plants. These will shield and bind the soil.

- Plant native vegetation to reduce the amount of water, fertilizers and pesticides applied to the landscape.
- Never apply pesticides or fertilizers when rain is predicted within the next 48 hours.

Garden & Lawn Maintenance

- Do not overwater. Use irrigation practices such as drip irrigation, soaker hoses or micro-spray systems. Periodically inspect and fix leaks and misdirected sprinklers.
- Do not rake or blow leaves, clippings or pruning waste into the street, gutter or storm drain. Instead, dispose of green waste by composting, hauling it to a permitted landfill, or recycling it through your city's program.

- Consider recycling your green waste and adding "nature's own fertilizer" to your lawn or garden.
- Read labels and use only as directed. Do not over-apply pesticides or fertilizers. Apply to spots as needed, rather than blanketing an entire area.
- Store pesticides, fertilizers and other chemicals in a dry covered area to prevent exposure that may result in the deterioration of containers and packaging.
- Rinse empty pesticide containers and re-use rinse water as you would use the product. Do not dump rinse water down storm drains or sewers. Dispose of empty containers in the trash.
- When available, use non-toxic alternatives to traditional pesticides, and use pesticides specifically designed to control the pest you are targeting.
- Try natural long-term common sense solutions first. Integrated Pest Management (IPM) can provide landscaping guidance and solutions, such as:
  - **Physical Controls** - Try hand picking, barriers, traps or caulking holes to control weeds and pests.
  - **Biological Controls** - Use predatory insects to control harmful pests.
  - **Chemical Controls** - Check out www.ipm.ucdavis.edu before using chemicals. Remember, all chemicals should be used cautiously and in moderation.
- If fertilizer is spilled, sweep up the spill before irrigating. If the spill is liquid, apply an absorbent material such as cat litter, and then sweep it up and dispose of it in the trash.
- Take unwanted pesticides to a Household Waste Collection Center to be recycled.
- *Dumping toxics into the street, gutter or storm drain is illegal!*

www.bewaterwise.com Great water conservation tips and drought tolerant garden designs.

www.ourwaterourworld.com Learn how to safely manage home and garden pests.

Additional information can also be found on the back of this brochure.

Helpful telephone numbers and links:

Riverside County Stormwater Protection Partners

Flood Control District	(951) 955-1200
County of Riverside	(951) 955-1000
City of Banning	(951) 922-3105
City of Beaumont	(951) 769-8520
City of Calimesa	(909) 795-9801
City of Canyon Lake	(951) 244-2955
Cathedral City	(760) 770-0327
City of Coachella	(760) 398-4978
City of Corona	(951) 736-2447
City of Desert Hot Springs	(760) 329-6411
City of Eastvale	(951) 361-0900
City of Hemet	(951) 765-2300
City of Indian Wells	(760) 346-2489
City of Indio	(760) 391-4000
City of Lake Elsinore	(951) 674-3124
City of La Quinta	(760) 777-7000
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City of Moreno Valley	(951) 413-3000
City of Murrieta	(951) 304-2489
City of Norco	(951) 270-5607
City of Palm Desert	(760) 346-0611
City of Palm Springs	(760) 323-8299
City of Perris	(951) 943-6100
City of Rancho Mirage	(760) 324-4511
City of Riverside	(951) 361-0900
City of San Jacinto	(951) 654-7337
City of Temecula	(951) 694-6444
City of Wildomar	(951) 677-7751

REPORT ILLEGAL STORM DRAIN DISPOSAL
1-800-506-2555 or e-mail us at
fcnpdes@rcflood.org

- Riverside County Flood Control and Water Conservation District
  www.rcflood.org

Online resources include:

- California Storm Water Quality Association
  www.casqa.org
- State Water Resources Control Board
  www.waterboards.ca.gov
- Power Washers of North America
  www.thepwna.org

Do you know where street flows actually go?

Storm drains are NOT connected to sanitary sewer systems and treatment plants!

The primary purpose of storm drains is to carry *rain* water away from developed areas to prevent flooding. Pollutants discharged to storm drains are transported directly into rivers, lakes and streams. Soaps, degreasers, automotive fluids, litter and a host of materials are washed off buildings, sidewalks, plazas and parking areas. Vehicles and equipment must be properly managed to prevent the pollution of local waterways.

Unintentional spills by mobile service operators can flow into storm drains and pollute our waterways. **Avoid mishaps.** *Always* have a **Spill Response Kit** on hand to clean up unintentional spills. Only emergency **Mechanical** repairs should be done in City streets, using drip pans for spills. **Plumbing** should be done on private property. Always store chemicals in a leak-proof container and keep covered when not in use. **Window/Power Washing** waste water shouldn't be released into the streets, but should be disposed of in a sanitary sewer, landscaped area or in the soil. Soiled **Carpet Cleaning** wash water should be filtered before being discharged into the sanitary sewer. Dispose of all filter debris properly. **Car Washing/Detailing** operators should wash cars on private property and use a regulated hose nozzle for water flow control and runoff prevention. Capture and dispose of waste water and chemicals properly. Remember, storm drains are for receiving rain water runoff only.

REPORT ILLEGAL STORM DRAIN DISPOSAL 1-800-506-2555

Help Protect Our Waterways!

Use these guidelines for Outdoor Cleaning Activities and Wash Water Disposal

Did you know that disposing of pollutants into the street, gutter, storm drain or body of water is *PROHIBITED* by law and can result in stiff penalties?

Best Management Practices

Waste wash water from Mechanics, Plumbers, Window/Power Washers, Carpet Cleaners, Car Washing and Mobile Detailing activities may contain significant quantities of motor oil, grease, chemicals, dirt, detergents, brake pad dust, litter and other materials.

Best Management Practices, or BMPs as they are known, are guides to prevent pollutants from entering the storm drains. ***Each of us*** can do our part to keep stormwater clean by using the suggested BMPs below:

Simple solutions for both light and heavy duty jobs:

Do...consider dry cleaning methods first such as a mop, broom, rag or wire brush. Always keep a spill response kit on site.

Do...prepare the work area before power cleaning by using sand bags, rubber mats, vacuum booms, containment pads or temporary berms to keep wash water away from the gutters and storm drains.

Do...use vacuums or other machines to remove and collect loose debris or litter before applying water.

Do...obtain the property owner's permission to dispose of ***small amounts*** of power washing waste water on to landscaped, gravel or unpaved surfaces.

Do...check your local sanitary sewer agency's policies on wash water disposal regulations before disposing of wash water into the sewer. (See list on reverse side)

Do...be aware that if discharging to landscape areas, soapy wash water may damage landscaping. Residual wash water may remain on paved surfaces to evaporate. Sweep up solid residuals and dispose of properly. Vacuum booms are another option for capturing and collecting wash water.

Do...check to see if local ordinances prevent certain activities.

Do not let...wash or waste water from sidewalk, plaza or building cleaning go into a street or storm drain.

Report illegal storm drain disposal
Call Toll Free
1-800-506-2555

Using Cleaning Agents

Try using biodegradable/phosphate-free products. They are easier on the environment, but don't confuse them with being toxic free. Soapy water entering the storm drain system can impact the delicate aquatic environment.

When cleaning surfaces with a ***high-pressure washer*** or ***steam cleaner***, additional precautions should be taken to prevent the discharge of pollutants into the storm drain system. These two methods of surface cleaning can loosen additional material that can contaminate local waterways.

Think Water Conservation

Minimize water use by using high pressure, low volume nozzles. Be sure to check all hoses for leaks. Water is a precious resource, don't let it flow freely and be sure to shut it off in between uses.

Screening Wash Water

Conduct thorough dry cleanup before washing exterior surfaces, such as buildings and decks ***with loose paint***, sidewalks or plaza areas. Keep debris from entering the storm drain after cleaning by first passing the wash water through a "20 mesh" or finer screen to catch the solid materials, then dispose of the mesh in a refuse container. Do not let the remaining wash water enter a street, gutter or storm drain.

Drain Inlet Protection & Collection of Wash Water

- Prior to any washing, block all storm drains with an impervious barrier such as sandbags or berms, or seal the storm drain with plugs or other appropriate materials.
- Create a containment area with berms and traps or take advantage of a low spot to keep wash water contained.
- Wash vehicles and equipment on grassy or gravel areas so that the wash water can seep into the ground.
- Pump or vacuum up all wash water in the contained area.

Concrete/Coring/Saw Cutting and Drilling Projects

Protect any down-gradient inlets by using dry activity techniques whenever possible. If water is used, minimize the amount of water used during the coring/drilling or saw cutting process. Place a barrier of sandbags and/or absorbent berms to protect the storm drain inlet or watercourse. Use a shovel or wet vacuum to remove the residue from the pavement. Do not wash residue or particulate matter into a storm drain inlet or watercourse.

Parking/Storage Area Maintenance SC-43

Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Targeted Constituents

Sediment	✓
Nutrients	
Trash	✓
Metals	✓
Bacteria	
Oil and Grease	✓
Organics	✓

Description

Parking lots and storage areas can contribute a number of substances, such as trash, suspended solids, hydrocarbons, oil and grease, and heavy metals that can enter receiving waters through stormwater runoff or non-stormwater discharges. The protocols in this fact sheet are intended to prevent or reduce the discharge of pollutants from parking/storage areas and include using good housekeeping practices, following appropriate cleaning BMPs, and training employees.

Approach

The goal of this program is to ensure stormwater pollution prevention practices are considered when conducting activities on or around parking areas and storage areas to reduce potential for pollutant discharge to receiving waters. Successful implementation depends on effective training of employees on applicable BMPs and general pollution prevention strategies and objectives.

Pollution Prevention

- Encourage alternative designs and maintenance strategies for impervious parking lots. (See New Development and Redevelopment BMP Handbook)

- Keep accurate maintenance logs to evaluate BMP implementation.

CASQA California Stormwater Quality Association

SC-43 Parking/Storage Area Maintenance

Suggested Protocols

General

- Keep the parking and storage areas clean and orderly. Remove debris in a timely fashion.
- Allow sheet runoff to flow into biofilters (vegetated strip and swale) and/or infiltration devices.
- Utilize sand filters or oleophilic collectors for oily waste in low quantities.
- Arrange rooftop drains to prevent drainage directly onto paved surfaces.
- Design lot to include semi-permeable hardscape.
- Discharge soapy water remaining in mop or wash buckets to the sanitary sewer through a sink, toilet, clean-out, or wash area with drain.

Controlling Litter

- Post "No Littering" signs and enforce anti-litter laws.
- Provide an adequate number of litter receptacles.
- Clean out and cover litter receptacles frequently to prevent spillage.
- Provide trash receptacles in parking lots to discourage litter.
- Routinely sweep, shovel, and dispose of litter in the trash.

Surface Cleaning

- Use dry cleaning methods (e.g., sweeping, vacuuming) to prevent the discharge of pollutants into the stormwater conveyance system if possible.
- Establish frequency of public parking lot sweeping based on usage and field observations of waste accumulation.
- Sweep all parking lots at least once before the onset of the wet season.
- Follow the procedures below if water is used to clean surfaces:
  - Block the storm drain or contain runoff.
  - Collect and pump wash water to the sanitary sewer or discharge to a pervious surface. Do not allow wash water to enter storm drains.
  - Dispose of parking lot sweeping debris and dirt at a landfill.
- Follow the procedures below when cleaning heavy oily deposits:
  - Clean oily spots with absorbent materials.
  - Use a screen or filter fabric over inlet, then wash surfaces.

- Do not allow discharges to the storm drain.
- Vacuum/pump discharges to a tank or discharge to sanitary sewer.
- Appropriately dispose of spilled materials and absorbents.

Surface Repair

- Preheat, transfer or load hot bituminous material away from storm drain inlets.
- Apply concrete, asphalt, and seal coat during dry weather to prevent contamination from contacting stormwater runoff.
- Cover and seal nearby storm drain inlets where applicable (with waterproof material or mesh) and manholes before applying seal coat, slurry seal, etc. Leave covers in place until job is complete and all water from emulsified oil sealants has drained or evaporated. Clean any debris from these covered manholes and drains for proper disposal.
- Use only as much water as necessary for dust control, to avoid runoff.
- Catch drips from paving equipment that is not in use with pans or absorbent material placed under the machines. Dispose of collected material and absorbents properly.

Inspection

- Have designated personnel conduct inspections of parking facilities and stormwater conveyance systems associated with parking facilities on a regular basis.
- Inspect cleaning equipment/sweepers for leaks on a regular basis.

Training

- Provide regular training to field employees and/or contractors regarding cleaning of paved areas and proper operation of equipment.
- Train employees and contractors in proper techniques for spill containment and cleanup.

Spill Response and Prevention

- Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.
- Place a stockpile of spill cleanup materials where it will be readily accessible or at a central location.
- Clean up fluid spills immediately with absorbent rags or material.
- Dispose of spilled material and absorbents properly.

Other Considerations

Limitations related to sweeping activities at large parking facilities may include high equipment costs, the need for sweeper operator training, and the inability of current sweeper technology to remove oil and grease.

SC-43 Parking/Storage Area Maintenance

Requirements

Costs

Cleaning/sweeping costs can be quite large. Construction and maintenance of stormwater structural controls can be quite expensive as well.

Maintenance

- Sweep parking lot regularly to minimize cleaning with water.
- Clean out oil/water/sand separators regularly, especially after heavy storms.
- Clean parking facilities regularly to prevent accumulated wastes and pollutants from being discharged into conveyance systems during rainy conditions.

Supplemental Information

Further Detail of the BMP

Surface Repair

Apply concrete, asphalt, and seal coat during dry weather to prevent contamination from contacting stormwater runoff. Where applicable, cover and seal nearby storm drain inlets (with waterproof material or mesh) and manholes before applying seal coat, slurry seal, etc. Leave covers in place until job is complete and all water from emulsified oil sealants has drained or evaporated. Clean any debris from these covered manholes and drains for proper disposal. Only use only as much water as is necessary for dust control to avoid runoff.

References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

Clark County Storm Water Pollution Control Manual
http://www.co.clark.wa.us/pubworks/bmpman.pdf

King County Storm Water Pollution Control Manual http://dnr.metrokc.gov/wlr/dss/spcm.htm

Pollution from Surface Cleaning Folder. 1996. Bay Area Stormwater Management Agencies Association (BASMAA). http://www.basmaa.org/

Oregon Association of Clean Water Agencies. Oregon Municipal Stormwater Toolbox for Maintenance Practices. June 1998.

Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp.org

The Storm Water Managers Resource Center http://www.stormwatercenter.net/

Drainage System Maintenance SC-44

Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize

Description

As a consequence of its function, the stormwater conveyance system collects and transports urban runoff and stormwater that may contain certain pollutants. The protocols in this fact sheet are intended to reduce pollutants reaching receiving waters through proper conveyance system operation and maintenance.

Targeted Constituents

Sediment	✓
Nutrients	
Trash	✓
Metals	
Bacteria	✓
Oil and Grease	
Organics	

Approach

Pollution Prevention

Maintain catch basins, stormwater inlets, and other stormwater conveyance structures on a regular basis to remove pollutants, reduce high pollutant concentrations during the first flush of storms, prevent clogging of the downstream conveyance system, restore catch basins' sediment trapping capacity, and ensure the system functions properly hydraulically to avoid flooding.

Suggested Protocols

Catch Basins/Inlet Structures

- Staff should regularly inspect facilities to ensure compliance with the following:
  - Immediate repair of any deterioration threatening structural integrity.
  - Cleaning before the sump is 40% full. Catch basins should be cleaned as frequently as needed to meet this standard.
  - Stenciling of catch basins and inlets (see SC34 Waste Handling and Disposal).

- Clean catch basins, storm drain inlets, and other conveyance structures before the wet season to remove sediments and debris accumulated during the summer.
- Conduct inspections more frequently during the wet season for problem areas where sediment or trash accumulates more often. Clean and repair as needed.
- Keep accurate logs of the number of catch basins cleaned.
- Store wastes collected from cleaning activities of the drainage system in appropriate containers or temporary storage sites in a manner that prevents discharge to the storm drain.
- Dewater the wastes if necessary with outflow into the sanitary sewer if permitted. Water should be treated with an appropriate filtering device prior to discharge to the sanitary sewer. If discharge to the sanitary sewer is not allowed, water should be pumped or vacuumed to a tank and properly disposed. Do not dewater near a storm drain or stream.

Storm Drain Conveyance System

- Locate reaches of storm drain with deposit problems and develop a flushing schedule that keeps the pipe clear of excessive buildup.
- Collect and pump flushed effluent to the sanitary sewer for treatment whenever possible.

Pump Stations

- Clean all storm drain pump stations prior to the wet season to remove silt and trash.
- Do not allow discharge to reach the storm drain system when cleaning a storm drain pump station or other facility.
- Conduct routine maintenance at each pump station.
- Inspect, clean, and repair as necessary all outlet structures prior to the wet season.

Open Channel

- Modify storm channel characteristics to improve channel hydraulics, increase pollutant removals, and enhance channel/creek aesthetic and habitat value.
- Conduct channel modification/improvement in accordance with existing laws. Any person, government agency, or public utility proposing an activity that will change the natural (emphasis added) state of any river, stream, or lake in California, must enter into a Steam or Lake Alteration Agreement with the Department of Fish and Game. The developer-applicant should also contact local governments (city, county, special districts), other state agencies (SWRCB, RWQCB, Department of Forestry, Department of Water Resources), and Federal Corps of Engineers and USFWS.

Illicit Connections and Discharges

- Look for evidence of illegal discharges or illicit connections during routine maintenance of conveyance system and drainage structures:
  - Is there evidence of spills such as paints, discoloring, etc?

- Are there any odors associated with the drainage system?
- Record locations of apparent illegal discharges/illicit connections?
- Track flows back to potential dischargers and conduct aboveground inspections. This can be done through visual inspection of upgradient manholes or alternate techniques including zinc chloride smoke testing, fluorometric dye testing, physical inspection testing, or television camera inspection.
- Eliminate the discharge once the origin of flow is established.

- Stencil or demarcate storm drains, where applicable, to prevent illegal disposal of pollutants. Storm drain inlets should have messages such as "Dump No Waste Drains to Stream" stenciled next to them to warn against ignorant or intentional dumping of pollutants into the storm drainage system.
- Refer to fact sheet SC-10 Non-Stormwater Discharges.

Illegal Dumping

- Inspect and clean up hot spots and other storm drainage areas regularly where illegal dumping and disposal occurs.
- Establish a system for tracking incidents. The system should be designed to identify the following:
  - Illegal dumping hot spots
  - Types and quantities (in some cases) of wastes
  - Patterns in time of occurrence (time of day/night, month, or year)
  - Mode of dumping (abandoned containers, "midnight dumping" from moving vehicles, direct dumping of materials, accidents/spills)
  - Responsible parties
- Post "No Dumping" signs in problem areas with a phone number for reporting dumping and disposal. Signs should also indicate fines and penalties for illegal dumping.
- Refer to fact sheet SC-10 Non-Stormwater Discharges.

Training

- Train crews in proper maintenance activities, including record keeping and disposal.
- Allow only properly trained individuals to handle hazardous materials/wastes.
- Have staff involved in detection and removal of illicit connections trained in the following:
  - OSHA-required Health and Safety Training (29 CFR 1910.120) plus annual refresher training (as needed).

- OSHA Confined Space Entry training (Cal-OSHA Confined Space, Title 8 and Federal OSHA 29 CFR 1910.146).

- Procedural training (field screening, sampling, smoke/dye testing, TV inspection).

Spill Response and Prevention

- Investigate all reports of spills, leaks, and/or illegal dumping promptly.
- Clean up all spills and leaks using "dry" methods (with absorbent materials and/or rags) or dig up, remove, and properly dispose of contaminated soil.
- Refer to fact sheet SC-11 Spill Prevention, Control, and Cleanup.

Other Considerations (Limitations and Regulations)

- Clean-up activities may create a slight disturbance for local aquatic species. Access to items and material on private property may be limited. Trade-offs may exist between channel hydraulics and water quality/riparian habitat. If storm channels or basins are recognized as wetlands, many activities, including maintenance, may be subject to regulation and permitting.
- Storm drain flushing is most effective in small diameter pipes (36-inch diameter pipe or less, depending on water supply and sediment collection capacity). Other considerations associated with storm drain flushing may include the availability of a water source, finding a downstream area to collect sediments, liquid/sediment disposal, and prohibition against disposal of flushed effluent to sanitary sewer in some areas.
- Regulations may include adoption of substantial penalties for illegal dumping and disposal.
- Local municipal codes may include sections prohibiting discharge of soil, debris, refuse, hazardous wastes, and other pollutants into the storm drain system.

Requirements

Costs

- An aggressive catch basin cleaning program could require a significant capital and O&M budget.
- The elimination of illegal dumping is dependent on the availability, convenience, and cost of alternative means of disposal. The primary cost is for staff time. Cost depends on how aggressively a program is implemented. Other cost considerations for an illegal dumping program include:

  - Purchase and installation of signs.

  - Rental of vehicle(s) to haul illegally-disposed items and material to landfills.

  - Rental of heavy equipment to remove larger items (e.g., car bodies) from channels.

  - Purchase of landfill space to dispose of illegally-dumped items and material.

- Methods used for illicit connection detection (smoke testing, dye testing, visual inspection, and flow monitoring) can be costly and time-consuming. Site-specific factors, such as the level of impervious area, the density and ages of buildings, and type of land use will determine the level of investigation necessary.

Maintenance

- Two-person teams may be required to clean catch basins with vactor trucks.
- Teams of at least two people plus administrative personnel are required to identify illicit discharges, depending on the complexity of the storm sewer system.
- Arrangements must be made for proper disposal of collected wastes.
- Technical staff are required to detect and investigate illegal dumping violations.

Supplemental Information

Further Detail of the BMP

Storm Drain Flushing

Flushing is a common maintenance activity used to improve pipe hydraulics and to remove pollutants in storm drainage systems. Flushing may be designed to hydraulically convey accumulated material to strategic locations, such as an open channel, another point where flushing will be initiated, or the sanitary sewer and the treatment facilities, thus preventing resuspension and overflow of a portion of the solids during storm events. Flushing prevents "plug flow" discharges of concentrated pollutant loadings and sediments. Deposits can hinder the designed conveyance capacity of the storm drain system and potentially cause backwater conditions in severe cases of clogging.

Storm drain flushing usually takes place along segments of pipe with grades that are too flat to maintain adequate velocity to keep particles in suspension. An upstream manhole is selected to place an inflatable device that temporarily plugs the pipe. Further upstream, water is pumped into the line to create a flushing wave. When the upstream reach of pipe is sufficiently full to cause a flushing wave, the inflated device is rapidly deflated with the assistance of a vacuum pump, thereby releasing the backed up water and resulting in the cleaning of the storm drain segment.

To further reduce impacts of stormwater pollution, a second inflatable device placed well downstream may be used to recollect the water after the force of the flushing wave has dissipated. A pump may then be used to transfer the water and accumulated material to the sanitary sewer for treatment. In some cases, an interceptor structure may be more practical or required to recollect the flushed waters.

It has been found that cleansing efficiency of periodic flush waves is dependent upon flush volume, flush discharge rate, sewer slope, sewer length, sewer flow rate, sewer diameter, and population density. As a rule of thumb, the length of line to be flushed should not exceed 700 feet. At this maximum recommended length, the percent removal efficiency ranges between 65-75% for organics and 55-65% for dry weather grit/inorganic material. The percent removal efficiency drops rapidly beyond that. Water is commonly supplied by a water truck, but fire hydrants can also supply water. To make the best use of water, it is recommended that reclaimed water be used or that fire hydrant line flushing coincide with storm sewer flushing.

References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

Clark County Storm Water Pollution Control Manual
http://www.co.clark.wa.us/pubworks/bmpman.pdf

Ferguson, B.K. 1991. Urban Stream Reclamation, p. 324-322, Journal of Soil and Water Conservation.

King County Storm Water Pollution Control Manual http://dnr.metrokc.gov/wlr/dss/spcm.htm

Oregon Association of Clean Water Agencies. Oregon Municipal Stormwater Toolbox for Maintenance Practices. June 1998.

Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp.org

The Storm Water Managers Resource Center http://www.stormwatercenter.net

United States Environmental Protection Agency (USEPA). 2002. Pollution Prevention/Good Housekeeping for Municipal Operations Storm Drain System Cleaning. On line:
http://www.epa.gov/npdes/menuofbmps/poll_16.htm

Landscape Maintenance SC-73

Objectives

- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	☑
Metals	
Bacteria	
Oil and Grease	
Organics	
Oxygen Demanding	☑

Description

Landscape maintenance activities include vegetation removal; herbicide and insecticide application; fertilizer application; watering; and other gardening and lawn care practices. Vegetation control typically involves a combination of chemical (herbicide) application and mechanical methods. All of these maintenance practices have the potential to contribute pollutants to the storm drain system. The major objectives of this BMP are to minimize the discharge of pesticides, herbicides and fertilizers to the storm drain system and receiving waters; prevent the disposal of landscape waste into the storm drain system by collecting and properly disposing of clippings and cuttings, and educating employees and the public.

Approach

Pollution Prevention

- Implement an integrated pest management (IPM) program. IPM is a sustainable approach to managing pests by combining biological, cultural, physical, and chemical tools.
- Choose low water using flowers, trees, shrubs, and groundcover.
- Consider alternative landscaping techniques such as naturescaping and xeriscaping.
- Conduct appropriate maintenance (i.e. properly timed fertilizing, weeding, pest control, and pruning) to help preserve the landscapes water efficiency.

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- Consider grass cycling (grass cycling is the natural recycling of grass by leaving the clippings on the lawn when mowing. Grass clippings decompose quickly and release valuable nutrients back into the lawn).

Suggested Protocols

Mowing, Trimming, and Weeding

- Whenever possible use mechanical methods of vegetation removal (e.g mowing with tractor-type or push mowers, hand cutting with gas or electric powered weed trimmers) rather than applying herbicides. Use hand weeding where practical.
- Avoid loosening the soil when conducting mechanical or manual weed control, this could lead to erosion. Use mulch or other erosion control measures when soils are exposed.
- Performing mowing at optimal times. Mowing should not be performed if significant rain events are predicted.
- Mulching mowers may be recommended for certain flat areas. Other techniques may be employed to minimize mowing such as selective vegetative planting using low maintenance grasses and shrubs.
- Collect lawn and garden clippings, pruning waste, tree trimmings, and weeds. Chip if necessary, and compost or dispose of at a landfill (see waste management section of this fact sheet).
- Place temporarily stockpiled material away from watercourses, and berm or cover stockpiles to prevent material releases to storm drains.

Planting

- Determine existing native vegetation features (location, species, size, function, importance) and consider the feasibility of protecting them. Consider elements such as their effect on drainage and erosion, hardiness, maintenance requirements, and possible conflicts between preserving vegetation and the resulting maintenance needs.
- Retain and/or plant selected native vegetation whose features are determined to be beneficial, where feasible. Native vegetation usually requires less maintenance (e.g., irrigation, fertilizer) than planting new vegetation.
- Consider using low water use groundcovers when planting or replanting.

Waste Management

- Compost leaves, sticks, or other collected vegetation or dispose of at a permitted landfill. Do not dispose of collected vegetation into waterways or storm drainage systems.
- Place temporarily stockpiled material away from watercourses and storm drain inlets, and berm or cover stockpiles to prevent material releases to the storm drain system.
- Reduce the use of high nitrogen fertilizers that produce excess growth requiring more frequent mowing or trimming.

- Avoid landscape wastes in and around storm drain inlets by either using bagging equipment or by manually picking up the material.

Irrigation

- Where practical, use automatic timers to minimize runoff.
- Use popup sprinkler heads in areas with a lot of activity or where there is a chance the pipes may be broken. Consider the use of mechanisms that reduce water flow to sprinkler heads if broken.
- Ensure that there is no runoff from the landscaped area(s) if re-claimed water is used for irrigation.
- If bailing of muddy water is required (e.g. when repairing a water line leak), do not put it in the storm drain; pour over landscaped areas.
- Irrigate slowly or pulse irrigate to prevent runoff and then only irrigate as much as is needed.
- Apply water at rates that do not exceed the infiltration rate of the soil.

Fertilizer and Pesticide Management

- Utilize a comprehensive management system that incorporates integrated pest management (IPM) techniques. There are many methods and types of IPM, including the following:
  - Mulching can be used to prevent weeds where turf is absent, fencing installed to keep rodents out, and netting used to keep birds and insects away from leaves and fruit.
  - Visible insects can be removed by hand (with gloves or tweezers) and placed in soapy water or vegetable oil. Alternatively, insects can be sprayed off the plant with water or in some cases vacuumed off of larger plants.
  - Store-bought traps, such as species-specific, pheromone-based traps or colored sticky cards, can be used.
  - Slugs can be trapped in small cups filled with beer that are set in the ground so the slugs can get in easily.
  - In cases where microscopic parasites, such as bacteria and fungi, are causing damage to plants, the affected plant material can be removed and disposed of (pruning equipment should be disinfected with bleach to prevent spreading the disease organism).
  - Small mammals and birds can be excluded using fences, netting, tree trunk guards.
  - Beneficial organisms, such as bats, birds, green lacewings, ladybugs, praying mantis, ground beetles, parasitic nematodes, trichogramma wasps, seed head weevils, and spiders that prey on detrimental pest species can be promoted.
- Follow all federal, state, and local laws and regulations governing the use, storage, and disposal of fertilizers and pesticides and training of applicators and pest control advisors.

- Use pesticides only if there is an actual pest problem (not on a regular preventative schedule).
- Do not use pesticides if rain is expected. Apply pesticides only when wind speeds are low (less than 5 mph).
- Do not mix or prepare pesticides for application near storm drains.
- Prepare the minimum amount of pesticide needed for the job and use the lowest rate that will effectively control the pest.
- Employ techniques to minimize off-target application (e.g. spray drift) of pesticides, including consideration of alternative application techniques.
- Fertilizers should be worked into the soil rather than dumped or broadcast onto the surface.
- Calibrate fertilizer and pesticide application equipment to avoid excessive application.
- Periodically test soils for determining proper fertilizer use.
- Sweep pavement and sidewalk if fertilizer is spilled on these surfaces before applying irrigation water.
- Purchase only the amount of pesticide that you can reasonably use in a given time period (month or year depending on the product).
- Triple rinse containers, and use rinse water as product. Dispose of unused pesticide as hazardous waste.
- Dispose of empty pesticide containers according to the instructions on the container label.

Inspection

- Inspect irrigation system periodically to ensure that the right amount of water is being applied and that excessive runoff is not occurring. Minimize excess watering, and repair leaks in the irrigation system as soon as they are observed.
- Inspect pesticide/fertilizer equipment and transportation vehicles daily.

Training

- Educate and train employees on use of pesticides and in pesticide application techniques to prevent pollution. Pesticide application must be under the supervision of a California qualified pesticide applicator.
- Train/encourage municipal maintenance crews to use IPM techniques for managing public green areas.
- Annually train employees within departments responsible for pesticide application on the appropriate portions of the agency's IPM Policy, SOPs, and BMPs, and the latest IPM techniques.

- Employees who are not authorized and trained to apply pesticides should be periodically (at least annually) informed that they cannot use over-the-counter pesticides in or around the workplace.
- Use a training log or similar method to document training.

Spill Response and Prevention

- Refer to SC-11, Spill Prevention, Control & Cleanup
- Have spill cleanup materials readily available and in a know in location
- Cleanup spills immediately and use dry methods if possible.
- Properly dispose of spill cleanup material.

Other Considerations

- The Federal Pesticide, Fungicide, and Rodenticide Act and California Title 3, Division 6, Pesticides and Pest Control Operations place strict controls over pesticide application and handling and specify training, annual refresher, and testing requirements. The regulations generally cover: a list of approved pesticides and selected uses, updated regularly; general application information; equipment use and maintenance procedures; and record keeping. The California Department of Pesticide Regulations and the County Agricultural Commission coordinate and maintain the licensing and certification programs. All public agency employees who apply pesticides and herbicides in "agricultural use" areas such as parks, golf courses, rights-of-way and recreation areas should be properly certified in accordance with state regulations. Contracts for landscape maintenance should include similar requirements.
- All employees who handle pesticides should be familiar with the most recent material safety data sheet (MSDS) files.
- Municipalities do not have the authority to regulate the use of pesticides by school districts, however the California Healthy Schools Act of 2000 (AB 2260) has imposed requirements on California school districts regarding pesticide use in schools. Posting of notification prior to the application of pesticides is now required, and IPM is stated as the preferred approach to pest management in schools.

Requirements

Costs

Additional training of municipal employees will be required to address IPM techniques and BMPs. IPM methods will likely increase labor cost for pest control which may be offset by lower chemical costs.

Maintenance

Not applicable

Supplemental Information

Further Detail of the BMP

Waste Management

Composting is one of the better disposal alternatives if locally available. Most municipalities either have or are planning yard waste composting facilities as a means of reducing the amount of waste going to the landfill. Lawn clippings from municipal maintenance programs as well as private sources would probably be compatible with most composting facilities

Contractors and Other Pesticide Users

Municipal agencies should develop and implement a process to ensure that any contractor employed to conduct pest control and pesticide application on municipal property engages in pest control methods consistent with the IPM Policy adopted by the agency. Specifically, municipalities should require contractors to follow the agency's IPM policy, SOPs, and BMPs; provide evidence to the agency of having received training on current IPM techniques when feasible; provide documentation of pesticide use on agency property to the agency in a timely manner.

References and Resources

King County Stormwater Pollution Control Manual. Best Management Practices for Businesses. 1995. King County Surface Water Management. July. On-line: http://dnr.metrokc.gov/wlr/dss/spcm.htm

Los Angeles County Stormwater Quality Model Programs. Public Agency Activities http://ladpw.org/wmd/npdes/model_links.cfm

Model Urban Runoff Program: A How-To Guide for Developing Urban Runoff Programs for Small Municipalities. Prepared by City of Monterey, City of Santa Cruz, California Coastal Commission, Monterey Bay National Marine Sanctuary, Association of Monterey Bay Area Governments, Woodward-Clyde, Central Coast Regional Water Quality Control Board. July. 1998.

Orange County Stormwater Program http://www.ocwatersheds.com/StormWater/swp_introduction.asp

Santa Clara Valley Urban Runoff Pollution Prevention Program. 1997 Urban Runoff Management Plan. September 1997, updated October 2000.

United States Environmental Protection Agency (USEPA). 2002. Pollution Prevention/Good Housekeeping for Municipal Operations Landscaping and Lawn Care. Office of Water. Office of Wastewater Management. On-line: http://www.epa.gov/npdes/menuofbmps/poll_8.htm

Trash Storage Areas SD-32

Description

Trash storage areas are areas where a trash receptacle (s) are located for use as a repository for solid wastes. Stormwater runoff from areas where trash is stored or disposed of can be polluted. In addition, loose trash and debris can be easily transported by water or wind into nearby storm drain inlets, channels, and/or creeks. Waste handling operations that may be sources of stormwater pollution include dumpsters, litter control, and waste piles.

Approach

This fact sheet contains details on the specific measures required to prevent or reduce pollutants in stormwater runoff associated with trash storage and handling. Preventative measures including enclosures, containment structures, and impervious pavements to mitigate spills, should be used to reduce the likelihood of contamination.

Design Objectives

- Maximize Infiltration
- Provide Retention
- Slow Runoff
- Minimize Impervious Land Coverage
- Prohibit Dumping of Improper Materials
- ☑ Contain Pollutants
- Collect and Convey

Suitable Applications

Appropriate applications include residential, commercial and industrial areas planned for development or redevelopment. (Detached residential single-family homes are typically excluded from this requirement.)

Design Considerations

Design requirements for waste handling areas are governed by Building and Fire Codes, and by current local agency ordinances and zoning requirements. The design criteria described in this fact sheet are meant to enhance and be consistent with these code and ordinance requirements. Hazardous waste should be handled in accordance with legal requirements established in Title 22, California Code of Regulation.

Wastes from commercial and industrial sites are typically hauled by either public or commercial carriers that may have design or access requirements for waste storage areas. The design criteria in this fact sheet are recommendations and are not intended to be in conflict with requirements established by the waste hauler. The waste hauler should be contacted prior to the design of your site trash collection areas. Conflicts or issues should be discussed with the local agency.

Designing New Installations

Trash storage areas should be designed to consider the following structural or treatment control BMPs:

- Design trash container areas so that drainage from adjoining roofs and pavement is diverted around the area(s) to avoid run-on. This might include berming or grading the waste handling area to prevent run-on of stormwater.
- Make sure trash container areas are screened or walled to prevent off-site transport of trash.

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- Use lined bins or dumpsters to reduce leaking of liquid waste.
- Provide roofs, awnings, or attached lids on all trash containers to minimize direct precipitation and prevent rainfall from entering containers.
- Pave trash storage areas with an impervious surface to mitigate spills.
- Do not locate storm drains in immediate vicinity of the trash storage area.
- Post signs on all dumpsters informing users that hazardous materials are not to be disposed of therein.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. The definition of " redevelopment" must be consulted to determine whether or not the requirements for new development apply to areas intended for redevelopment. If the definition applies, the steps outlined under "designing new installations" above should be followed.

Additional Information

Maintenance Considerations

The integrity of structural elements that are subject to damage (i.e., screens, covers, and signs) must be maintained by the owner/operator. Maintenance agreements between the local agency and the owner/operator may be required. Some agencies will require maintenance deed restrictions to be recorded of the property title. If required by the local agency, maintenance agreements or deed restrictions must be executed by the owner/operator before improvement plans are approved.

Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

Ventura Countywide Technical Guidance Manual for Stormwater Quality Control Measures, July 2002.

Appendix E

Focused Fairy Shrimp Results Report

January 31, 2024 15342

U.S. Fish and Wildlife Service
Attention: Stacey Love, Recovery Permit Coordinator
2177 Salk Avenue, Suite 250
Carlsbad, California 92008

Subject: Survey Summary Report for the 2022/2023 Protocol-Level, Wet Season Large Branchiopod Survey for the Proposed Double Butte Battery Energy Storage Project, City of Menifee, Riverside County, California

Dear Stacey Love:

This letter provides a summary of the 2022/2023 protocol-level, wet season survey for federally listed large branchiopod species (i.e., fairy shrimp species) conducted in 21 basins by Senior Wildlife Biologist, Brock Ortega of (TE813545-09) Dudek for the proposed Double Butte Battery Energy Storage Project (Project) in the City of Menifee, Riverside County, California (Attachment A; Figure 1). The 2022/2023 wet season fairy shrimp survey followed the most recent U.S. Fish and Wildlife Service (USFWS) survey guidelines, titled *Survey Guidelines for the Listed Large Branchiopods* and dated November 13, 2017 (USFWS 2017). This wet season fairy shrimp survey satisfies a portion of the current USFWS survey requirements, which will include two complete wet season survey within a 3-year period. Because of the extraordinary rain season and late season rains, the survey ran through October 2023.

The following report provides a brief description of the proposed project, the fairy shrimp species that have a potential to occur within the vicinity of the proposed project, the survey methods, and the results of the wet season fairy shrimp survey.

PROPOSED PROJECT LOCATION & DESCRIPTION

The Project site consists of approximately 27 acres of land on seven parcels identified as Assessor's Parcel Number (APN) 331-190-010, 331-190-011, 331-190-014, 331-190-017, 331-190-047, 331-190-060, and 331-190-056, and 17.8 acres of land for a construction laydown yard identified as APN 331-240-011 (Figure 1). All parcels are located in the City of Menifee, California. The Project will include the construction and operation of a 500-megawatt utility-scale (lithium-ion, flow, or other technology) battery energy storage system. The primary electrical equipment includes battery modules and power conversion equipment.

The majority of the project area is relatively flat and the areas that supported ponding water are on a large, graded pad that includes a mix of gravel, hard-packed soil and ruderal vegetation. The largest ponded areas are situated in the northwest within excavated areas. These areas did merge on a couple of occasions due to the amount of rainfall. One of the areas stayed hydrated for most of the year. The basins appear to be filled by direct rainfall and surrounding surface flows. The majority of the basins provide low quality habitat for fairy shrimp because they appear to be repeatedly impacted by vehicle traffic from mowing, discing, and other maintenance activities. Representative photographs of the basins are provided in Attachment B.

FAIRY SHRIMP NATURAL HISTORY

The project area contains 21 basins that provide fairy shrimp habitat with potential to support the common, non-sensitive versatile fairy shrimp (*Branchinecta lindahli*), as well as three federally listed fairy shrimp species, vernal

pool fairy shrimp (*Branchinecta lynchi*), Riverside fairy shrimp (*Streptocephalus woottoni*), and San Diego fairy shrimp (*Branchinecta sandiegonensis*).

The Riverside fairy shrimp was federally listed as endangered in August of 1993 (USFWS 1993) and is a Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP)-covered species. On December 4, 2012, USFWS published a Final Rule revising the critical habitat for the Riverside fairy shrimp that became effective on January 3, 2013 (USFWS 2012). The revised critical habitat now includes land in three units in Ventura, Orange, and San Diego counties, California, for a total of approximately 1,724 acres of critical habitat for this species. No critical habitat for Riverside fairy shrimp occurs in Riverside County in the original or revised Final Rules.

The vernal pool fairy shrimp was federally listed as threatened on September 19, 1994 (USFWS 1994) and is a MSHCP-covered species. On August 11, 2005, USFWS published a Final Rule designating 858,846 acres of critical habitat for four vernal pool crustaceans and 11 vernal pool plants that became effective on September 12, 2005 (USFWS 2005). This critical habitat includes 597,821 acres of land from Oregon south to Ventura County, California. No critical habitat for vernal pool fairy shrimp occurs in Riverside County in this Final Rule.

The San Diego fairy shrimp was federally listed as endangered in February 1997 (USFWS 1997). On December 12, 2007, USFWS published a Final Rule revising the critical habitat for the San Diego fairy shrimp that became effective on January 11, 2008 (USFWS 2007). This revised Final Rule designated critical habitat for the San Diego fairy shrimp to include approximately 3,082 acres of habitat in five units, with a total of 29 subunits throughout Orange and San Diego counties, California. No critical habitat for San Diego fairy shrimp occurs in Riverside County in the original or revised Final Rules.

SURVEY METHODS

The wet season fairy shrimp survey followed the most recent USFWS survey guidelines, titled *Survey Guidelines for the Listed Large Branchiopods* and dated November 13, 2017 (USFWS 2017). This wet season fairy shrimp survey satisfies a portion of the current USFWS survey requirements, which include a minimum of one complete dry season survey and one complete wet season survey within a 3-year period.

Following approval from USFWS to conduct the wet season fairy shrimp survey, Dudek immediately initiated sampling efforts. During the initial sampling event, Dudek assessed the entire project area for inundated/potential basins and sampled all inundated basins identified. During each subsequent sampling event, Dudek visited all basins that were inundated during the previous sampling event to determine if the basins were still holding water. If a rain event occurred between sampling events, Dudek also visited all known and potential basins that may have been inundated by the rain event while also re-assessing the survey area for new basins.

During each sampling event, Dudek biologists recorded information about each inundated basin, such as air temperature, water temperature, average depth, approximate size, habitat condition (if changed), voucher information, and other relevant notes. Dudek sampled each inundated basin by sweeping a hand-held net through the water, examining the net contents, and recording all aquatic species. For fairy shrimp species observed, Dudek noted the reproductive status and approximate numbers of fairy shrimp in each basin and identified the species in the field with a hand lens or in the lab with a microscope if field identification was not possible. In addition, as necessary during the survey season, Dudek estimated the maximum depth of each basin and estimated the maximum surface area of each basin by using a handheld Global Positioning Systems (GPS) unit to record the approximate boundaries of each basin. Dudek completed the basin sampling once a basin dried up and was not re-inundated during the wet season or once the basin reached 120 days of continual inundation. Because of the continued rain events throughout the year, the survey commenced through October 2023.

Mature male and female fairy shrimp voucher specimens were collected from as many basins as possible during the wet season survey. These fairy shrimp voucher specimens, along with a copy of the Vernal Pool Data Sheet, will be submitted to the collections department at the Natural History Museum of Los Angeles.

RESULTS

The following sections provide a summary of the 2022/2023 rainfall totals and the wet season survey results.

Summary of Rainfall

Attachment C provides a summary of precipitation statistics, including monthly precipitation totals for the 2022/2023 survey season as well as the historical average monthly precipitation totals from the Riverside Municipal Airport (National Oceanic and Atmospheric Administration [NOAA] 2022 and 2023).

The precipitation total for the covered 2022/2023 rainy season was above average, with a total of 15.68 inches recorded between October 2022 and October 2023, compared to an average of 9.09 inches normally recoded during this time period. The first significant precipitation of the 2022/2023 wet season occurred on October 11 and 15, 2022, the only days with precipitation in October 2022. Precipitation was slightly below average in October 2022 with 0.20 inches, more than two times above average in November 2022 with 1.30 inches, slightly above average in December 2022 with 2.02 inches, slightly above average in January 2023 with 3.09 inches, slightly below average in February 2023 with 1.95 inches, more than 3.5 times above average in March 2023 with 4.25 inches, more than 10 times below average in April 2023 with 0.05 inches, and more than 2 times above average in May 2023 with 0.47 inches. Additional large storms occurred on August 20 and 21, 2023 and September 1, 2023, with smaller storms in October 2023.

The project area is in Western Riverside County in Southern California, which is currently not classified as being under drought conditions according to the Palmer Drought Index as of August 2023 (National Integrated Drought Information Center 2023). The Palmer Drought Index is a measurement of dryness based on recent precipitation and temperature, which can be used to determine long-term drought conditions on a regional level.

Summary of Survey Results

A survey summary is provided in Attachment C. The site was reviewed for pools that satisfied minimum pool depths that would initiate surveys from the outset of the rainy season. The first pools met criteria on October 16, 2022, and these were watched on a weekly basis, until permission was granted to perform surveys (November 14, 2022. During that time, no pools had fairy shrimp until November 13, 2022. Surveys continued until October 25, 2023. Basins filled, dried, and refilled during this period. All but the “Main Pool 1” and “Main Pool 2” were dry when the study finished. Attachment D provides a summary of the wet season survey dates, times, and conditions during each survey.

The wet season survey consisted of a total of 44 sampling visits to 21 basins within the project survey area. Wet season sampling was performed by USFWS-permitted biologist Brock Ortega (TE-813545-9). Figure 2 depicts the location of each feature. Of the 21 basins that were sampled within the project area, fairy shrimp were detected in one (1) basin. The only species detected was versatile fairy shrimp (*Branchinecta lindahli*). Representative organisms present within many of the larger features, as indicated in Attachment 6, include species such as oar-feet (Class Copepoda), seed shrimp (Class Ostracoda), water flea (Order Cladocera), predaceous diving beetle (Order Coleoptera), water boatmen (Order Hemiptera), mosquito larvae (Order Diptera), midge larvae (Order Diptera), western spadefoot toad (*Spea hammondi*).

Attachment E provides a table summarizing the overall survey results for the entire wet season survey, including actual maximum depth and actual maximum surface area for the features basins; the fairy shrimp and other species observed; habitat conditions, disturbance types, and disturbance level. Attachment 6 provides a table of the actual survey data collected during each survey date.

The project area contains a variety of basins, such as excavated basins, road ruts, ditches, tire tracks, and other depressions, that provide potential fairy shrimp habitat. The basins appear to be filled by direct rainfall and surrounding surface flows. The majority of the basins provide low quality habitat for fairy shrimp because they occur on gravelly fill soils and appear to be repeatedly impacted by vehicle traffic from the surrounding area plus, mowing and discing. Attachment 2 provides representative photographs of the basins.

SUMMARY

Of the 21 basins that were sampled within the project area, fairy shrimp were detected in one basin and only the common versatile fairy shrimp was detected. No Riverside fairy shrimp, vernal pool fairy shrimp, or San Diego fairy shrimp were observed in the project area during the 2022/2023 wet season survey.

The 2022/2023 wet season fairy shrimp survey satisfies a portion of the current USFWS survey requirements, which include a minimum of one complete dry season survey and one complete wet season survey within a 3-year period. However, subsequent communication with the Carlsbad office allowed for a second wet season survey to replace the dry season survey.

I certify that the information in this survey report and attached exhibits fully and accurately represents my work.

Please feel free to contact Brock Ortega at bortega@dudek.com or 619.884.0467 if you have any questions regarding the contents of this report.

Sincerely

Brock Ortega
Permit #TE-813545-9
Dudek

Att.: *Figures*
Attachment A – Figures
Attachment B – Representative Photographs
Attachment C – Survey Summary Information
Attachment D – Survey Conditions
Attachment E – Feature Data

References

National Integrated Drought Information Center
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2005 Endangered and Threatened Wildlife and Plants; Final Designation of Critical Habitat for Four Vernal Pool Crustaceans and Eleven Vernal Pool Plants in California and Southern Oregon; Final Rule. *Federal Register* 70(154): 46923–46999. Washington, D.C.: USFWS.

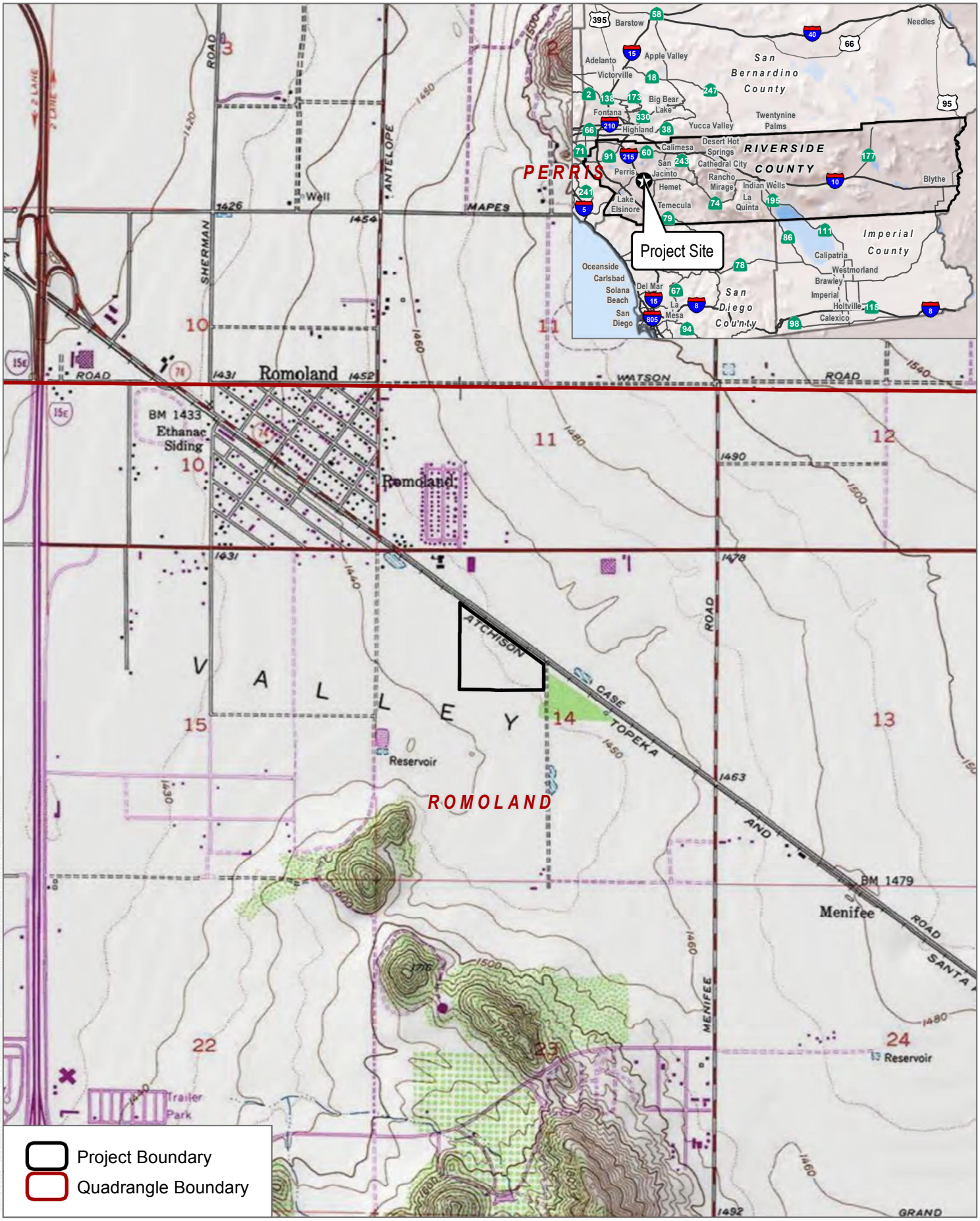
2007 Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the San Diego Fairy Shrimp (*Branchinecta sandiegonensis*). 50 CFR Part 17.

2012 Endangered and Threatened Wildlife and Plants; Revised Critical Habitat for the Riverside Fairy Shrimp; Final Rule. *Federal Register* 77(233): 72070–72140. Washington, D.C.: USFWS.

2017 Survey Guidelines for the Listed Large Branchiopods. Nov 13.

Attachment A

Figures



SOURCE: USA Topo Maps 7.5 Minute Series Romoland Quadrangle
Township 5S; Range 3W; Section 14

DUDEK

0 1,000 2,000 Feet
1:24,000

FIGURE 1

Project Location

2022/2023 Wet Season Large Branchiopod Survey for the Proposed Double Butte Battery Energy Storage Project

SOURCE: Bing Maps; Riverside County 2023

DUDEK

0 135 270 Feet

FIGURE 2

Riverine, Vernal Pool, and Fairy Shrimp Habitat

2022/2023 Wet Season Large Branchiopod Survey for the Proposed Double Butte Battery Energy Storage Project

Attachment B

Representative Photographs

	Photograph 1. View of Main Pool 1 showing feature and tracks (taken 11/17/22; facing north).
	Photograph 2. View of Main Pool 2 and covered road between in and Main Pool 1. Suring the peak, both pools were connected. (taken 2/1/23; facing south).
	Photograph 3. View of smaller features and pad area (taken 2/1/23; facing southwest).

Attachment C

Survey Summary Information

Rain Date	Rain Amount	Survey Date	Criteria Features Present?	Surveyed Features	Shrimp Present?	Estimated Numbers	Comment
10/11/2022	0.03						
		10/12/2022	no		no		
10/15/2022	0.17						
		10/16/2022	yes	Main Pool 1	no		
		10/23/2022	yes	Main Pool 1	no		
		10/30/2022	yes	Main Pool 1	no		
11/2/2022	0.05						
11/5/2022	0.05						
		11/6/2022	yes	Main Pool 1	no		
11/8/2022	0.98						
11/9/2022	0.22						
		11/13/2022	yes	Main Pool 1,Main Pool 2, 11	yes - too small to ID (Feature Main Pool 1)	1,000	11/14/22 survey approved by FWS
		11/17/2022	yes	Main Pool 1,Main Pool 2, 11	yes - too small to ID (Feature Main Pool 1)	500	
		11/24/2022	yes	Main Pool 1,Main Pool 2, 11	Yes-collected (Feature Main Pool 1)	100	Identified on 12/02/2022 as BRLI
		11/30/2022	yes	Main Pool 1,Main Pool 2, 11	Yes - few (Feature Main Pool 1)	10	BRLI
12/2/2022	0.01						
12/4/2022	0.04						
12/5/2022	T						
12/6/2022	T						
		12/7/2022	yes	Main Pool 1,Main Pool 2, 11	Yes - few (Feature Main Pool 1)	10	BRLI
12/11/2022	0.48						
12/12/2022	0.32						

		12/14/2022	yes	Main Pool 1, Main Pool 2, 11, 16, 19	no		
		12/21/2022	yes	Main Pool 1, Main Pool 2, 11, 16, 19	no		
12/27/2022	0.35						
12/28/2022	0.06						
12/29/2022	T	12/29/2022	yes	Main Pool 1, Main Pool 2, 11, 16, 17, 19	no		
12/30/2022	0.01						
12/31/2022	0.75						
1/1/2023	0.2						
1/2/2023	0.04						
1/3/2023	0.08						
1/4/2023	0.03	1/4/2023	yes	Main Pool 1, Main Pool 2, 11, 12, 14, 16, 17, 18, 19	no		
1/5/2023	0.42						
1/9/2023	T						
1/10/2023	0.23						
		1/11/2023	yes	Main Pool 1, Main Pool 2, 11, 12, 14, 16, 17, 18, 19	no		
1/14/2023	1.12						
1/15/2023	0.59						
1/16/2023	0.31						
1/17/2023	T						
1/19/2023	T	1/19/2023	yes	Main Pool 1, Main Pool 2, 11, 16, 17, 19	no		
1/28/2023	T						
1/29/2023	0.03						
1/30/2023	0.04						
		2/1/2023	yes	Main Pool 1, Main Pool 2, 11, 16, 19	no		

2/5/2023	T	2/5/2023	yes	Main Pool 1, Main Pool 2, 11, 19	no		
2/12/2023		2/12/2023	yes	Main Pool 1, Main Pool 2	no		Features 1 & 2 meet 120 criteria
2/13/2023	T						
2/14/2023	0.22						
		2/19/2023		Main Pool 1, Main Pool 2, 11, 16, 19	no		
2/21/2023	T						
2/22/2023	0.01						
2/23/2023	0.29						
2/24/2023	0.09						
2/25/2023	1.21						
2/26/2023	0.06	2/26/2023		Main Pool 1, Main Pool 2, 11, 16, 19	no		
2/27/2023	0.03						
2/28/2023	0.04						
3/1/2023	0.04						
3/5/2023	T	3/5/2023		Main Pool 1, Main Pool 2, 11, 19	no		
3/6/2023	0.03						
3/10/2023	0.59						
3/11/2023	0.08						
		3/12/2023		Main Pool 1, Main Pool 2, 3b, 4, 5, 9, 10, 11, 12, 14, 15, 16, 17, 18, 19	no		
3/14/2023	0.7						
3/15/2023	0.71						
3/16/2023	0.01						
3/19/2023	0.01	3/19/2023		Main Pool 1, Pain Pool 2, 1, 2, 3a, 3b, 4,	no		

				5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19			
3/20/2023	T						
3/21/2023	1.08						
3/22/2023	0.43						
		3/26/2023		Main Pool 1, Pain Pool 2, 1, 2, 3a, 3b, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19	no		
3/29/2023	0.35						
3/30/2023	0.22						
		4/2/2023		Main Pool 1, Pain Pool 2, 1, 2, 3a, 3b, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19	no		
		4/9/2023		Main Pool 1, Pain Pool 2, 1, 2, 3a, 3b, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19	no		
4/12/2023	0.02						
4/13/2023	0.02						
4/14/2023	T						
		4/16/2023		Main Pool 1, Main Pool 2, 5, 11, 12, 14, 15, 16, 17, 18, 19	no		
		4/23/2023		Main Pool 1, Main	no		

				Pool 2, 11, 16, 17, 19			
		4/30/2023		Main Pool 1, Main Pool 2, 11, 19	no		
5/1/2023	0.02						
5/2/2023	T						
5/4/2023	0.44						
5/5/2023	0.01						
		5/7/2023		Main Pool 1, Main Pool 2	no		
5/9/2023	T						
		5/14/2023		0			
		5/21/2023		0			
5/28/2023	T	5/28/2023		0			
		6/4/2023		0			
6/7/2023	T						
6/11/2023	0.02	6/11/2023		0			
7/31/2023	0.03						
8/1/2023	T	8/1/2023		0			
8/9/2023	T						
8/10/2023	0.03						
		8/11/2023		0			
8/16/2023	T						
8/20/2023	1.83						
8/21/2023	0.13						
		8/22/2023		Main Pool 1, Main Pool 2, 11, 16, 19	no		
		8/29/2023		Main Pool 1, Main Pool 2	no		
9/1/2023	0.28						
9/2/2023	T						
9/3/2023	T						
		9/4/2023		Main Pool 1	no		
9/10/2023	0.03						
9/11/2023	T						
		9/12/2023		Main Pool 1	no		

		9/19/2023		Main Pool 1	no		
9/30/2023	T						
10/1/2023	T						
10/11/2023	0.01						
		10/12/2023		Main Pool 1	no		
10/25/2023	T						

Attachment D

Survey Conditions

Survey Date	Temp (C)	Wind (mph)	Clouds (%)
10/12/2022	21	1-5	100
10/16/2022	15	3	90
10/23/2022	15	3	100
10/30/2022	20	1-3	50
11/6/2022	15	0-5	60
11/13/2022	5	1-3	100
11/17/2022	15	1-3	100
11/24/2022	15	5	100
11/30/2022	10	5-10	90
12/7/2022	11	5	90
12/14/2022	10	3	50
12/21/2022	12	3	70
12/29/2022	10	1-3	100
1/4/2023	11	0-3	100
1/11/2023	10	1-5	100
1/19/2023	5-10	5	0
2/1/2023	12	3	0
2/5/2023	10-15	0-5	0
2/12/2023	7-10	0-3	0
2/19/2023	15-20	0-5	0
2/26/2023	15-20	0-3	0-80
3/5/2023	6-12	0-5	60
3/12/2023	10	0	75
3/19/2023	13	5-10	40
3/26/2023	14	3	50
4/2/2023	12	5	70
4/9/2023	13	1-5	80
4/16/2023	15	3	100
4/23/2023	15	5	100
4/30/2023	10	1-3	100
5/7/2023	10	0	100
5/14/2023	20	0	0
5/21/2023	25	3-5	50
5/28/2023	15	1-3	50
6/4/2023	20	1-3	25
6/11/2023	19	3-5	0
8/1/2023	32	1-3	0
8/11/2023	30	1-10	100
8/22/2023	30	0-3	0
8/29/2023	38	1-3	50
9/4/2023	27	3-5	30
9/12/2023	28	1-3	30

9/19/2023	28	1-3	0
10/12/2023	23	0-5	10

Attachment E

Feature Data

Feature ID	Inundated Date Range	Survey Date Range	Maximum Temp (C)	Maximum Depth (cm)	Maximum Surface Area (ac)	Maximum number of Branchiopods	Copepods	Ostracods	Cladocera	Coleptera	Hemiptera	Mosquito larvae	Midge larvae	Amphibians	Habitat Conditions
Main Pool 1	10/16/22-5/7/23; 8/22/23-10/12/23+	10/16/22-2/12/23 Meets 120-day criteria	20	40	0.23	1,000	X	X	X	X	X	X	X	Western spadefoot	Constructed, Disturbed
Main Pool 2	11/13/22-5/7/23; 8/22/23-9/4/23	10/16/22-2/12/23 Meets 120-day criteria	16	38	0.24	0	X	X	X		X				Constructed, Disturbed
1	3/12/23-4/9/23	3/12/23-4/9/23	14	6	0.004										Constructed, Disturbed
2	3/12/23-4/9/23	3/12/23-4/9/23	13	5	0.003										Constructed, Disturbed
3a	3/19/23-4/9/23	3/19/23-4/9/23	15	38	0.01	0									Constructed, Disturbed
3b	3/12/23-4/9/23	3/12/23-4/9/23	14	7	0.01	0									Constructed, Disturbed

4	3/12/23-4/9/23	3/12/23-4/9/23	15	6	0.01	0									Constructed, Disturbed
5	3/12/23-4/9/23	3/12/23-4/9/23	16	5	0.02	0									Constructed, Disturbed
6	3/12/23-4/9/23	3/12/23-4/9/23	15	6	0.01	0		X							Constructed, Disturbed
7	3/12/23-4/9/23	3/12/23-4/9/23	16	5	0.01	0	X					X			Constructed, Disturbed
8	3/12/23-4/9/23	3/12/23-4/9/23	15	6	0.01	0	X								Constructed, Disturbed
9	3/12/23-4/9/23	3/12/23-4/9/23	15	5	0.01	0	X								Constructed, Disturbed
10	3/12/23-4/9/23	3/12/23-4/9/23	16	7	0.01	0	X								Constructed, Disturbed
11	11/13/22-2/5/23; 2/19/23-4/30/23; 8/22/23	11/13/22-2/5/23; 2/19/23-4/30/23; 8/22/23	16	6	0.03	0	X	X	X			X			Constructed, Disturbed
12	1/4/23-1/11/23; 3/12/23-4/16/23	1/4/23-1/11/23; 3/12/23-4/16/23	15	5	0.01	0									Constructed, Disturbed
13	3/19/23-4/9/23	3/19/23-4/9/23	13	5	0.01	0						X			Constructed, Disturbed
14	1/4/23-1/11/23; 3/12/23-4/16/23	1/4/23-1/11/23; 3/12/23-4/16/23	13	5	0.01	0									Constructed, Disturbed

15	3/12/23-4/9/23	3/12/23-4/9/23	14	6	0.02	0									Constructed, Disturbed
16	12/14/22-2/1/23; 2/19/23-2/26/23; 3/12/23-4/23/23; 8/22/23	12/14/22-2/1/23; 2/19/23-2/26/23; 3/12/23-4/23/23; 8/22/23	15	10	0.09	0	X	X							Constructed, Disturbed
17	12/29/22-1/19/23; 3/12/23-4/23/23	12/29/22-1/19/23; 3/12/23-4/23/23	14	8	0.03	0	X	X							Constructed, Disturbed
18	1/4/23-1/11/23; 3/12/23-4/16/23	1/4/23-1/11/23; 3/12/23-4/16/23	15	7	0.01	0									Constructed, Disturbed
19	12/14/23-2/5/23; 2/19/23-4/30/23; 8/22/23	12/14/23-2/5/23; 2/19/23-4/30/23; 8/22/23	16	25	0.01	0	X	X	X			X			Constructed, Disturbed

Appendix F
Geotechnical Engineering Report

GEOTECHNICAL ENGINEERING REPORT – REVISION 1

Prepared For
The AES Corporation

Proposed
Double Butte Battery Energy Storage Systems
Vicinity of Matthews Road and Palomar Road,
Menifee, Riverside County, CA
331190010, 011, 014, 017, 047, 056, 060

Job No: 22-247
August 17, 2022
REVISED September 6, 2023

BRUIN GEOTECHNICAL SERVICES, INC.
44732 Yucca Avenue
Lancaster, California 93534
www.bruingsi.net

BRUIN
GEOTECHNICAL
SERVICES INC.
est. 2004

SOIL AND MATERIAL
TESTING AND INSPECTIONS

August 17, 2022 Job No.: 22-247
REVISED September 6, 2023

Mr. Michael Jenkinson, PE
The AES Corporation
282 Century Place, Suite 2000
Louisville, CO 80027

Subject: **Geotechnical Engineering Report for the Proposed Double Butte Battery Energy Storage Systems Located in the Vicinity of Matthews Road and Palomar Road, Menifee, Riverside County, CA**
APN 331190010, 011, 014, 017, 047, 056, 060

Dear Mr. Jenkinson:

Presented herewith in is our Geotechnical Engineering Report for the subject project. Our work was performed in accordance with the scope of work outlined in our original proposal dated June 6, 2022.

This report presents the results of our field investigation, laboratory testing, along with our engineering judgment, opinions, conclusions, and recommendations pertaining to the proposed development.

It has been a pleasure to be of service to you on this project. Should you have any questions regarding the contents of this report, or should you require additional information, please contact the undersigned at (661) 273-9078.

Respectfully submitted,

BRUIN GEOTECHNICAL SERVICES, INC.

REGISTERED PROFESSIONAL ENGINEER
RYAN DUKE
9/2024
C 79729
CIVIL ENGINEER
STATE OF CALIFORNIA

Ryan D. Duke, P.E.
RDD/mes

August 17, 2022 Job No.: 22-247
REVISED September 6, 2023

EXECUTIVE SUMMARY

There appear to be no significant geotechnical constraints on-site that cannot be mitigated by our recommendations, the proposed planning, design, and utilization of sound construction practices.

Based on our geotechnical investigation of the subject site, the information obtained from our subsurface exploration, and review of available reports and literature, it is our professional opinion that the proposed development is feasible at the site provided that the geotechnical engineering recommendations contained in this report are implemented in the design and construction of the project.

The following key elements should be noted from this investigation:

- The subject site is located within the seismically active Southern California area. As such, the proposed development shall be designed in accordance with seismic considerations specified in the 2019 California Building Code (CBC) and the County requirements.

- The Limitations and Uniformity of Conditions Section should be read for an understanding of the report limitations.

- The south portion of the subject site is located within FEMA Flood Zones A and X.

This Executive Summary should be used in conjunction with the entire report for design and/or construction purposes. It should be recognized that specific details were not included or fully developed in this summary, and the report must be read in its entirety for a complete interpretation of the items contained herein.

SUMMARY OF RECOMMENDATIONS

DESIGN ITEM	RECOMMENDATIONS
REMEDIAL GRADING	
Structure Over-Excavation	48” below existing or finish grade, whichever is lower
Scarification	12” compacted at 90%
Horizontal Limits	5 feet beyond foundation perimeter
Remedial Grading for Access Driveways	Scarify 12” compacted to 95%
Exterior Non-Traffic Bearing Concrete Flatwork	Scarify 12” compacted to 90%
Native Soil Shrinkage	2-19% (90% Compaction), 4-20% (92% comp), 7-23% (95% comp)
PERIMETER (CONTINUOUS) FOUNDATION DESIGN VALUES	
Allowable Net Bearing Capacity	1,500 psf
Width	Minimum 12 inches
Embedment (minimum)	Minimum 15 inches below lowest adjacent soil elevation
ISOLATED (COLUMN/PIER) FOUNDATION DESIGN VALUES	
Allowable Net Bearing Capacity	1,800 psf
Width	Minimum 24 inches square
Embedment (minimum)	Minimum 15 inches below lowest adjacent soil elevation
MAT FOUNDATION DESIGN VALUES	
Allowable Net Bearing Capacity	1,500 psf
Embedment (minimum)	Minimum 15 inches below lowest adjacent soil elevation
LATERAL EARTH PRESSURES	
Active (Well-Drained Soil)	33 psf
At Rest (Restrained Wall)	55 psf
LATERAL LOAD RESISTANCE	
Allowable Passive Pressure	275 psf per foot
Coefficient of Friction	0.25
SOIL EXPANSION	
Expansion Index	18
Classification	Very Low
CORROSION AND CHEMICAL ATTACK	
Soil Resistivity	2,800-3,300 ohm-cm
Exposure Category	S0 (all samples)

GEOTECHNICAL ENGINEERING REPORT

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GEOTECHNICAL ENGINEERING REPORT
Double Butte Solar Battery Energy Storage Systems
Vicinity of Matthews Road and Palomar Road
Menifee, Riverside County, CA
APN 331190010, 011, 014, 017, 047, 056, 060

1.0 INTRODUCTION

This report presents the results of the geotechnical investigation performed by Bruin Geotechnical Services, Inc. for the proposed Battery Energy Storage System (BESS) Facility based on the assessor's parcel maps, a preliminary Site Plan, and google KMZ file provided by the client. This report is specific to the proposed development.

The following Assessors Parcels are included are included in this report:

- APN 331190010
- APN 331190011
- APN 331190014
- APN 331190017
- APN 331190047
- APN 331190056
- APN 331190060

The purpose of this investigation was to evaluate the current subsurface soil conditions and to provide geotechnical recommendations relative to earthwork, grading and design parameters for the construction of equipment pad foundations, drilled shafts (substation), and access roads associated with the proposed development.

The scope of the authorized for this investigation included the following tasks:

- Performing a site reconnaissance
- Conducting a field subsurface exploration through borings and soil sampling
- Performing a field and laboratory soil corrosivity study
- Performing a soil thermal analysis of the native soil
- Laboratory testing program of selected soil samples obtained during drilling
- Performing engineering analyses of the data obtained
- Preparing this Geotechnical Engineering Report

This study also includes a review of published and unpublished literature and geotechnical maps with respect to active and potentially active faults located in proximity to the site which may have an impact on the seismic design of the proposed development.

2.0 SITE LOCATION AND DESCRIPTION

The subject square-shaped site, herein after referred to as Site, is located east of the Matthews Road and Palomas Road junction, across the BNSF Railroad in the city of Menifee, Riverside County, California, and consists of seven (7) parcels totaling approximately 27.09 acres. The subject parcels include:

- APN 331190010 – approximately 5.00 acres
- APN 331190011 – approximately 5.00 acres
- APN 331190014 – approximately 3.40 acres
- APN 331190017 – approximately 1.58 acres
- APN 331190047 – approximately 4.61 acres
- APN 331190056 – approximately 3.83 acres
- APN 331190060 – approximately 3.67 acres

At the time of Bruin GSI's field investigation, the site was vacant, undeveloped land. The contiguous APNs are bound by a railroad to the north, an existing solar development to the west, commercial land to the east, and an aqueduct system to the south. The site vegetation consisted of sparse annual weeds and small shrubs.

The Site topography is relatively flat and level gently sloping down to the southwest, with drainage by sheet flow at approximately 1%. The approximate elevation at the site is 1,450 feet above mean sea level.

The intention of the site description is to be illustrative and specifically not intended for use as a legal description of the Site.

The general location of the subject Site is shown on Figure 1.

3.0 PROPOSED CONSTRUCTION

Based on our conversations with the client and information obtained through review of the preliminary plans, it is our understanding that the proposed project consists of a Battery Energy Storage System (BESS) Facility. The Project will utilize thickened concrete mat foundations for storage and converter equipment and substation with potential drilled shafts foundations. Construction will also include one (1) infiltration basin approximately three to four (3-4) feet below ground surface for the purpose of percolating sheet-flow storm-drain water.

It is anticipated that the proposed earthwork will consist of clearing and grubbing of the vegetation, construction of shallow infiltration basins (approximately three to four feet

Vicinity Map

N.T.S.

= Denotes approximate parcel boundary

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Figure 1

deep, with maximum 4:1 slopes) and minor grading with cuts and fills of less than one (1) foot, maintaining the natural drainage through the site. Dirt or gravel drive areas for interior access are also anticipated.

Although construction details are not available at the time of writing this report, based upon conversations with the client, we anticipate allowable stress design loads of approximately 2-3 kips for auxiliary structures.

4.0 GEOTECHNICAL INVESTIGATION

The geotechnical investigation included a field exploration program and a laboratory testing program. These programs were performed in accordance with our proposal for Geotechnical Engineering Report dated June 6, 2022 and Addendum Proposal dated June 19, 2023. The scope of work did not include environmental assessment or investigation for the presence or absence of hazardous substances or toxic materials in structures, soil, surface water, groundwater, or air, below or around the site.

4.1 Field Exploration Program

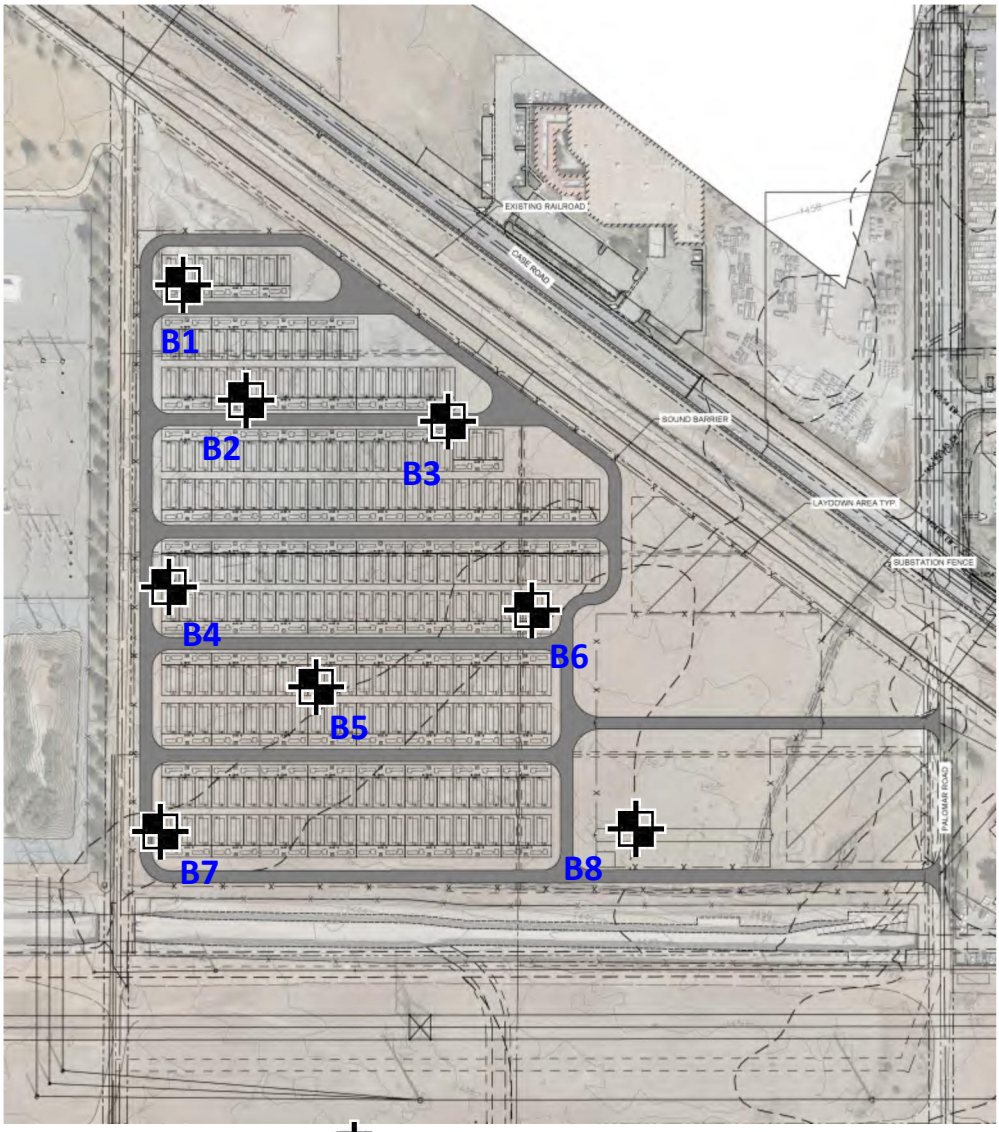
The field exploration program for the geotechnical investigation report was initiated on July 15, 2022 and July 17, 2023, under the technical supervision of our engineer. A total of eight (8) exploratory borings and two (2) exploratory borings, respectively were drilled using a CME 75 drill rig with eight (8) inch hollow stem auger. The borings were advanced to maximum depths of twenty (20) feet below ground surface (bgs).

The approximate locations of the borings are presented on Figure 2. The borings were located in the field by sighting and pacing from existing streets and landmarks. A hand-held GPS device was utilized to determine the approximate latitude and longitude of the borings. If an exact location of the boring locations is desired, it should be performed by a licensed surveyor.

Logs of subsurface materials encountered in the borings were prepared in the field by a representative of Bruin GSI at the time of drilling and sampling. Soil samples were obtained at various depth intervals, consisting of relatively undisturbed brass ring samples (Modified California split-spoon sampler) and Standard Penetration Test (SPT) samples driven by a 140-pound hammer falling thirty (30) inches. Bulk samples were also collected at various depths from zero to five (0-5) feet below existing ground surface. The soil samples were returned to the laboratory for analysis and testing.

Boring Location Map

N.T.S.



= Denotes Approximate Boring Location (2022)

= Denotes Approximate Boring Location (2023)

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Figure 2

Flood Zone Map

N.T.S.

= Approximate site boundary

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Job Number:

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Figure 3

the soil samples were classified in accordance with the Unified Soils Classification System and a testing program was established.

The samples were tested to determine the following:

- In-situ moisture and density determination ASTM D 2937
- Consolidation potential ASTM D 2435
- Shear strength ASTM D 3080
- Expansion index ASTM D 4829
- Chemical analyses CA 422/417/643

The following classification tests were performed:

- Description and Identification of Soils ASTM D 2488
- Maximum density – Optimum moisture ASTM D 1557
- Sieve Analysis of Fine and Coarse Aggregates ASTM C 136
- Sand Equivalent Value ASTM D 2419
- Grain Size Analysis (Hydrometer method) ASTM D 422

Tabular and graphical test results are presented in Appendix C.

4.7 Field Resistivity Testing

JDH Corrosion conducted four (4) field resistivity tests at the Site using the Wenner 4-pin method (ASTM G57). Refer to the corrosion report by JDH Corrosion is provided in Appendix D. Design for grounding and corrosion shall be completed by the structural engineer.

The pin spacing was determined based on AES SOW and may have been changed due to project constraints due to structures or boundaries.

4.8 Thermal Resistivity Testing

Two (2) bulk soil samples were obtained during drilling. The soil samples are a mixture of soils within the noted depths. The maximum density/ optimum moisture determinations (ASTM D1557 test method) were performed on each sample. The data and soil samples were delivered to Geotherm USA for thermal resistivity testing (RHO), as requested by the client. The selected samples were remolded by Geotherm USA to 90% relative compaction and evaluated for thermal resistivity to determine thermal dry-out curves. Results from Geotherm USA are presented in Appendix E.

5.0 REGIONAL GEOLOGY AND SEISMIC HAZARD ASSESSMENT

The following sections address the regional geology and seismic hazards, and potential subsurface conditions at the subject site. This information is based on limited field exploration and published maps and reports. Our scope of services included a review of published maps and reports to characterize the regional geology and potential for seismic hazards.

5.1 Regional Geology

The project site is located in the northern portion of the Peninsular Ranges Geomorphic province, bounded easterly by the San Andreas fault zone and reaches westerly offshore. The province is characterized by three major fault blocks: Santa Ana Mountains, Perris, and San Jacinto Mountains blocks. The city of Menifee is located on the Perris block bounded by two faults, one in the southwest (Elsinore Fault) and one in northeast (San Jacinto Fault).

The following fault descriptions are provided by the City of Menifee:

Elsinore Fault
The Elsinore fault is estimated to have an 11 percent probability of rupturing in an earthquake of at least magnitude 6.7 earthquake in the next 30 years.

San Jacinto Fault
The San Jacinto fault has historically produced more large earthquakes than any other fault in southern California, although none of these earthquakes has been as large as the 1857 and 1906 earthquakes on the San Andreas fault. The two most-recent surface-rupturing earthquakes on the San Jacinto fault were the April 9, 1968, Mw 6.5 on the Coyote Creek segment, and the 1987 event on the Superstition Hills segment.

Although the city of Menifee is surrounded by these prominent and active fault systems, the Perris block is an area of lower relief that has remained relatively stable and undeformed for thousands of years (City of Menifee General Plan, 2013).

Seismic activity along the San Andreas, San Jacinto, and Elsinore Faults have resulted in uplift in the San Jacinto and Santa Ana Mountains blocks and down dropping within the Perris block. The uplifted areas of the San Jacinto and Santa Ana mountains are eroding, causing sand, silt, and gravel to be deposited in the lower lying valleys in alluvial fans, washes, and channels. The alluvium deposits have a large range of ages from approximately 1 million years to less than 11,000 years old. At depth, the alluvium is underlain by granitoid and/or metasedimentary crystalline rock.

5.2 Site Geology

The site is located on the Romoland, CA United States Geological Survey (USGS) 7.5-minute topographic quadrangle. Elevation at the site is approximately 1,450 feet above mean sea level.

The Site consists older alluvial fan and channel deposits that emanate from the base of the eastern flanks of San Jacinto and Santa Ana Mountains. Rock outcrops are not visible on the project site. Morton (2003) maps alluvium across the project site area as distal alluvial fan deposits. These are older (Pleistocene) surficial alluvial deposits in this area and are described as well consolidated gravel and sand with layers of silt, and clay. At depth, the site is underlain primarily by Cretaceous granodiorite and less commonly by metasedimentary rocks.

No springs or areas indicative of shallow ground water were mapped or observed on the project site.

5.3 Seismic Hazards Assessment

There are two unnamed faults within the city of Menifee: one in central Sun City and one in western Quail Valley. These faults are confined to bedrock; they do not affect sediments of Holocene or late Pleistocene age (about the last 15,000 years) and thus are not considered active faults (City of Menifee General Plan, 2013).

The purpose of the Alquist-Priolo Geologic Hazards Zone Act, as summarized in CDMG Special Publication 2 (SP 42), is to "prohibit the location of most structures for human occupancy across the traces of active faults and to mitigate thereby the hazard of fault-rupture." As indicated by SP 42, "the State Geologist is required to delineate "earthquake fault zones" (EFZs) along known active faults in California. Cities and counties affected by the zones must regulate certain development 'projects' within the zones. They must withhold development permits for sites within the zones until geologic investigations demonstrate that the sites are not threatened by surface displacement from future faulting. Zones of Required Investigation referred to as "Seismic Hazard Zones" in CCR Section 3722, are areas shown on Seismic Hazard Zone Maps where Site investigations are required to determine the need for mitigation of potential liquefaction and/or earthquake-induced landslide ground displacements.

The Site is not located in a Landslide and/or Liquefaction Seismic Hazard Zone as specified by the State of California. No other published liquefaction studies were reviewed.

5.3.1 Liquefaction

Our scope of services did not include a fifty (50) foot test boring or detailed analysis of liquefaction, however, due to relatively deep (greater than 40 feet below ground surface) groundwater, we performed a limited research of published liquefaction studies within the area.

Earthquake-induced ground shaking can be the cause of several significant phenomena, including liquefaction of saturated fine sands and silty sands. Loose soils can transform from a solid to a liquid state as a result of increased pore pressure during seismic loading. Liquefaction results in a complete loss of strength and can cause structures to settle or even overturn if it occurs in the bearing zone. If liquefaction occurs beneath sloping ground, a phenomenon known as lateral spreading can occur. Due relatively dense and firm soil encountered during our subsurface investigation and the absence of a shallow groundwater table, the potential for liquefaction is low, and therefore, it is our professional opinion that the project site has a low susceptibility to liquefaction.

5.4 CBC Design Parameters

The following coefficients have been estimated in accordance with the requirements of the 2022 CBC, utilizing the Structural Engineers Association of California and California's Office of Statewide Health Planning and Development Seismic Design Maps Application: *http://seismicmaps.org/.* The following seismic parameters are provided, based on the approximate latitude and longitude at the northern portion of the subject site:

Latitude	33.74150302°
Longitude	-117.17036944°

Type	Value	Period
Spectral Response Acceleration, Short Period) – S_s	1.424g	0.2(sec)
Spectral Response Acceleration at 1 sec. – S_1	0.529g	1.0(sec)
Mapped Spectral Response, Short period – S_{DS}	0.949g	0.2(sec)
Mapped Spectral Response at 1 sec. – S_{D1}	*	1.0(sec)
Site Coefficient – F_A	1.0	
Site Coefficient – F_V	*	
Site Modified Spectral Response Acceleration, Short period – S_{MS}	1.424g	
Site Modified Spectral Response Acceleration, Short period – S_{M1}	*	

Site Classification (2022 CBC, further defined in ASCE7-16 Chapter 20) = D Stiff Soil

* The actual method of seismic design should be determined by the Structural Engineer in accordance with Section 11.4.8 Site-Specific Ground Motion Procedures of the ASCE 7-16. Refer to Appendix F for the Design Maps Summary Report provided by the Structural Engineers Association of California and California's Office of Statewide Health Planning and Development website.

5.5 Soil Settlement

Differential soil settlement occurs when supporting soils are not uniform in density or soil type and one portion of soil settles more than the other. When unaccounted for in design, such settlement can result in damage to structures, pavement, and subsurface utilities. Based on the subsurface data obtained during the investigation, the on-site soils are relatively uniform, consisting of predominantly medium dense or firm soils that should not be prone to differential settlement.

Re-compaction of the upper site soils is intended to remedy the potential for surficial differential settlement due to auxiliary structures supported on non-uniform thickness of compacted fill.

In accordance with the specifications in this report, settlement of auxiliary structures founded on compacted fill will be relatively small, less than three-quarter (3/4) inch. Differential settlement is anticipated to be on the order of 50% of the total settlement in a thirty-foot span. Most settlement is anticipated to take place during construction.

5.6 Erosion

The subject site drainage occurs by minor sheet flow and erosion could occur. Appropriate analysis, grading and drainage design and site maintenance should minimize the sheet flow erosion potential.

6.0 OPINIONS AND CONCLUSIONS

Based upon the results of our investigation, it is our professional opinion that the proposed development is considered feasible from a geotechnical standpoint provided that the recommendations presented herein are incorporated into the design and construction. If changes in the design of the structure are made or variations of changed conditions are encountered during construction, Bruin GSI should be contacted to evaluate their effects on these recommendations. The following geotechnical engineering recommendations for the

proposed development are based on observations from the field investigation program and the test results and our experience with sites of similar conditions.

Conventional or mat concrete foundations may be used for equipment pads and structures. However, due to the non-uniform condition of the near surface soils and moderate potential for hydro-consolidation, remedial grading including over-excavation and recompaction is recommended for conventional concrete foundations. Drilled shafts may be used for heavily loaded structures at the substation. Cast-in-drilled-hole (CIDH) foundation may also be used.

7.0 GEOTECHNICAL RECOMMENDATIONS

The following geotechnical engineering recommendations for the proposed development are based on observations from the field investigation program and the laboratory test results and our experience with sites of similar conditions.

The local Department of Building and Safety should be contacted prior to the start of construction to assure the project is properly permitted and inspected during construction.

Field observations and testing during construction operations should be provided by Bruin GSI so a decision can be formed regarding the adequacy of the site preparation, the acceptability of fill materials, and the extent to which the earthwork construction and the degree of compaction comply with the project geotechnical specifications. **Any work related to grading performed without the full knowledge of, and under the supervision of the Geotechnical Consultant, may render the recommendations of this report invalid.**

The Geotechnical Consultant shall observe and approve all removals prior to fill placement. Additional recommendations may be necessary at the time of grading.

7.1 Earthwork

Earthwork is expected to be minimal. Where earthwork is required to achieve design grades, the following procedures shall be implemented during site preparation. The existing vegetation and deleterious materials shall be removed from the area to be graded and shall not be incorporated into the engineered fill. Topsoil was not encountered.

In order to provide a more uniform soil support and reduce the potential for hydroconsolidation, the following recommendations are provided:

7.2 Remedial Grading for Conventional Spread or Mat Foundations

Subsequent to removals of the vegetation and deleterious materials in the areas to be graded, the exposed surface shall be excavated a minimum of forty-eight (48) inches below existing grade or finish grade, whichever is lower. The horizontal limits of the excavation shall extend a minimum of five (5) feet beyond the limits of the proposed foundations.

The bottom of the excavation shall be observed and approved by the Geotechnical Consultant.

Subsequent to approval of the resulting excavated surface by the Geotechnical Consultant, the resulting soil surface shall be scarified an additional twelve (12) inches, properly moisture conditioned or aerated to near optimum moisture content, and mechanically compacted to minimum **90% relative compaction** as determined by ASTM D 1557 test method. **Compaction shall be verified by testing.**

A minimum of thirty-six (36) inches of compacted fill is required beneath the proposed foundations.

7.3 Remedial Grading for Access Drive Areas

Subsequent to clearing and grubbing the site, the existing native soils shall be scarified twelve (12) inches below existing grade or finish grade, whichever is lower. The Geotechnical Consultant shall inspect the resulting surfaces prior to fill placement.

Subsequent to approval of the resulting surface by the Geotechnical Consultant, the resulting soil surface shall be properly moisture conditioned or aerated to near optimum moisture content, and mechanically compacted to minimum **95% relative compaction** as determined by ASTM D 1557 test method. **Compaction shall be verified by testing.**

7.4 Fill Slope Construction and Stability for Infiltration Basins

Permanent cut slopes at infiltration basin locations may be constructed at a slope ratio not exceeding 4:1 (horizontal: vertical) or flatter. Cut slopes constructed as recommended are expected to be both surficial and grossly stable and anticipated to remain so under normal conditions.

The slopes should be planted with native vegetation as soon as possible to minimize erosion and maintenance. If slopes are planned steeper than 2:1, the Geotechnical Consultant shall be notified for slope stability determinations.

7.5 Fill Placement and Compaction Requirements

Native soils may be used as engineered fill. Materials for engineered fill should be free of organic material, debris, and other deleterious substances, and should not contain rocks greater than three (3) inches in maximum dimension.

All native soil fill should be placed in eight (8) inch thick maximum lifts, moisture conditioned or air dried as necessary to achieve optimum moisture condition, and then compacted in place to a minimum relative compaction of 90% **(95% for drive areas)** as determined in accordance with ASTM D 1557 test method.

Non-structural and landscape areas shall be compacted to minimum 85% relative compaction.

A representative of the project consultant should be present on-site during grading operations to verify proper placement and compaction of all fill, as well as to verify compliance with the other geotechnical recommendations presented herein.

7.6 Native Soil Shrinkage

Based on the laboratory data obtained, the following table represents implied shrinkage factors for soil s from 0-6 feet below ground surface (recompaction for structures):

	Field Dry Unit Weight (pcf)	Proctor Max Dry Unit Weight (pcf)	Field Percent of Max Dry Unit Weight	Implied Shrinkage at 90% compaction	Implied Shrinkage at 92% compaction	Implied Shrinkage at 95% compaction
Minimum	93.9	129.0	72.79%	19.12%	20.88%	23.38%
Maximum	134	132.0	101.52%	12.79%	10.34%	6.86%
Average	114.6	130.5	87.79%	2.45%	4.57%	7.59%

During compaction, an additional one-quarter inch subsidence of the underlying soil is estimated. Losses from site clearing and grubbing operations may affect quantity calculations and should be taken into account. Actual shrinkage of the soil may vary.

7.7 Fill Slope Construction and Stability

Provided all material is properly compacted as recommended, fill slopes may be constructed at a 2:1 (horizontal to vertical) gradient or flatter. Permanent cut slopes may be constructed at 2:1 or flatter. Fill slopes constructed as recommended at a slope ratio not exceeding 2:1 (horizontal: vertical), are expected to be both grossly and surficially stable and are expected to remain so under normal conditions.

Proper drainage should be planned so water is not allowed to flow over the tops of slopes. The slopes should be planted as soon as possible to minimize erosion and maintenance.

If slopes are planned steeper than 2:1, the Geotechnical Consultant shall be notified for slope stability determinations.

7.8 Import Soil

Import soil must be free from organic material or deleterious substances. The project specifications shall require the contractor to contact the Geotechnical Consultant to review the proposed import soil for conformance with these recommendations at least two weeks prior to importing to the site.

Imported soil must be non-hazardous and derived from a single, consistent soil type conforming to the following criteria:

- 100% passing a 3-inch sieve
- 65% to 100% passing the #4 sieve
- 20 to 45% passing a #200 sieve
- Expansion index less than 20
- Liquid limit less than 35
- Plasticity index less than 12
- R-value greater than 25
- Corrosion potential equal to or better than the on-site soil, including:
    - Soluble Sulfates
    - Soluble Chlorides
    - Minimum Resistivity

7.9 Grading Observations and Testing

The grading of the site shall be observed and tested by the Geotechnical Consultant to verify compliance with the recommendations. Any grading performed without full

knowledge of the Geotechnical Consultant may render the recommendations of this report invalid.

7.10 Foundations

Provided the recommendations contained in this report are implemented during design and construction, it is our opinion that at grade structures can be supported on shallow or mat foundations, driven piles, and cast-in-drilled-hole (CIDH) concrete foundations.

The structural engineer should evaluate reinforcement, embedment depth based on the requirements for the structural loadings, shrinkage, and temperatures stresses.

7.11 Continuous and Isolated Spread Foundations

Continuous and isolated spread footings must have a minimum width of twelve (12) inches and twenty-four (24) inches, respectively. The minimum depth of footing embedment is fifteen (15) inches. Continuous footing foundations may be design using a net allowable bearing pressure of 1,500 pounds per square foot (psf) with a factor of safety of three (3). Isolated spread footing foundations may be designed using a net allowable bearing pressure of 1,800 psf. The net allowable bearing pressure applies to the dead load plus live load (DL + LL) conditions; it may be increased by one-third (1/3) for wind or seismic loads.

Total foundation settlements are expected to be less than one (1) inch and differential settlements between similarly loaded (DL + LL) and sized footings are anticipated to be less than one-half (0.5) inches.

7.12 Mat Foundations

We understand that the structures (equipment pads) may be supported on a concrete mat foundation. The mat foundation may be designed to impose a maximum allowable pressure of 1,500 pounds per square foot (psf) dead plus live loads with a factor of safety of three (3). This value may be increased by one-third (1/3) for transient loads such as seismic or wind. The concrete mat foundation should be at least twelve (12) inches thick and satisfy structural considerations.

Based on the results of our laboratory tests and analyses, total static settlements of the mat foundation under the allowable bearing pressure are expected to be approximately three-quarters (3/4) of an inch, and maximum differential settlements are expected to be about 50% of the total settlement.

Mat foundations values may be used for grade beams provided that the minimum embedment is fifteen (15) inches below adjacent grade.

7.13 Lateral Earth Pressures

Provided the Site is prepared as recommended above, the following earth pressure parameters for footings may be used for design purposes. The parameters shown in the table below are for drained conditions of selected non-expansive engineered fill or undisturbed native soil.

Table 1: Recommended Static Lateral Earth Pressures for Footings

Lateral Pressure Condition	Equivalent Fluid Density (pcf) Drained Condition
Active Pressure	33
At Rest Pressure	55
Passive Pressure	275

The lateral earth pressures listed herein are obtained by the conventional equation for active, at rest, and passive conditions assuming level backfill and a bulk unit weight of 115 pcf for the Site soils. A coefficient of friction of 0.25 may be used between soil sub-grade and the bottom of footings.

The coefficient of friction and passive earth pressure values given above represent ultimate soil strength values. The Geotechnical Consultant recommends that a safety factor consistent with the design conditions be included in their usage in accordance with Sections 1806.3.1 through 18106.3.3 of the 2022 CBC. For stability against lateral sliding that is resisted solely by the passive earth pressure against footings or friction along the bottom of footings, appropriate safety factor should be applied by the structural engineer.

For stability against lateral sliding that is resisted by combined passive pressure and frictional resistance, a minimum safety factor of 2.0 is recommended. For lateral stability against seismic loading conditions, a minimum safety factor of 1.2 is recommended.

7.14 Footing Reinforcement

Reinforcement for cast-in-place foundations should be designed by the structural engineer based on the anticipated loading conditions and expansion index of the supporting soil. Preliminary expansion index for the native soil is categorized as “very

low" as determined by ASTM D 4829. Foundations should be reinforced as required by the structural engineer.

7.15 MFAD Parameters

MFAD parameters are inputs required on the MFAD program developed as part of research conducted by the Electric Power Research Institute during the 1980s. Based on our in-house research, the MFAD parameters required the correlation of SPT-N values, as evaluated from the field N60 values obtained during our site visit. The Modulus of Deformation was estimated using the values of SPT-N for cohesionless soil, as referred to the Estimation of Ep form SPT N for cohesionless soils. Based on our evaluation of the current soil layers encountered during our investigation, the following parameters are provided:

Table 2: MFAD Parameters

Soil Layer	Depth (ft)	USCS	SPT-N (blows/ft)	Total Unit Weight, ϒ (pcf)	Deformation Modulus, Ep (ksi)	Friction Angle (deg)	Cohesion (psf)
1	0-5	SM	30	110.0	1.8	15	10
2	5-9	SM	33	115.0	2.8	20	30
3	9-15	ML	20	112.0	2.0	10	200

7.16 Soil Interaction Analysis (L-Pile Analysis)

L-Pile is a program that allows the foundation designer to model and evaluate the soil conditions encountered during lateral load pile testing. The solution provided by the program describes the behavior of a beam-column with non-linear support.

The program correlates laboratory data such as effective weight of the soil, cohesion and friction angle for different boring depths, and the designer can use a p-modifier to more closely model the soil response to applied loads based on rebound deflections observed in the field during lateral pile testing.

The table below show preliminary input parameters which are provided for the structural engineer to use in their L-Pile analysis. These values include a safety factor of 1.5 for the lateral load capacity of the pile, and as further discussed in section 1810.3.3.2 of the 2022 CBC. The analysis did not include scour or corrosion, however, when performing the L-Pile analysis, the Structural Engineer should consider the pile section properties and include safety factors in relation to scour and corrosion as deemed appropriate. The following preliminary soil parameters may be used in the

analysis (*subject to change based upon review of the results of field pile load testing report, which will be submitted under separate cover upon completion*):

Table 3: LPILE Input Parameters for 14ft.+ Embedment Pile	
p-y curve model	Sand (Reese)
Effective Unit Weight, [pcf]	122
Elastic Subgrade Reaction, K [pci]	Default
Angle of Fiction, [degrees]	29
p- modifier *	1.0

*Modification factor from the ground surface to top of pile, assuming top of pile is 4 ft. above grade

7.17 Deep Foundations

The proposed structures may be constructed on drilled concrete cast-in-drilled-hole (CIDH) pile foundations. Provided the recommendations in this report are incorporated into site development, foundations (CIDH) for load bearing members shall be designed using skin friction as follows:

7.17.1 Pile Capacity

Skin friction should be used to design the proposed concrete CIDH piles. Allowable vertical load capacity curve for a thirty-six (36) inch diameter CIDH pile is presented in Appendix G. The vertical load capacity is based on the frictional resistance between the pile and surrounding soil. The allowable capacity shown is based on friction only and has a safety factor of 1.5 for downward loads. Allowable uplift capacity may be taken at one-half (1/2) the downward capacity. The allowable pile capacity may be increased by one-third (1/3) for short term seismic loading including wind. Piles in groups should be spaced a minimum eight (8) diameters from center to center.

7.17.2 Passive Earth Pressure

Allowable lateral forces on friction piles may be resisted by passive earth pressure. A passive earth pressure of 150 psf per foot of depth may be used. This value has a factor of safety of 1.5. Refer to Appendix G for passive earth pressures based on Rankine's Method. The allowable passive earth pressure may be doubled when pier footings are at least eight (8) diameters apart and may also be increased by one-third (1/3) when resisting short term wind and seismic loads.

8.0 CORROSION AND CHEMICAL ATTACK

Four (4) subsurface bulk soil samples obtained from the Site were tested to provide a preliminary screening of the potential for concrete deterioration or steel corrosion due to attack by soil-borne soluble salts. The test results are presented in the table below. The soil was evaluated for minimum resistivity (ASTM 643), sulfate ion concentration (CT 417), chloride ion concentration (CT 422), and pH of soil (ASTM D 4972).

Table 4: Summary of Corrosion Test Results

Sample Location	pH	Sulfate, mg/kg	Chloride, mg/kg	Minimum Resistivity, ohm-cm	Exposure Category
B2 @ 0-5 feet bgs	7.80	36	N.D.	3,300	S0
B5 @ 0-5 feet bgs	8.12	24	N.D.	3,100	S0
B7 @ 0-5 feet bgs	8.12	22	16	2,800	S0
B8 @ 0-5 feet bgs	8.39	21	N.D.	2,900	S0

The water-soluble sulfate content severity class is considered negligible to concrete (Exposure Category S0 per Table 4.2.1 of ACI 318-11); therefore, Type II cement should be used for design of concrete structure in contact with soil.

Representative samples of the Site soil in the vicinity have a minimum resistivity ranging from 2,800 to 3,300 ohm-cm. Buried metal conduits, ferrous metal pipes, and exposed steel should have a protective coating in accordance with the manufacturer's specification.

Corrosivity results should be provided to design team members for their interpretation of results relative to their specific area of design and incorporated accordingly as deemed necessary. Results are presented in Appendix D.

9.0 EXCAVATIONS AND BACKFILL

The attention of contractors, particularly the underground contractors, should be drawn to the State of California Construction Safety Orders for "Excavations, Trenches, and Earthwork." Trenches or excavations greater than five (5) feet in depth should be shored or sloped back in accordance with OSHA Regulations prior to entry.

Soil backfill around foundations or behind walls below grade should be placed in lifts not exceeding eight (8) inches, moisture conditioned to optimum moisture content and mechanically compacted to 90% relative compaction as determined by ASTM D 1557 test method. **No flooding or jetting will be allowed.**

Trench backfill shall be moisture conditioned to near optimum moisture content, placed in lifts not exceeding six (6) inches, and mechanically compacted to 90% relative compaction as determined by ASTM D 1557 test method. **No flooding or jetting will be allowed**.

For purposes of this section of the report, "bedding" is defined as material placed in a trench up to one (1) foot above a utility pipe, and "backfill" is all material placed in the trench above the bedding. Unless concrete bedding is required around utility pipes, free-draining sand should be used as bedding. Sand proposed for use as bedding should be tested in our laboratory to verify its suitability and measure its compaction characteristics. **Bedding sand should be compacted by mechanical means to achieve at least 90% relative compaction based on ASTM D 1557.**

Backfill operations should be observed and tested by the Geotechnical Consultant to monitor compliance with these recommendations.

All utility trench backfill should be compacted to a minimum relative compaction of 90% **(95% beneath roadways)**. Utility trench backfill beneath roadways should be compacted to minimum 95% relative compaction in roadways in the upper twelve (12) inches. Trench backfill materials should be placed in lifts no greater than approximately eight (8) inches in thickness, watered or air-dried as necessary to achieve near optimum moisture conditions, and then mechanically compacted in place to a minimum relative compaction of 90%. A representative of the project geotechnical consultant shall test the backfill to verify adequate compaction.

9.1 Excavation Stability

Soils encountered within the depth explored are generally classified as Type C soils in accordance with OSHA (Occupational Safety and Health Administration). The slopes surrounding or along temporary excavations may be vertical for excavations that are less than five feet deep and exhibit no indication of potential caving but should be no steeper than 1.5 H:1V for excavations that are deeper than five (5) feet, up to a maximum depth of fifteen (15) feet. Certified trench shields or boxes may also be used to protect workers during construction in excavations that have vertical sidewalls and are greater than five (5) feet deep.

Temporary excavations for the project construction should be left open for as short a time as possible and should be protected from water runoff. In addition, equipment and/or soil stockpiles must be maintained at least ten (10) feet away from the top of the excavations.

Because of variability in soils, Geotechnical Consultant must be afforded the opportunity to observe and document sloping and shoring conditions at the time of

construction. Slope height, slope inclination, and excavation depth (including utility trench excavations) must in no case exceed those specified in local, state, or federal safety regulations, (e.g., OSHA Health and Safety Standards for Excavations, 29 CFR Part 1926, or successor regulations).

10.0 PRELIMINARY STRUCTURAL SECTION (FLEXIBLE PAVEMENT ENTRANCE)

For project entrances that require structural paving sections, the following recommendations are provided. Asphalt concrete pavements shall be designed per the Caltrans Highway Design Manual based on R-Value and Traffic Index. An R-value of the native soil of 12 was utilized for the preliminary structural pavement section. During grading as soils are mixed, soil samples should be tested for R-Value determination.

For budgetary purposes, the preliminary flexible pavement layer thickness is as follows:

Table 5: Recommended Asphalt Pavement Section Layer Thickness

Pavement Material	Recommended Thickness (TI = 5.0) Entrance Only
Asphalt Concrete	5”
Class II Aggregate Base	13”
Compacted Subgrade Soils	12”

Asphalt concrete should conform to Sections 203 and 302 of the latest edition of the Standard Specifications for Public Works Construction (“Greenbook”).

Class II aggregate base should conform to Section 26 of the Caltrans Standard Specifications, latest edition. The aggregate base should be compacted to at least 95% of the maximum dry density as determined by ASTM Method D 1557.

Soil samples of the exposed subgrade at entrance approaches and areas requiring flexible pavements should be obtained during construction for R-value determination and final structural section calculations. Structural pavement sections may be subject to review approval of the governing agency.

10.1 Interior Access Roads

A minimum of six (6) inches of class II aggregate base shall be placed and mechanically compacted to minimum **95% relative compaction** as determined by ASTM D 1557 test method. The aggregate base is intended for interior road sections without asphalt.

Subsequent to approval of the resulting surface by the Geotechnical Consultant, the resulting soil surface shall be scarified 12 inches, properly moisture conditioned or aerated to near optimum moisture content, and mechanically compacted to minimum **95% relative compaction** as determined by ASTM D 1557 test method. **Compaction shall be verified by testing.**

Note: If interior access roads are not paved, maintenance should be performed periodically to limit rutting and ponding.

It is our understanding that interior traffic will consist of an occasional pick-up truck maintenance vehicle. If interior access roads are not paved, maintenance should be performed periodically to limit rutting and ponding.

For an optional aggregate base driving surface, a minimum three (3) inch thick of crushed miscellaneous base is recommended. The base shall be placed on compacted subgrade as recommended in this report, and be compacted to minimum 95% relative compaction as determined by ASTM D 1557 test method.

Table 6: Aggregate Surfaced Roadways (18" compacted fill) 20-year design

Purpose	Estimated ESAL	Estimated TI	R-VALUE	Aggregate Base
Pick Up Truck Access	N/A	N/A	25	N/A
Fire Truck Loading	1,000	4	25	3.0”
Fire Truck Loading	5,000	5	25	3.0"
Fire Truck Loading	10,000	5	25	3.0"

11.0 CONSTRUCTION CONSIDERATIONS

Based on our field exploration program, earthwork may be performed with conventional construction equipment.

11.1 Temporary Shoring

If shoring is considered, it shall be designed by a registered Civil Engineer in accordance with current Cal-OSHA requirements.

11.2 CIDH Or Drilled Shaft Construction

Due to the interbedded silty sands encountered, some caving should be anticipated during drilling. Casing may be required.

In order to minimize caving potential, it is recommended that all drilled holes be filled with concrete within a maximum 24 hours of drilling completion.

Drilled holes should be observed by a representative of the project geotechnical consultant to verify that they have been excavated into competent soils prior to placement of forms, reinforcement or concrete, to verify soil conditions and evaluate any unanticipated conditions.

The drilling contractor should be prepared to provide the appropriate means and methods to properly construct drilled shafts.

11.3 Drainage Considerations

Bruin GSI understands the proposed project incorporates the construction of shallow basins for the purposes of infiltrating runoff water. The control surface drainage in the project areas is an important design consideration. Site drainage is the responsibility of the project civil engineer. Bruin GSI recommends that final grading around shallow foundations must provide for positive and enduring drainage away from the structures, and ponding of water must not be allowed around, or near the shallow foundations, with the exception of piles erected within designated infiltration basin areas. Ground surface profiles next to the shallow foundations other than pile foundations must have at least a 2% gradient away from the structures.

Appropriate drainage considerations should be incorporated into the project design relative to all existing and proposed drainage courses by the project civil engineer. Drainage velocity reducers, swales, riprap, etc. should be implemented as determined by the project civil engineer as deemed necessary to prevent erosion and scouring.

No water should be allowed to flow over fill slopes. A berm should be constructed at the top of the fill slope to divert drainage run-off to an approved area.

Vegetation is an important factor in minimizing erosion due to sheet flow and should be planted as soon as possible. Native indigenous plants should be used to assure sustainability of vegetation during the lifetime of the project.

12.0 ADDITIONAL SERVICES

Final project plans and specifications should be reviewed prior to construction to confirm that the full intent of the recommendations presented herein have been applied to design and construction. This report is based on the assumption that an adequate testing and

inspection program along with client consultation will be performed during final design and construction phases to verify compliance with the recommendations of this report. Retaining Bruin GSI as the geotechnical consultant to provide additional services from preliminary design through project completion will assure continuity of services.

Additional services may include:

- Consultation during design stages of the project.
- Review of the grading and structural plans.
- Observation and testing during grading and trench backfill
- Field pile testing
- Deputy Inspection of structural members
- Consultation as required during construction.

Cost estimates can be prepared if requested. Please contact our office.

13.0 LIMITATIONS AND UNIFORMITY CONDITIONS

This report is based on the development plans provided to our office. If structure design changes or structure locations changes occur, the conclusion and recommendations in this report may not be considered valid unless the changes are reviewed, and the conclusions of this report are modified or approved by the Geotechnical Consultant.

The subsurface conditions and characteristics described herein have been projected from individual borings placed across the subject property. Actual variations in the subsurface conditions and characteristics may occur.

If conditions encountered during construction differ from those described in this report, this office should be notified so as to consider the necessity for modifications. No responsibility for construction compliance with the design concepts, specifications, or recommendations is assumed unless on-site construction review is performed during the course of construction, which pertains to the specific recommendations contained herein.

It is recommended that Bruin GSI be provided the opportunity for a general review of final design and specifications in order that earthwork and foundation recommendations may be properly interpreted and implemented in the design specifications. If Bruin GSI is not accorded the privilege of making this recommended review, Bruin GSI can assume no responsibility for misinterpretation of the recommendations contained in this report.

This report has been prepared in accordance with generally accepted practice and standards in this community at this time. No warranties, either expressed or implied, are made as to

the professional advice provided under the terms of the agreement and included in this report. This report has been prepared for the exclusive use of The AES Corporation and their authorized agents. Unauthorized reproduction of any portion of this report without expressed written permission is prohibited.

If parties other than Bruin GSI are engaged to provide construction geotechnical services, they must be notified that they will be required to assume complete responsibility for the geotechnical phase of the project by concurring with the findings and recommendations in this report or providing alternate recommendations.

14.0 CLOSURE

The conclusions, recommendations, and opinions presented herein are: (1) based upon our evaluation and interpretations of the limited data obtained from our field and laboratory programs; (2) based upon an interpolation of soil conditions between and beyond the borings; (3) are subject to confirmation of the actual conditions encountered during construction; and, (4) are based upon the assumption that sufficient observation and testing will be provided during the grading, infrastructure installation and building phases of site development.

15.0 REFERENCES

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APPENDIX A

Boring Logs and Classification Key

Date(s) drilled	**7/15/2022**	**LOG OF BORING 1**	
Drilling Contractor	**GP Drilling**	**Page 1 of 1**	
Drilling Method	**Hollow Stem Auger**		
Drill Rig Type	**CME 75**	Logged By:	**AM**
Drill Bit Size/Type	**8"**	Checked By:	**MS**
Sampling Method(s)	**CSS**	Total Depth of Borehole	**20' BGS**
Client: **AES - Double Butte BESS**	Groundwater	**None Encountered**	Boring Location: **See Figure 2**
Project Number: **22-247**	Borehole Backfill	**Native/ Cuttings**	Notes:
Project Location: **Menifee, CA**	Hammer Data	**140#, 30" drop**	

Depth	Sample	USCS	Graphic Log	Material Description	Penetration Resistance (Blows/6")	Dry Unit Weight pcf	Water Content %
		SM		Brown silty fine to medium sand w/ occ coarse sand Medium dense, moist	22-23	DIST	7.1
		SM		Reddish brown silty fine to medium sand (slightly cemented) Dense, moist	24-50/3"	110.6	8.1
5'		SM		Yellowish brown silty medium sand w/ coarse sand & #4 - 1" gravel Very dense, moist	50/4"	116.4	9.2
		SM		Brown silty fine to medium sand (slightly cemented) Very dense, moist	50/6"	DIST	8.7
10'		SM		Yellowish brown silty medium to coarse sand w/ some fines & clay binder Dense, slightly moist	34-50/4"	120.0	4.6
15'		SC		Brown clayey fine to medium sand w/ silt Very dense, moist	50/6"	109.9	11.1
20'		SM		Brown silty fine to medium sand Dense, very moist	27-50/4"	97.2	12.6
25'				Boring terminated @ 20' bgs No groundwater No caving			
30'							

Date(s) drilled	**7/15/2022**	**LOG OF BORING 2**	
Drilling Contractor	**GP Drilling**	**Page 1 of 1**	
Drilling Method	**Hollow Stem Auger**		
Drill Rig Type	**CME 75**	Logged By:	**AM**
Drill Bit Size/Type	**8"**	Checked By:	**MS**
Sampling Method(s)	**CSS/Bulk**	Total Depth of Borehole	**20' BGS**
Client: **AES - Double Butte BESS**	Groundwater	**None Encountered**	Boring Location: **See Figure 2**
Project Number: **22-247**	Borehole Backfill	**Native/ Cuttings**	Notes:
Project Location: **Menifee, CA**	Hammer Data	**140#, 30" drop**	

Depth	Sample	USCS	Graphic Log	Material Description	Penetration Resistance (Blows/6")	Dry Unit Weight pcf	Water Content %
		SM		Dark brown silty fine to medium sand w/ occ #4 gravel & clay	19-22	DIST	5.4
				Medium dense, slightly moist			
		SC		Reddish brown clayey fine to medium sand w/ silt	50/5"	101.2	7.1
				Stiff, slightly moist			
5'		SM		Reddish brown silty fine to coarse sand w/ clay	50/6"	96.6	8.1
				Dense, moist			
		SM		Reddish brown silty fine to coarse sand	50/5"	N/R	N/R
				Very dense, slightly moist			
		SM		Light brown silty fine to coarse sand w/ clay binder	37-42	115.6	9.5
10'				Dense, moist			
15'		SM		Brown silty fine to medium sand	37-50/2"	108.0	13.8
				Dense, very moist			
20'		SM		Brown silty fine to medium sand	50/6"	103.6	13.3
				Dense, very moist			
				Boring terminated @ 20' bgs			
25'				No groundwater			
				No caving			
30'							

Date(s) drilled	**7/15/2022**	**LOG OF BORING 3**	
Drilling Contractor	**GP Drilling**	**Page 1 of 1**	
Drilling Method	**Hollow Stem Auger**		
Drill Rig Type	**CME 75**	Logged By:	**AM**
Drill Bit Size/Type	**8"**	Checked By:	**MS**
Sampling Method(s)	**CSS**	Total Depth of Borehole	**20' BGS**
Client: **AES - Double Butte BESS**	Groundwater	**None Encountered**	Boring Location: **See Figure 2**
Project Number: **22-247**	Borehole Backfill	**Native/ Cuttings**	Notes:
Project Location: **Menifee, CA**	Hammer Data	**140#, 30" drop**	

Depth	Sample	USCS	Graphic Log	Material Description	Penetration Resistance (Blows/6")	Dry Unit Weight pcf	Water Content %
		SM		Yellowish brown silty medium to coarse sand Medium dense, slightly moist	19-16	120.1	6.3
		SM		Brown silty fine to coarse sand w/ #4 gravel Loose, dry	5-6	111.1	3.4
5'		SM		Greyish brown silty medium to coarse sand w/ slight fine sand Medium dense, moist	19-27	126.1	7.9
		SM		Dark yellowish brown silty fine to medium sand w/ coarse sand Dense, moist	22-50/6"	127.3	9.1
10'		SM		Brown silty fine to medium sand w/ coarse sand & slight #4 gravel & clay binder Medium dense, moist	12-30	122.5	9.2
15'		SM		Yellowish brown silty medium to coarse sand w/ some fine sand Medium dense, moist	28-22	120.0	8.8
20'		SM		Brown silty fine to medium sand Medium dense, saturated	19-32	109.0	16.7
25'				Boring terminated @ 20' bgs No groundwater No caving			
30'							

Date(s) drilled	**7/15/2022**	**LOG OF BORING 4**	
Drilling Contractor	**GP Drilling**	**Page 1 of 1**	
Drilling Method	**Hollow Stem Auger**		
Drill Rig Type	**CME 75**	Logged By:	**AM**
Drill Bit Size/Type	**8"**	Checked By:	**MS**
Sampling Method(s)	**CSS**	Total Depth of Borehole	**15' BGS**
Client: **AES - Double Butte BESS**	Groundwater	**None Encountered**	Boring Location: **See Figure 2**
Project Number: **22-247**	Borehole Backfill	**Native/ Cuttings**	Notes:
Project Location: **Menifee, CA**	Hammer Data	**140#, 30" drop**	

Depth	Sample	USCS	Graphic Log	Material Description	Penetration Resistance (Blows/6")	Dry Unit Weight pcf	Water Content %
	■	SM		Yellowish brown silty fine to coarse sand	17-23	127.0	7.0
				Medium dense, moist			
	■	SM		Brown silty fine to medium sand	28-50/5"	106.8	9.1
5'				Dense, moist			
	■	SM		Brown silty fine to medium sand	50/6"	116.1	7.5
				Dense, moist			
	■	SM		Dark yellowish brown silty fine to medium sand w/ coarse sand	35-50/4"	109.0	9.4
				Dense, moist			
10'	■	SM		Reddish brown silty fine to medium sand w/ coarse sand	32-47	99.2	13.0
				Dense, very moist			
15'	■	SC		Brown clayey fine to medium sand w/ silt	17-22	113.4	15.1
				Firm, very moist			
20'				Boring terminated @ 15' bgs			
				No groundwater			
				No caving			
25'							
30'							

Date(s) drilled	**7/15/2022**	**LOG OF BORING 5**	
Drilling Contractor	**GP Drilling**	**Page 1 of 1**	
Drilling Method	**Hollow Stem Auger**		
Drill Rig Type	**CME 75**	Logged By:	**AM**
Drill Bit Size/Type	**8"**	Checked By:	**MS**
Sampling Method(s)	**SPT/Bulk**	Total Depth of Borehole	**20' BGS**
Client: **AES - Double Butte BESS**	Groundwater	**None Encountered**	Boring Location: **See Figure 2**
Project Number: **22-247**	Borehole Backfill	**Native/ Cuttings**	Notes:
Project Location: **Menifee, CA**	Hammer Data	**140#, 30" drop**	

Depth	Sample	USCS	Graphic Log	Material Description	Penetration Resistance (Blows/6")	Dry Unit Weight pcf	Water Content %
		SM/ML		Dark reddish brown silty fine to coarse sand w/ clay (cemented)	17-27-30		5.7
				Medium dense, slightly moist			
		SC		Dark brown clayey fine to coarse sand	20-25-22		8.0
				Medium dense, moist			
5'		SM		Dark reddish brown silty fine to coarse sand w/ clay (cemented)	15-19-21		8.8
				Medium dense, moist			
		ML		Dark yellowish brown sandy silt fine to coarse sand (cemented)	12-17-21		11.1
				Firm, moist			
		SM		Dark yellowish brown silty fine to coarse sand w/ clay	11-15-24		24.0
10'				Medium dense, saturated			
15'		SM		Dark yellowish brown very silty fine to coarse sand	7-7-10		6.2
				Loose, slightly moist			
20'		SM		Dark yellowish brown fine to medium sand w/ clay	19-21-20		20.5
				Medium dense, saturated			
				Boring terminated @ 20' bgs			
25'				No groundwater			
				No caving			
30'							

Date(s) drilled	**7/15/2022**	**LOG OF BORING 6**	
Drilling Contractor	**GP Drilling**	**Page 1 of 1**	
Drilling Method	**Hollow Stem Auger**		
Drill Rig Type	**CME 75**	Logged By:	**AM**
Drill Bit Size/Type	**8"**	Checked By:	**MS**
Sampling Method(s)	**CSS**	Total Depth of Borehole	**20' BGS**
Client: **AES - Double Butte BESS**	Groundwater	**None Encountered**	Boring Location: **See Figure 2**
Project Number: **22-247**	Borehole Backfill	**Native/ Cuttings**	Notes:
Project Location: **Menifee, CA**	Hammer Data	**140#, 30" drop**	

Depth	Sample	USCS	Graphic Log	Material Description	Penetration Resistance (Blows/6")	Dry Unit Weight pcf	Water Content %
	■	SC		Dark brown clayey sandy fine to medium sand w/ occ #4 gravel	9-10	127.2	7.8
				Loose, moist			
	■	SM		Brown silty fine to medium sand w/ slight #4 gravel	9-50/4"	123.2	7.9
				Dense, moist			
5'	■	SM		Dark yellowish brown silty fine to coarse sand w/ occ #4 gravel	50/6"	123.9	8.0
				Very dense, moist			
	■	SM		Yellowish brown silty medium to coarse sand w/ fine sand	50/6"	112.8	8.5
				Very dense, moist			
	■	SM		Dark yellowish brown silty fine to medium sand w/ coarse sand & clay binder	41-50/6"	115.0	10.7
10'				Very dense, moist			
15'	■	SM		Brown silty fine to medium sand	22-50/6"	111.6	13.8
				Very dense, moist			
20'	■	SM		Light brown silty fine to medium sand w/ occ #4 - 3/8" gravel	25-50	108.2	5.8
				Dense, slightly moist			
				Boring terminated @ 20' bgs			
25'				No groundwater			
				No caving			
30'							

Date(s) drilled	**7/15/2022**	**LOG OF BORING 7**	
Drilling Contractor	**GP Drilling**	**Page 1 of 1**	
Drilling Method	**Hollow Stem Auger**		
Drill Rig Type	**CME 75**	Logged By:	**AM**
Drill Bit Size/Type	**8"**	Checked By:	**MS**
Sampling Method(s)	**CSS/Bulk**	Total Depth of Borehole	**20' BGS**
Client: **AES - Double Butte BESS**	Groundwater	**None Encountered**	Boring Location: **See Figure 2**
Project Number: **22-247**	Borehole Backfill	**Native/ Cuttings**	Notes:
Project Location: **Menifee, CA**	Hammer Data	**140#, 30" drop**	

Depth	Sample	USCS	Graphic Log	Material Description	Penetration Resistance (Blows/6")	Dry Unit Weight pcf	Water Content %
		SM		Reddish brown very silty fine to medium sand w/ clay Medium dense, very moist	18-20	104.6	11.7
		SM		Dark yellowish brown silty fine to medium sand w/ clay Medium dense, moist	22-30	116.1	7.9
5'		SM		Dark yellowish brown silty fine to medium sand w/ coarse sand & occ #4 gravel Dense, moist	50/6"	113.7	7.5
		SM		Brown silty fine to medium sand Dense, moist	50/6"	119.5	8.8
10'		SM		Brown silty fine to medium sand Dense, moist	27-50/6"	113.1	9.8
15'		SM		Yellowish brown silty fine to medium sand w/ coarse sand Medium dense, saturated	18-25	113.9	17.1
20'		SM		Brown silty fine to medium sand w/ clay Medium dense, very moist	21-18	118.2	13.4
25'				Boring terminated @ 20' bgs No groundwater No caving			
30'							

Date(s) drilled	**7/15/2022**	**LOG OF BORING 8**	
Drilling Contractor	**GP Drilling**	**Page 1 of 1**	
Drilling Method	**Hollow Stem Auger**		
Drill Rig Type	**CME 75**	Logged By:	**AM**
Drill Bit Size/Type	**8"**	Checked By:	**MS**
Sampling Method(s)	**CSS**	Total Depth of Borehole	**20' BGS**
Client: **AES - Double Butte BESS**	Groundwater	**None Encountered**	Boring Location: **See Figure 2**
Project Number: **22-247**	Borehole Backfill	**Native/ Cuttings**	Notes:
Project Location: **Menifee, CA**	Hammer Data	**140#, 30" drop**	

Depth	Sample	USCS	Graphic Log	Material Description	Penetration Resistance (Blows/6")	Dry Unit Weight pcf	Water Content %
	■	SM		Brown silty fine to medium sand	18-20	117.2	3.2
				Medium dense, dry			
	■	SM		Orange brown silty fine to medium sand w/ clay (cemented)	12-30	102.9	10.1
5'				Medium dense, moist			
	■	SM		Brown silty fine to medium sand w/ clay	50/6"	110.1	8.0
				Very dense, moist			
	■	SM		Dark yellowish brown silty fine to medium sand w/ clay binder	50/4"	110.8	8.9
				Very dense, moist			
10'	■	SM		Brown silty fine to medium sand	32-50/6"	123.9	9.6
				Very dense, moist			
15'	■	SC		Brown clayey fine to medium sand w/ silt (cemented)	20-39	114.6	14.0
				Medium dense, very moist			
20'	■	SM		Brown silty fine to medium sand w/ clay	23-50/6"	112.3	13.4
				Very dense, very moist			
				Boring terminated @ 20' bgs			
25'				No groundwater			
				No caving			
30'							

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Date(s) drilled	**7/17/2023**	**LOG OF BORING 1**	
Drilling Contractor	**GP Drilling**	**Page 1 of 1**	
Drilling Method	**Hollow Stem Auger**		
Drill Rig Type	**CME 75**	Logged By:	**AM**
Drill Bit Size/Type	**8"**	Checked By:	**MS**
Sampling Method(s)	**CSS/Bulk**	Total Depth of Borehole	**20' bgs**
Client: **AES - Double Butte**	Groundwater	**None Encountered**	Boring Location: **See Figure 2**
Project Number: **22-247**	Borehole Backfill	**Native/ Cuttings**	Notes:
Project Location: **Menifee**	Hammer Data	**140#, 30" drop**	

Depth	Sample	USCS	Graphic Log	Material Description	Penetration Resistance (Blows/6")	Dry Unit Weight pcf	Water Content %
		ML		Light brown fine to medium sandy silt w/ occ. Coarse sand (Soft, Slightly moist)	5-6	93.9	3.4
		SM/ML		Light brown very silty fine to medium sand w/ occ. Coarse sand (Medium dense, slightly moist)	7-13	108.3	3.1
		SM/ML			12-13	105.9	5.9
		SM		Brown silty fine to medium sand w/ coarse sand (Very dense, slightly)	11-50/5"	121.2	13
5'		SM/ML		Brown fine to medium sandy silt w/ occ. Coarse sand (Very dense, slightly moist)	50/5"	97.8	8.3
		SM		Brown very silty fine to medium sand w/ coarse sand (Very dense, moist)	50/6"	126.7	6.8
		SM			50/6"	105.9	6.1
		SM		Moderate brown silty fine to medium sand w/ coarse sand & occ. #4 gravel (Very dense, moist)	50/6"	113.4	7
		SM		Moderate brown silty fine to coarse sand w/ occ. #4 gravel (Slightly cemented, Very dense, moist)	50/6"		
10'		SM		Reddish brown silty fine to coarse sand w/ occ. #4 gravel & clay binder (Very dense, moist)	50/6"	102.4	14.8
		ML		Brown fine to medium sandy silt w/ occ. Coarse sand	18-30		
				Stiff, moist			
15'		ML			15-31	102.8	16.1
				Stiff, moist			
20'		ML		Brown fine to medium sandy silt w/ occ. Coarse sand	14-39	112.3	12.8
				Stiff, moist			
				Boring terminated @ 20' bgs			
				No groundwater			
25'				No caving			
30'							

Date(s) drilled	**7/17/2023**	**LOG OF BORING 2**	
Drilling Contractor	**GP Drilling**	**Page 1 of 1**	
Drilling Method	**Hollow Stem Auger**		
Drill Rig Type	**CME 75**	Logged By:	**AM**
Drill Bit Size/Type	**8"**	Checked By:	**MS**
Sampling Method(s)	**CSS**	Total Depth of Borehole	**20' bgs**
Client: **AES - Double Butte**	Groundwater	**None Encountered**	Boring Location: **See Figure 2**
Project Number: **22-247**	Borehole Backfill	**Native/ Cuttings**	Notes:
Project Location: **Menifee**	Hammer Data	**140#, 30" drop**	

Depth	Sample	USCS	Graphic Log	Material Description	Penetration Resistance (Blows/6")	Dry Unit Weight pcf	Water Content %
		SM/ML		Dark reddish brown silty very fine to coarse sand (Medium dense, moist)	7-13	DIST	8.8
		SM		Dark reddish brown silty fine to coarse sand w/ occ. #4 gravel and clay binder (very dense, moist)	21-50/5"	134.0	7.2
		SM		Dark brown silty fine to coarse sand w/ occ. #4 gravel (Very dense, slightly moist)	50/6"	110.2	8.7
		SM			50/6"	117.5	9.0
5'		SM		Brown silty fine to coarse sand w/ occ. #4 gravel (Very dense, slightly moist)	50/6"	106.3	7.5
		SM/ML		Brown very silty fine to medium sand w/ coarse sand (Very dense, slightly moist)	29-50/5"	132.7	8.4
		SM			19-40		
		SM			20-46	131.0	9.2
		SP		Greenish brown slightly silty fine to coarse sand w/ occ. #4 gravel (Dense, moist)	26-29	116.5	7.2
10'		ML		Brown fine to medium sandy silt w/ occ. coarse sand (Stiff, moist)	16-33	117.5	14.2
		SM/SP		Yellowish brown silty fine to medium sand w/ coarse sand & occ. #4 gravel	22-39	123.4	8.2
				Dense, moist			
15'		ML		Yellowish brown fine to medium sandy silt w/ occ. coarse sand & #4 gravel	21-43	107.7	15.6
				Stiff, slightly moist			
20'		ML		Brown fine to medium sandy silt w/ occ. Coarse sand	17-25	112.3	12.8
				Very firm, moist			
				Boring terminated @ 20' bgs			
				No groundwater			
25'				No caving			
30'							

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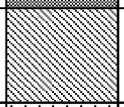
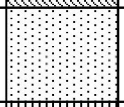
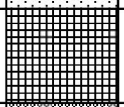
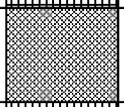
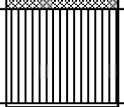
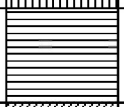
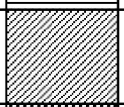
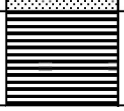
GEOTECHNICAL REPORTS | MATERIAL TESTING | CONSTRUCTION INSPECTION

SOIL CLASSIFICATION KEY

MAJOR DIVISIONS			SYMBOL		TYPICAL NAMES
Coarse Grained Soils 50% or more larger than #200 sieve	**Gravels** More than half coarse-fraction is larger than No. 4 sieve size	Clean gravels with little or no fines	GW		Well graded gravels, gravel-sand mixtures
			GP		Poorly graded gravels, gravel-sand mixtures
		Gravel with over 12% fines	GM		Silty gravels, poorly graded gravel-sand-silt mixtures
			GC		Clayey gravels, poorly graded gravel-sand-clay mixtures
	Sands More than half coarse-fraction is smaller than No. 4 sieve size	Clean sands with little or no fines	SW		Well graded sands, gravelly sands
			SP		Poorly graded sands, gravelly sands
		Sands with over 12% fines	SM		Silty sands, poorly graded sand-silt mixtures
			SC		Clayey sands, poorly graded sand-clay mixtures
Fine Grained Soils 50% or more smaller than #200 sieve	**Silts and Clays** Liquid limit less than 50		ML		Inorganic silts, rock flour, clayey silts
			CL		Inorganic clays of low to medium plasticity, sandy clays, silty clays
			OL		Organic clays and organic silty clays of low plasticity
	Silts and Clays Liquid limit greater than 50		MH		Inorganic silts, micaceous or diatomaceous fine sandy/silty soils, elastic silts
			CH		Inorganic clays with high plasticity, fat clays
			OH		Organic clays of medium to high plasticity, organic silts
Highly Organic Soils			Pt		Peat and other highly organic soils

CLASSIFICATION SYSTEM BASED ON THE UNIFIED SOIL CLASSIFICATION SYSTEM

44732 Yucca Avenue
Tel (661) 273-9078

Lancaster, California 93534
www.bruingsi.net

Boring Log Key

Depth	Sample	USCS	Graphic Log	Material Description	Penetration Resistance (Blows/6")	Dry Unit Weight pcf	Water Content %
1	2	3	4	5	6	7	8

COLUMN DESCRIPTIONS

1	Depth in feet below the ground surface
2	Sampling Method see "symbols" below
3	USCS symbol
4	Graphic depiction of the subsurface material
5	Description of the material encountered. May include consistency, moisture, color, and other descriptors
6	Number of blows to advance driven sampler one foot (or distance shown) beyond seating interval
7	Dry weight per unit volume of soil sample measured in laboratory units in pounds per cubic foot
8	Water content of the sample expressed as a percentage of the dry weight of the sample

ABBREVIATIONS

DIST = Disturbed Sample
N/R = No Recovery
CHEM = Chemical Test
N/A = Not Analyzed

SAMPLING METHOD SYMBOLS

California Split Spoon (CSS)

Standard Penetration Test (SPT)

Bulk Sample

Grab Sample

GENERAL NOTES

1. Soil classifications are based on the Unified Soil Classification System. Descriptions and stratum lines are interpretive, and actual lithologic changes may be gradual. Field descriptions may have been modified to reflect results of lab tests.

2. Descriptions on these logs apply only at the specific boring locations and at the time the borings were advanced. They are not warranted to be representative of subsurface conditions at other locations or times.

APPENDIX B

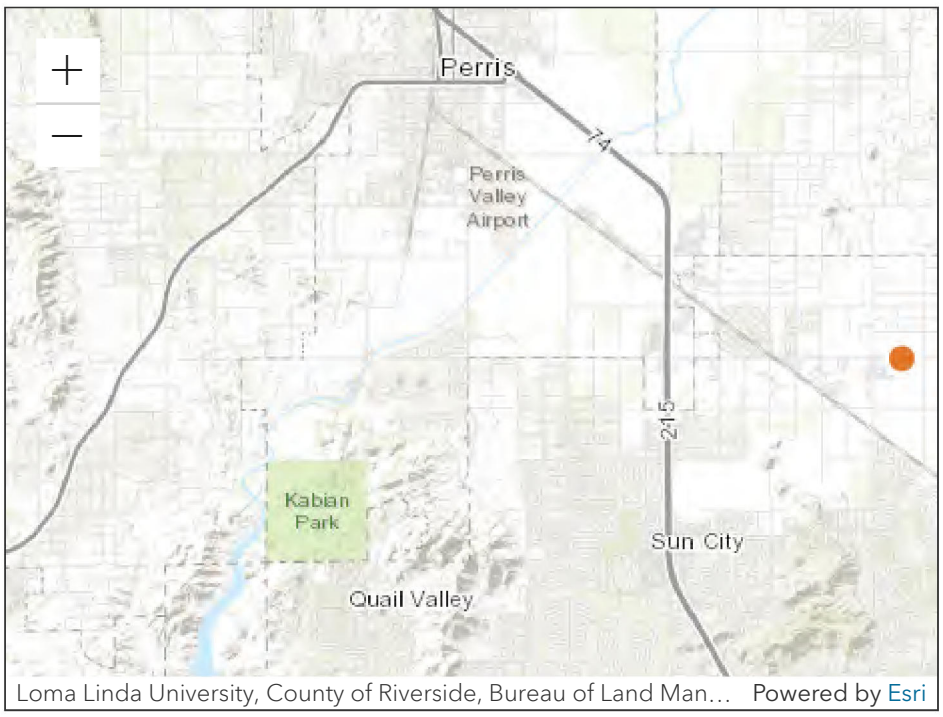
Well Site Data

Groundwater Level Report

Station 337429N1171494W001

Station Data | Groundwater Level Data

State Well Number:	
Local Well Name:	EMWD12759
Site Code:	337429N1171494W001
Latitude (NAD83):	33.74287
Longitude (NAD83):	-117.149438
Basin Subbasin Name (Code):	San Jacinto (8-005)
Well Use Type:	Observation
Well Status:	Active
WCR Number:	
Reference Point Elevation (NAVD88 ft):	1495.710
Ground Surface Elevation (NAVD88 ft):	1493.610
Well Depth (feet bgs):	693
Perforated Interval Depths (feet bgs):	



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APPENDIX C

Laboratory Test Data

SUMMARY OF LABORATORY TEST RESULTS
2022

SIEVE ANALYSIS

Percent passing individual sieves

Sample I.D.	1/2"	3/8"	#4	#10	#40	#100	#200
B3@2	100	100	99	91	59	33	23
B4@2	100	100	100	97	79	56	42
B2@5	100	100	100	98	76	51	39
B5@5	100	100	99	93	68	46	34
B1@6	96	94	90	82	51	25	14
B3@6	100	100	100	94	57	24	15
B2@9	100	100	100	95	75	54	41
B5@9	99	96	92	86	66	47	30
B1@10	99	99	98	90	65	42	30
B4@10	100	100	100	99	88	61	41
B3@15	100	100	100	93	67	37	23
B5@20	100	100	98	95	78	53	33

SAND EQUIVALENT

Sample I.D.	Sand Equivalent
B5@3	22
B7@4	28
B3@6	28
B5@7	11
B6@7	28
B1@8	20
B6@15	12

EXPANSION INDEX

Sample I.D.	Expansion Index	Classification
B1@0-5’	18	Very Low

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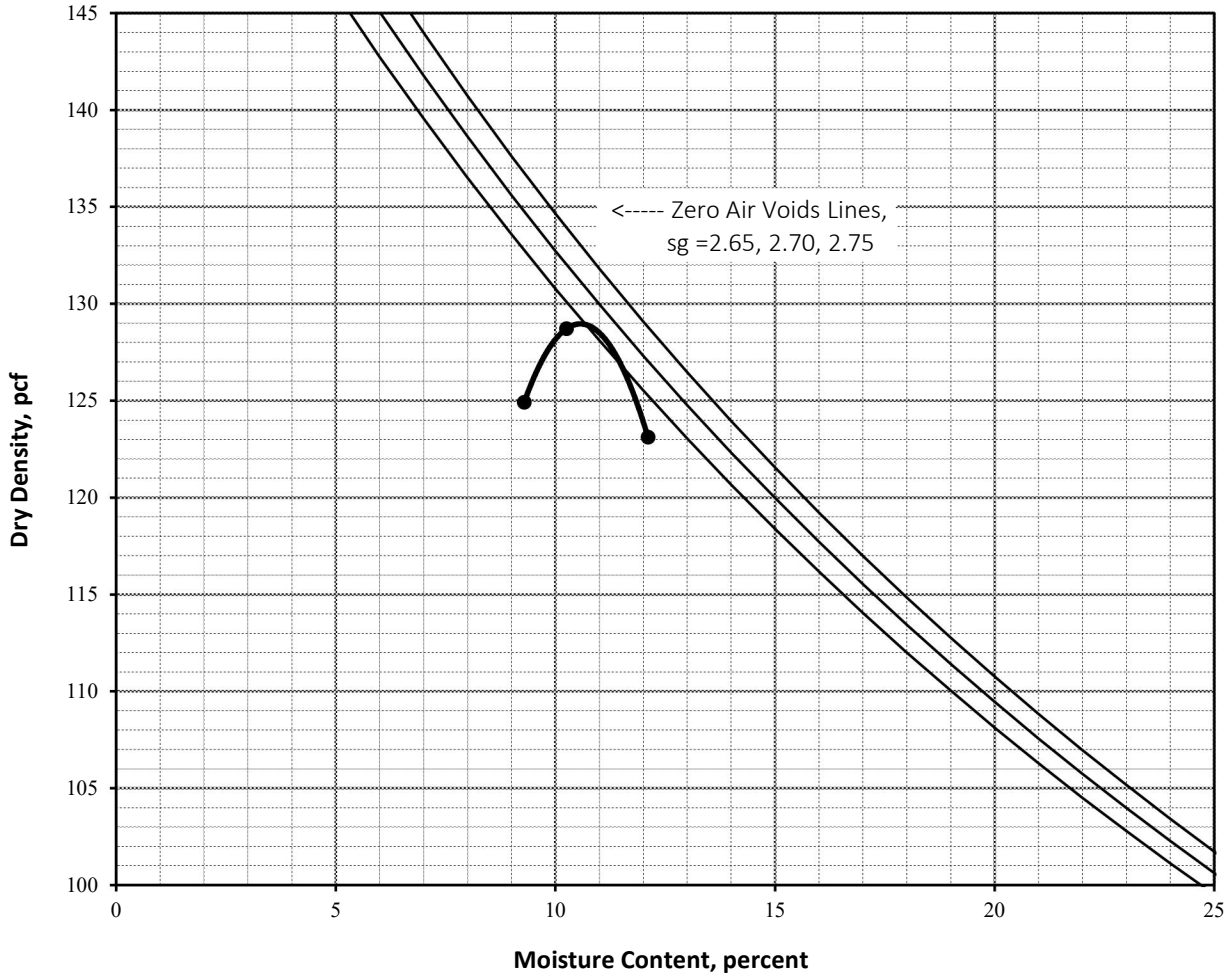
Maximum Density/Optimum Moisture Proctor ASTM D698/D1557

Job Number:	22-247	July 29, 2022
Client:	AES - Double Butte Storage	ASTM D-1557 A
Lab ID Number:	B5	Rammer Type: 10#
Sample Location:	Bulk 0'-5'	
Description:	(SC) Dark reddish brown clayey fine to coarse sand w/ silt	

Maximum Density: **129 pcf**
Optimum Moisture: **10.5%**



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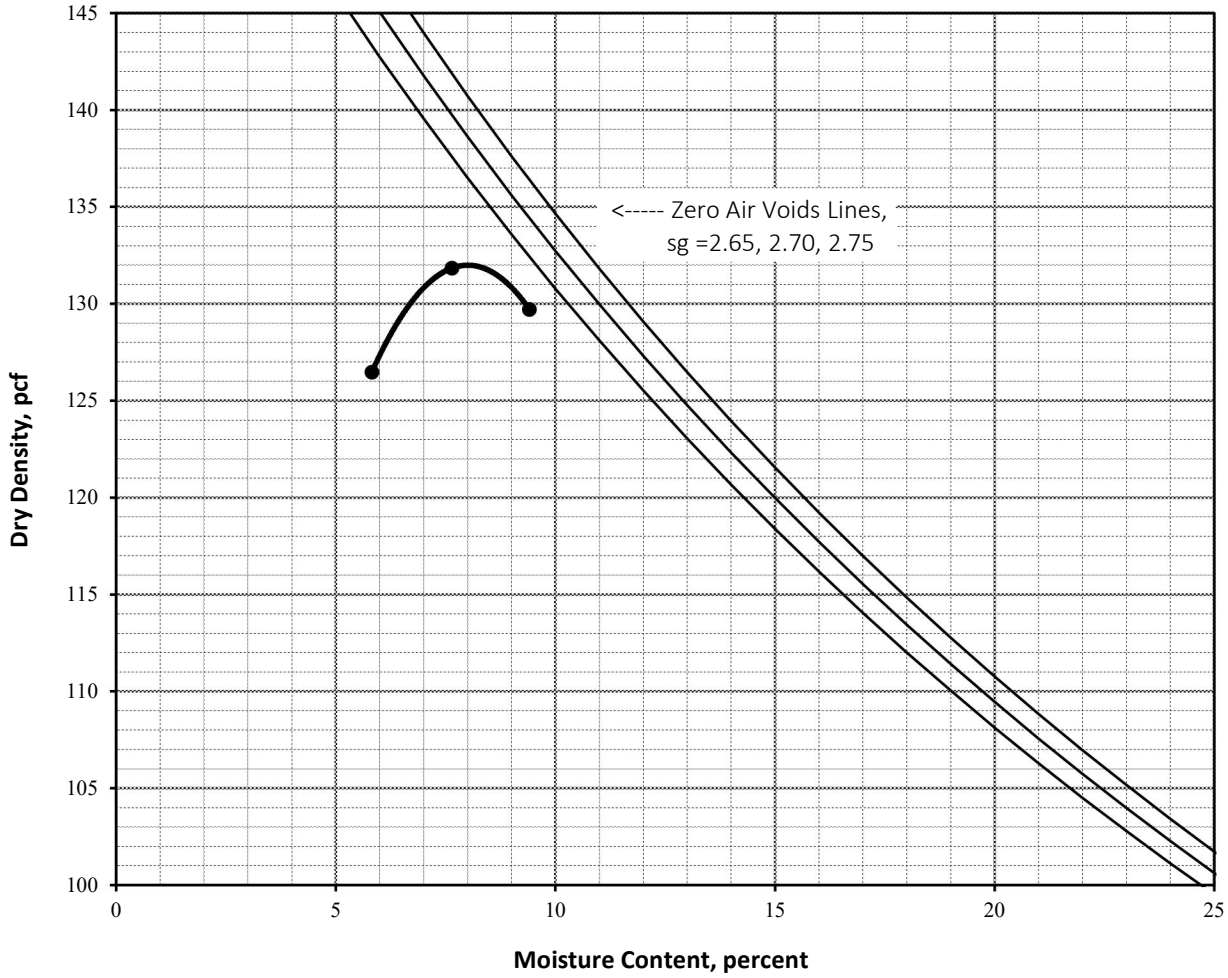
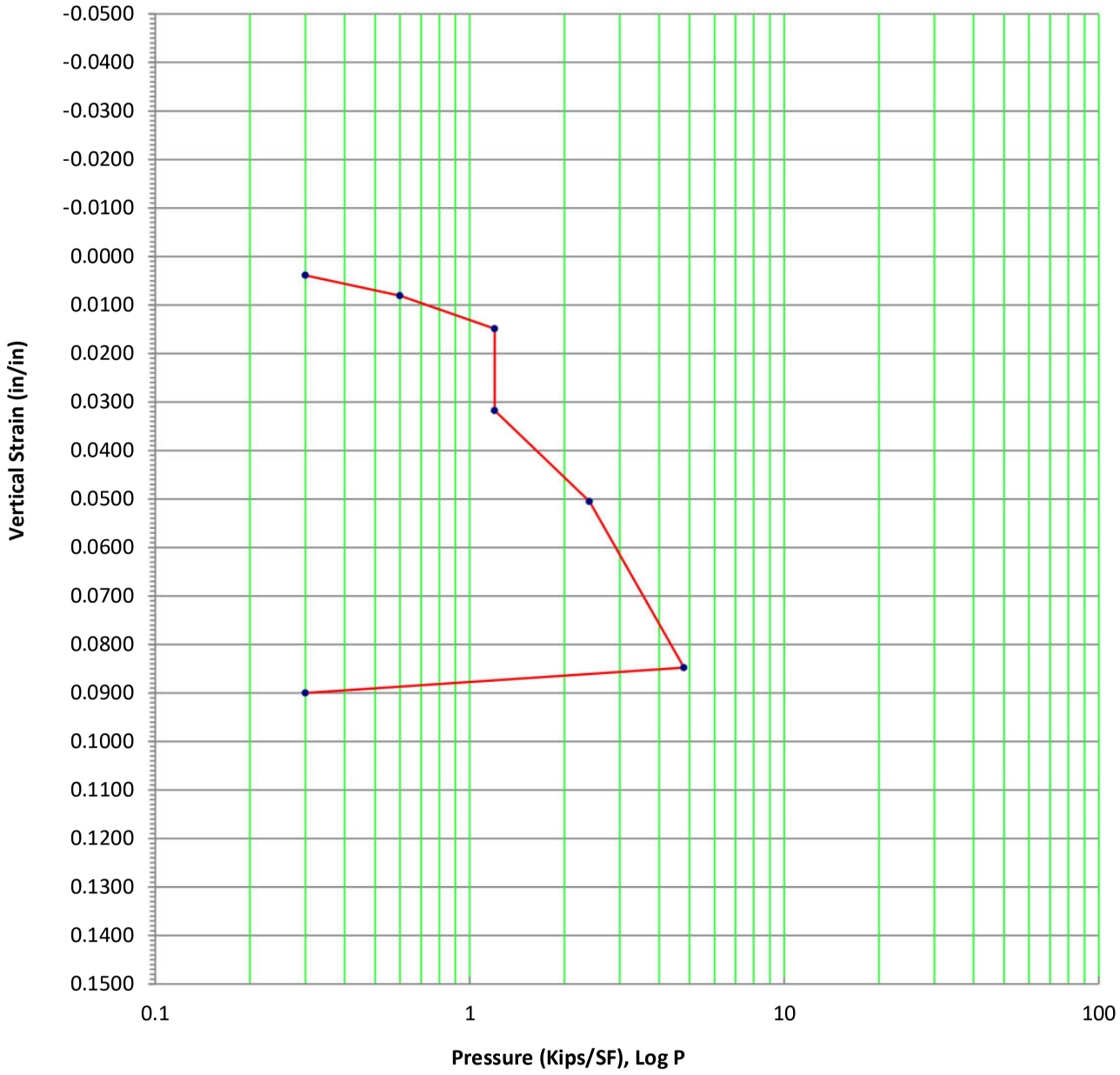
Maximum Density/Optimum Moisture Proctor ASTM D698/D1557

Job Number:	22-247	July 29, 2022
Client:	AES - Double Butte Storage	ASTM D-1557 A
Lab ID Number:	B2	Rammer Type: 10#
Sample Location:	Bulk 0'-5'	
Description:	(SC) Brown clayey fine to medium sand w/ occ #4 gravel & silt	

Maximum Density: **132 pcf**
Optimum Moisture: **8%**





Sample location:	B7@2'	
Material:	SM	
Initial Dry Density:	104.6	PCF
Moisture Content:	11.7	%
% Hydroconsolidation:	1.7	%

* Test Method: ASTM D-2435

Consolidation Test

AES - Double Butte Storage

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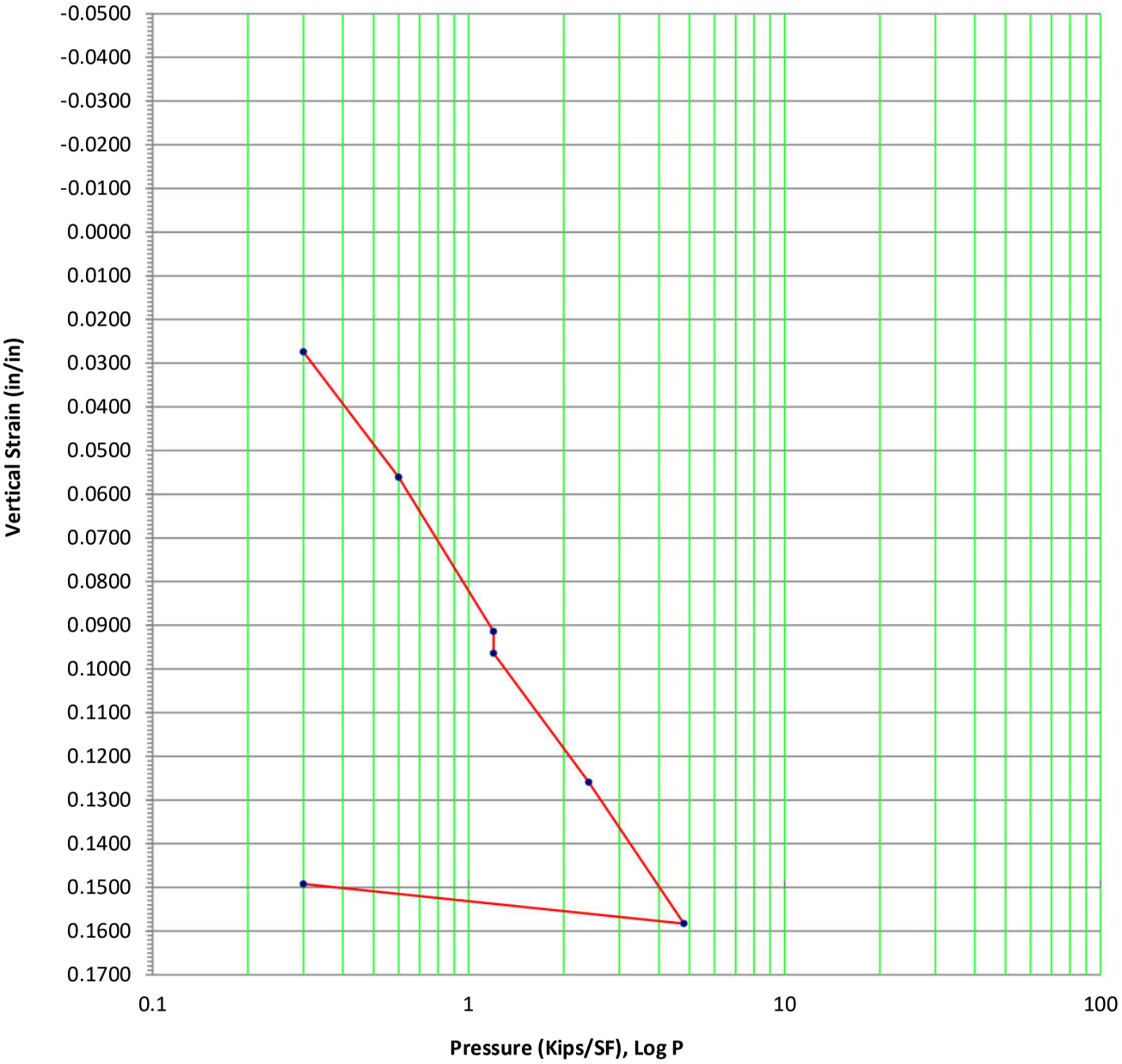

Sample location:	B2@3'	
Material:	SC	
Initial Dry Density:	101.3	PCF
Moisture Content:	7.1	%
% Hydroconsolidation:	0.5	%

* Test Method: ASTM D-2435

Consolidation Test

AES - Double Butte Storage

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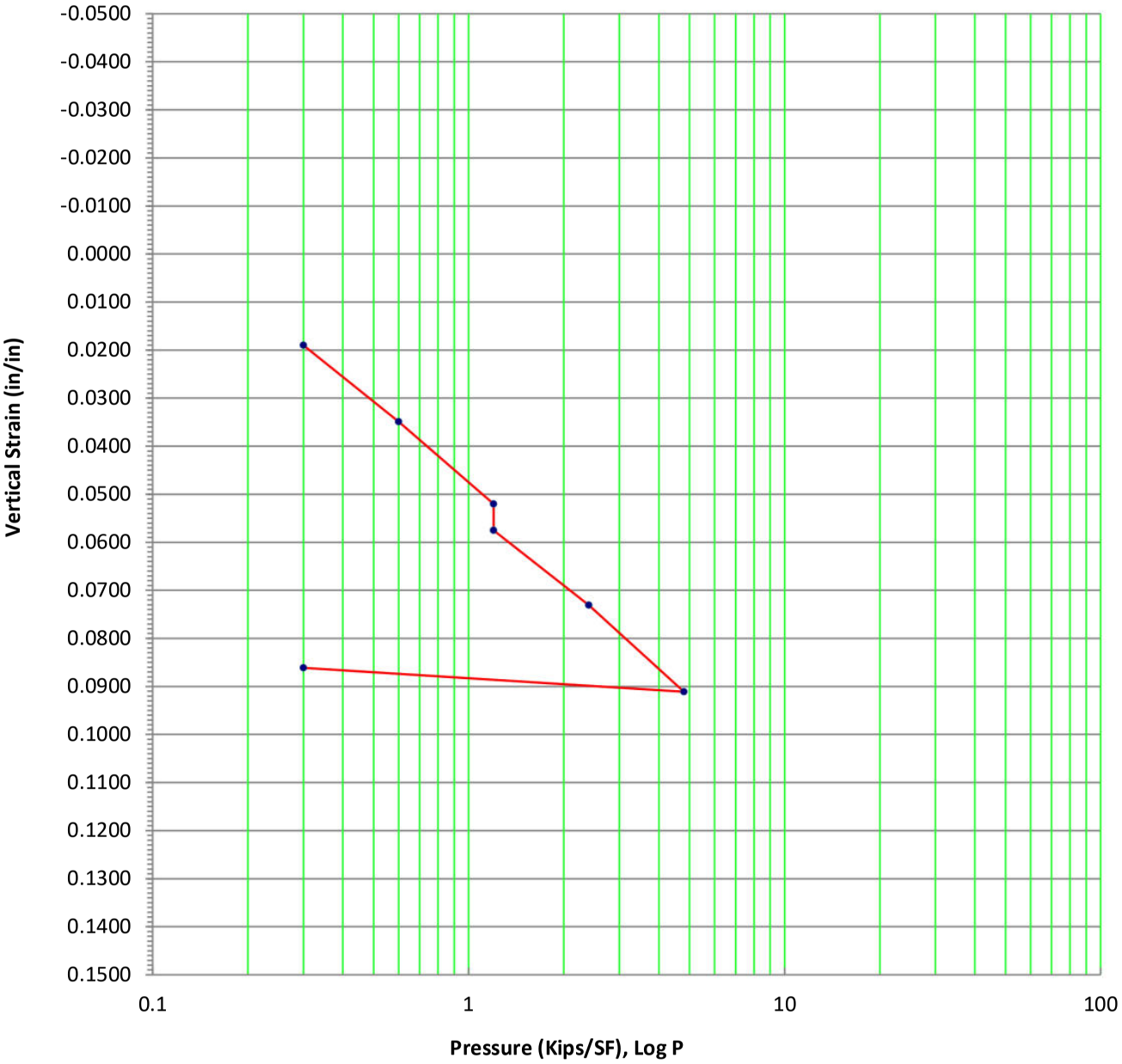
est. 2004

22-247	Menifee, CA



Sample location:	B3@4'	
Material:	SM	
Initial Dry Density:	111.1	PCF
Moisture Content:	3.4	%
% Hydroconsolidation:	0.6	%

* Test Method: ASTM D-2435

Consolidation Test

AES - Double Butte Storage

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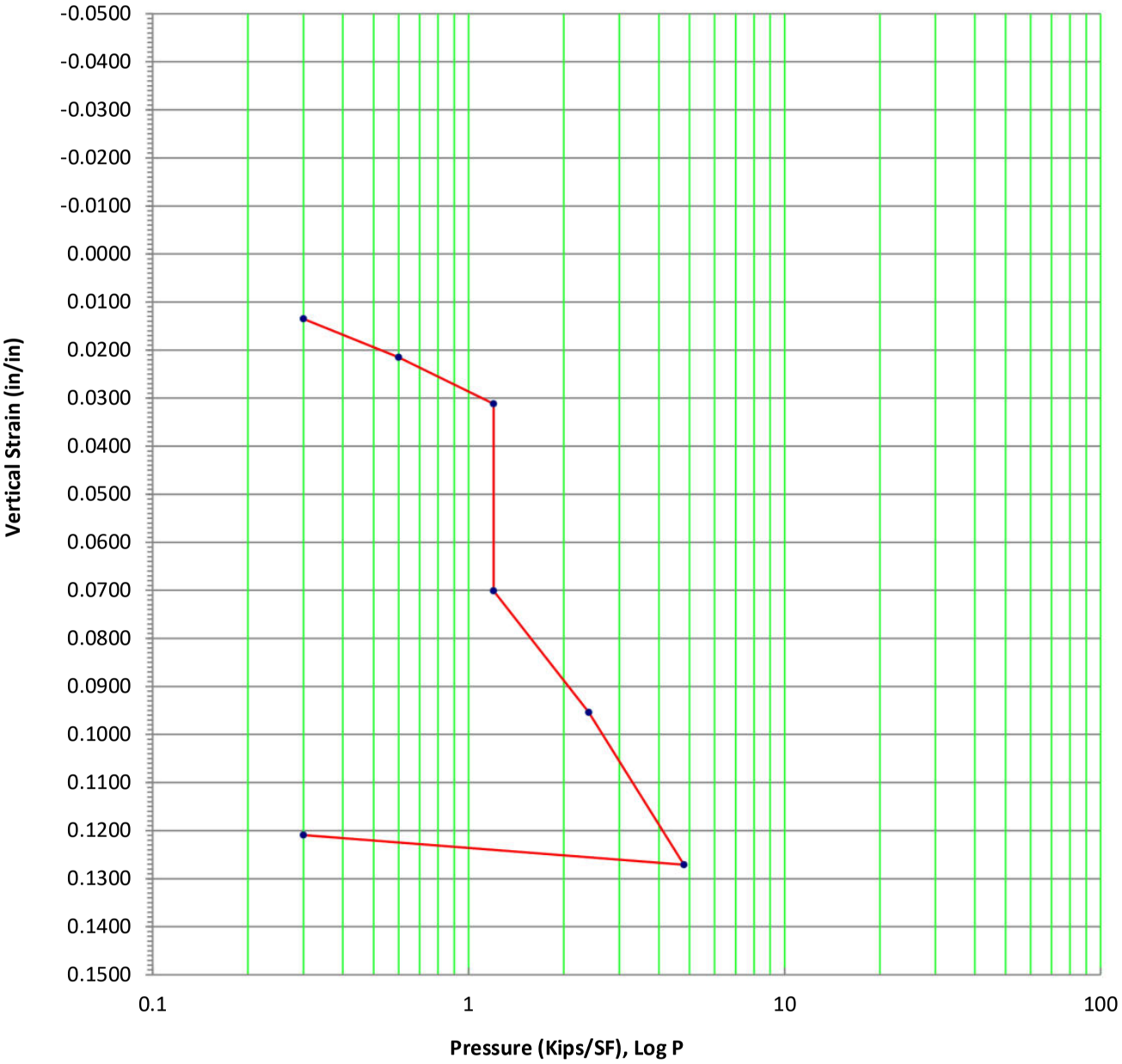
22-247	**Menifee, CA**



Sample location:	B4@4'	
Material:	SM	
Initial Dry Density:	106.8	PCF
Moisture Content:	9.1	%
% Hydroconsolidation:	3.9	%

* Test Method: ASTM D-2435

Consolidation Test

AES - Double Butte Storage

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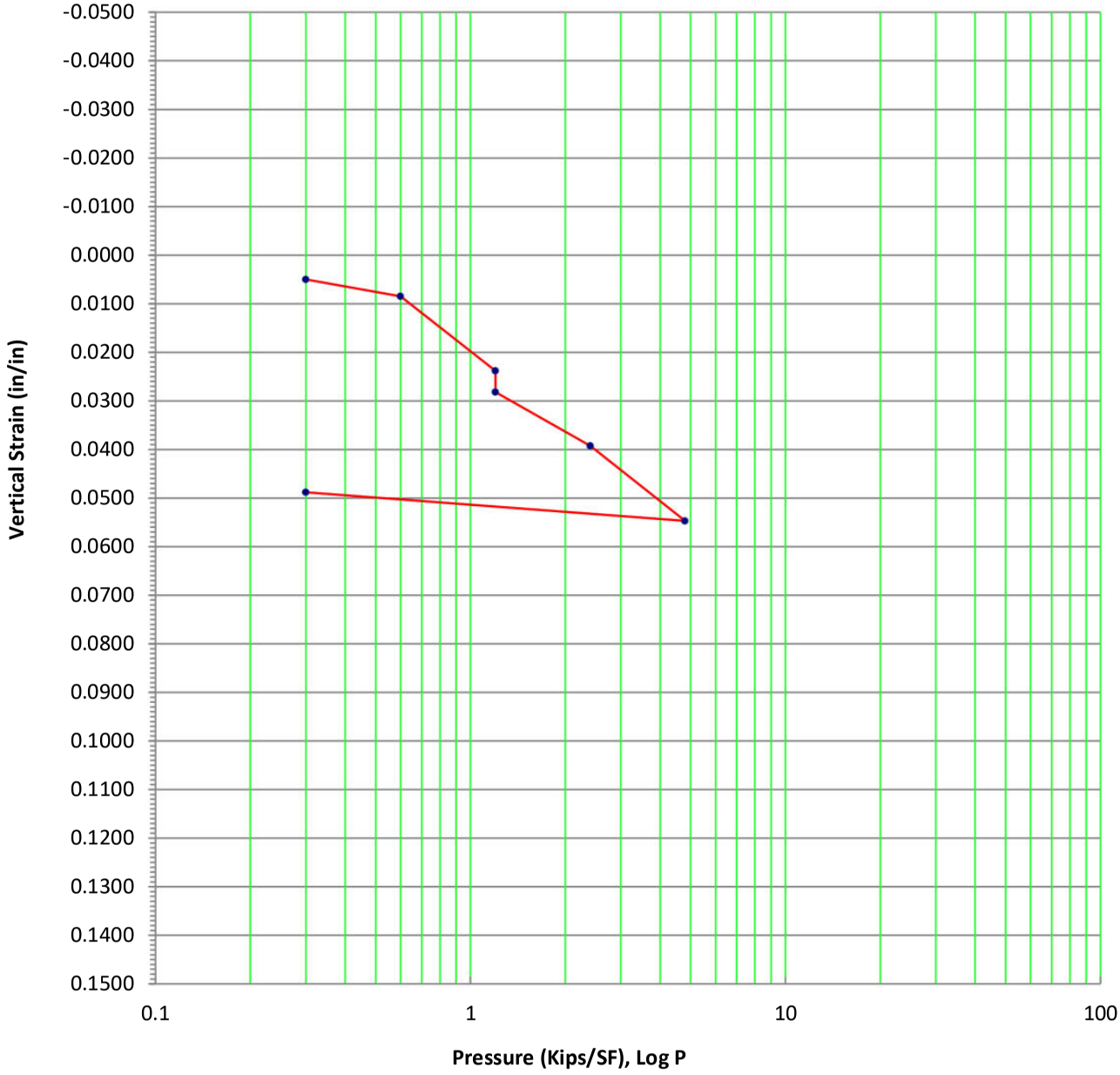
22-247	Menifee, CA



Sample location:	B7@4'	
Material:	SM	
Initial Dry Density:	116.1	PCF
Moisture Content:	7.9	%
% Hydroconsolidation:	0.4	%

* Test Method: ASTM D-2435

Consolidation Test

AES - Double Butte Storage

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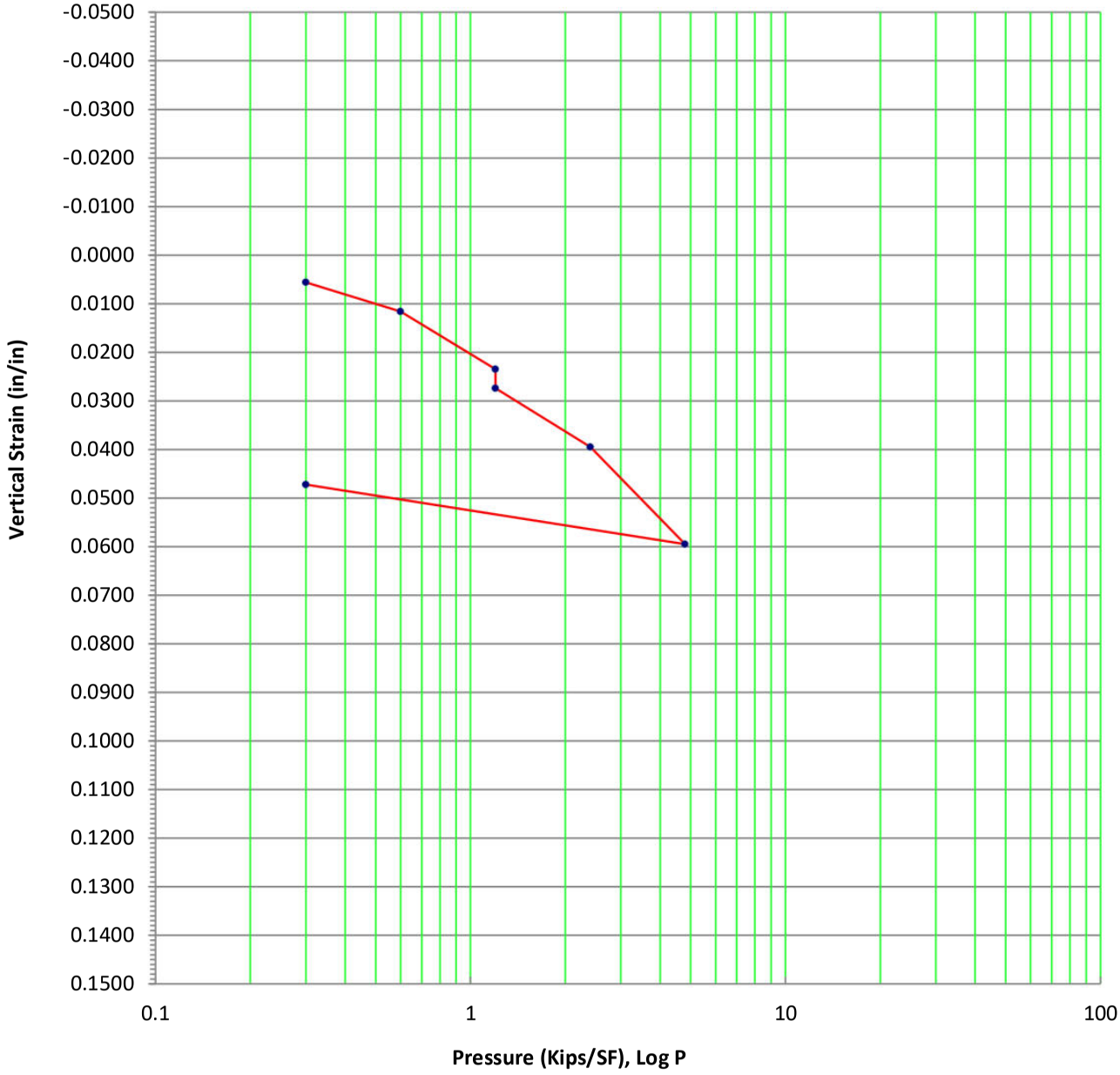
22-247	**Menifee, CA**



Sample location:	B8@4'	
Material:	SM	
Initial Dry Density:	102.8	PCF
Moisture Content:	10.1	%
% Hydroconsolidation:	0.4	%

* Test Method: ASTM D-2435

Consolidation Test

AES - Double Butte Storage

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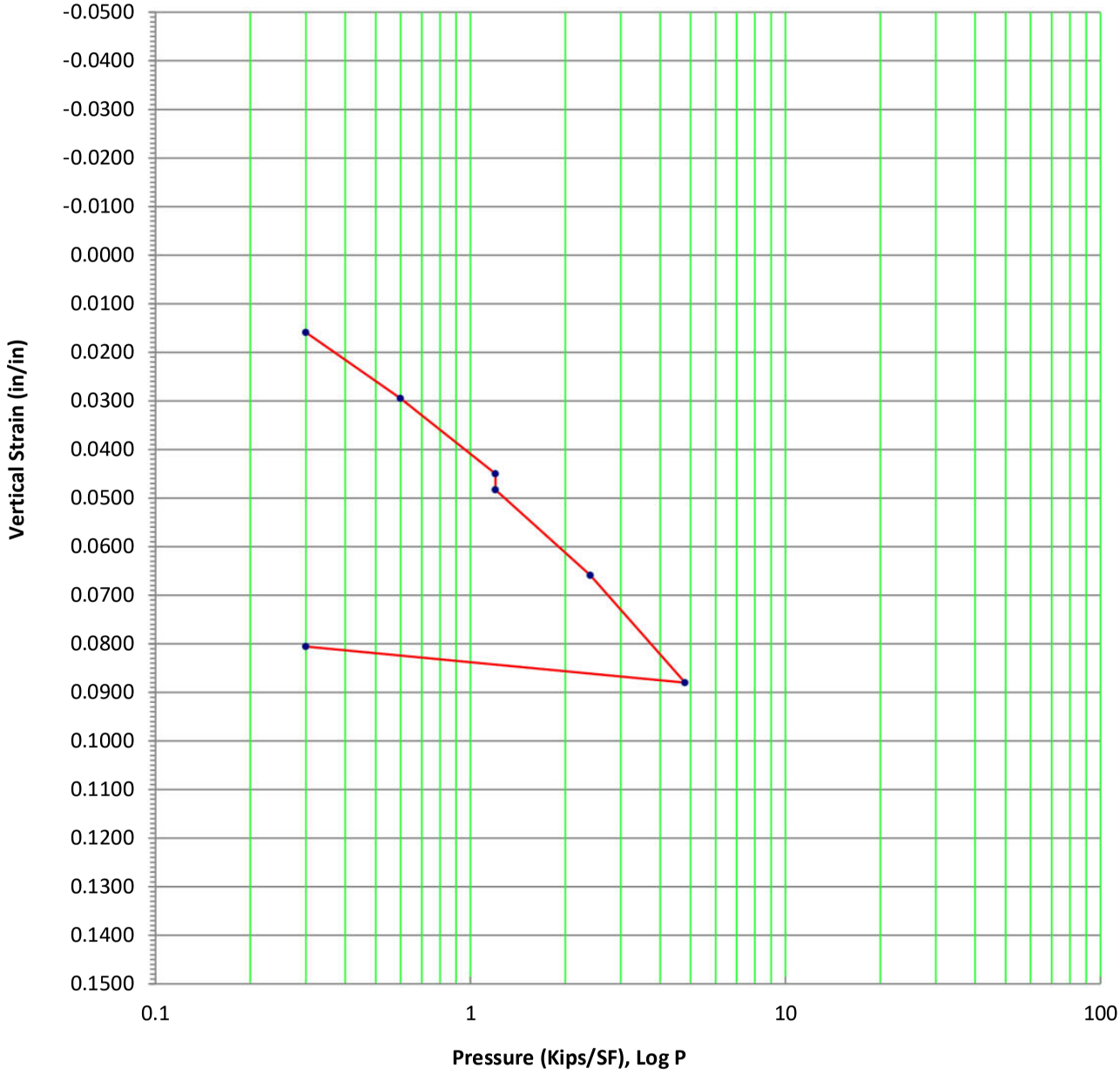
est. 2004

22-247	Menifee, CA



Sample location:	B1@6'	
Material:	SM	
Initial Dry Density:	110.8	PCF
Moisture Content:	8.1	%
% Hydroconsolidation:	0.3	%

* Test Method: ASTM D-2435

Consolidation Test

AES - Double Butte Storage

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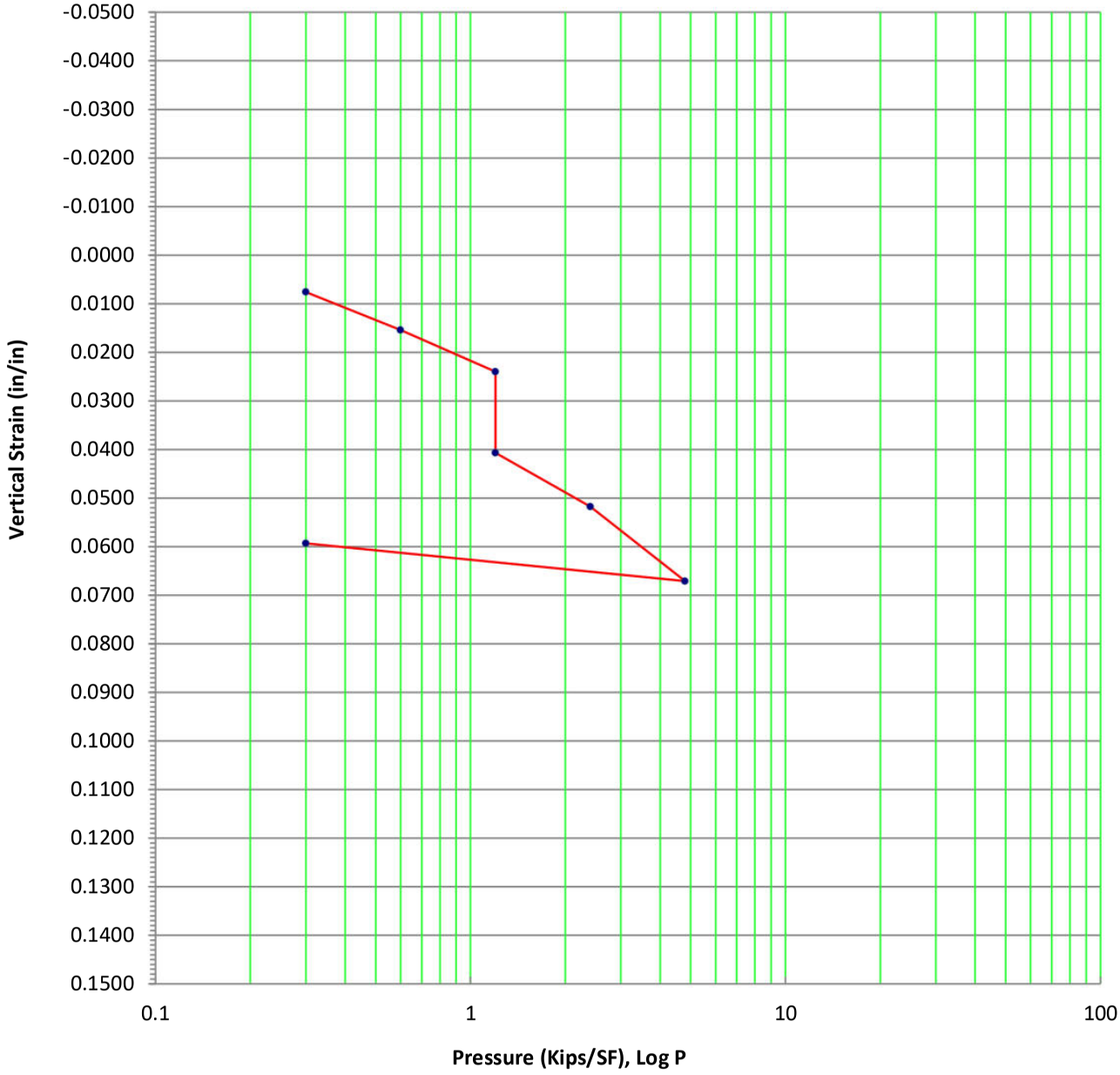
22-247	**Menifee, CA**



Sample location:	B4@6'	
Material:	SM	
Initial Dry Density:	-19.3	PCF
Moisture Content:	7.5	%
% Hydroconsolidation:	1.7	%

* Test Method: ASTM D-2435

Consolidation Test

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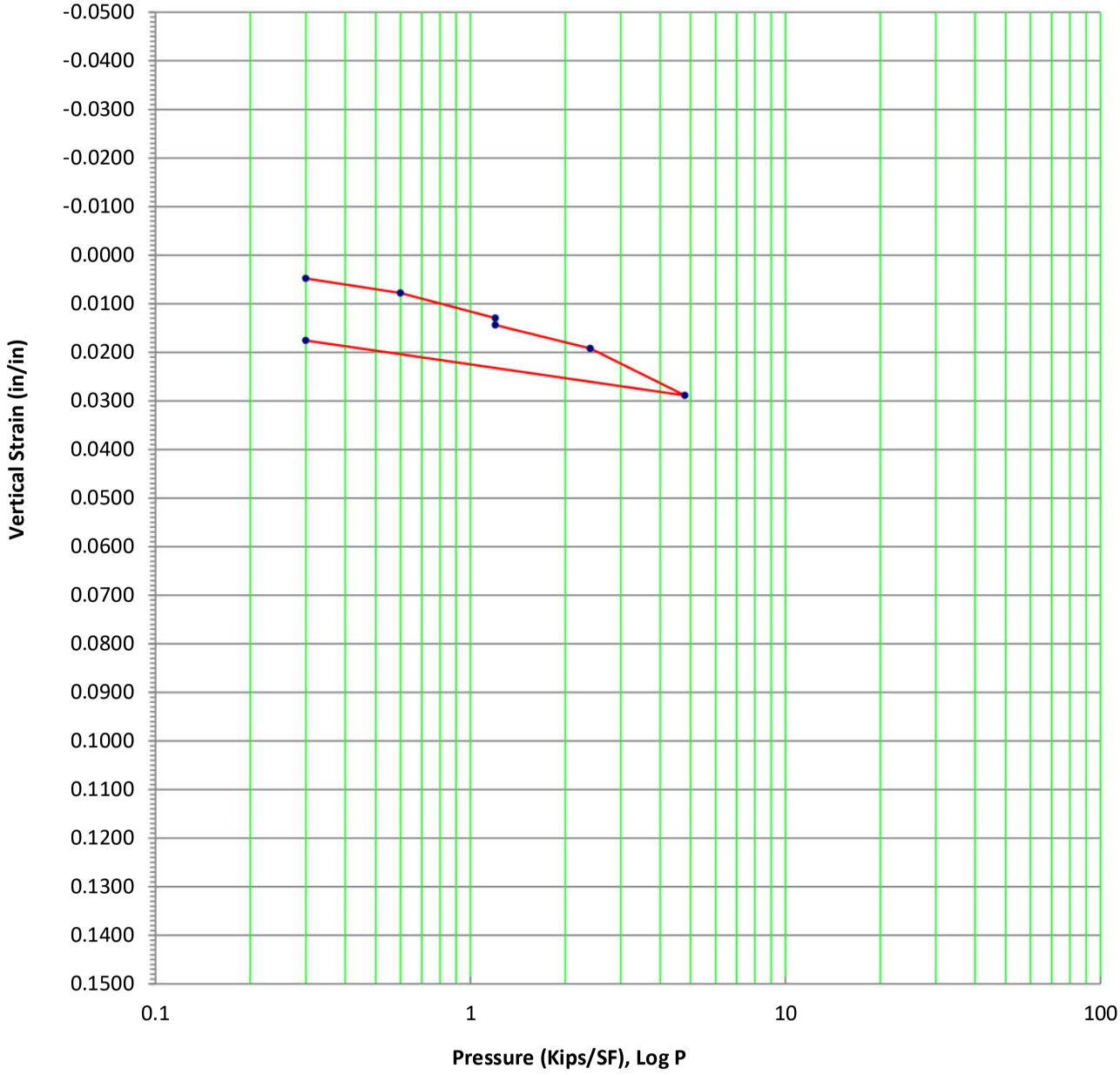
22-247	**Menifee, CA**



Sample location:	B3@8'	
Material:	SM	
Initial Dry Density:	127.4	PCF
Moisture Content:	9.1	%
% Hydroconsolidation:	0.1	%

* Test Method: ASTM D-2435

Consolidation Test

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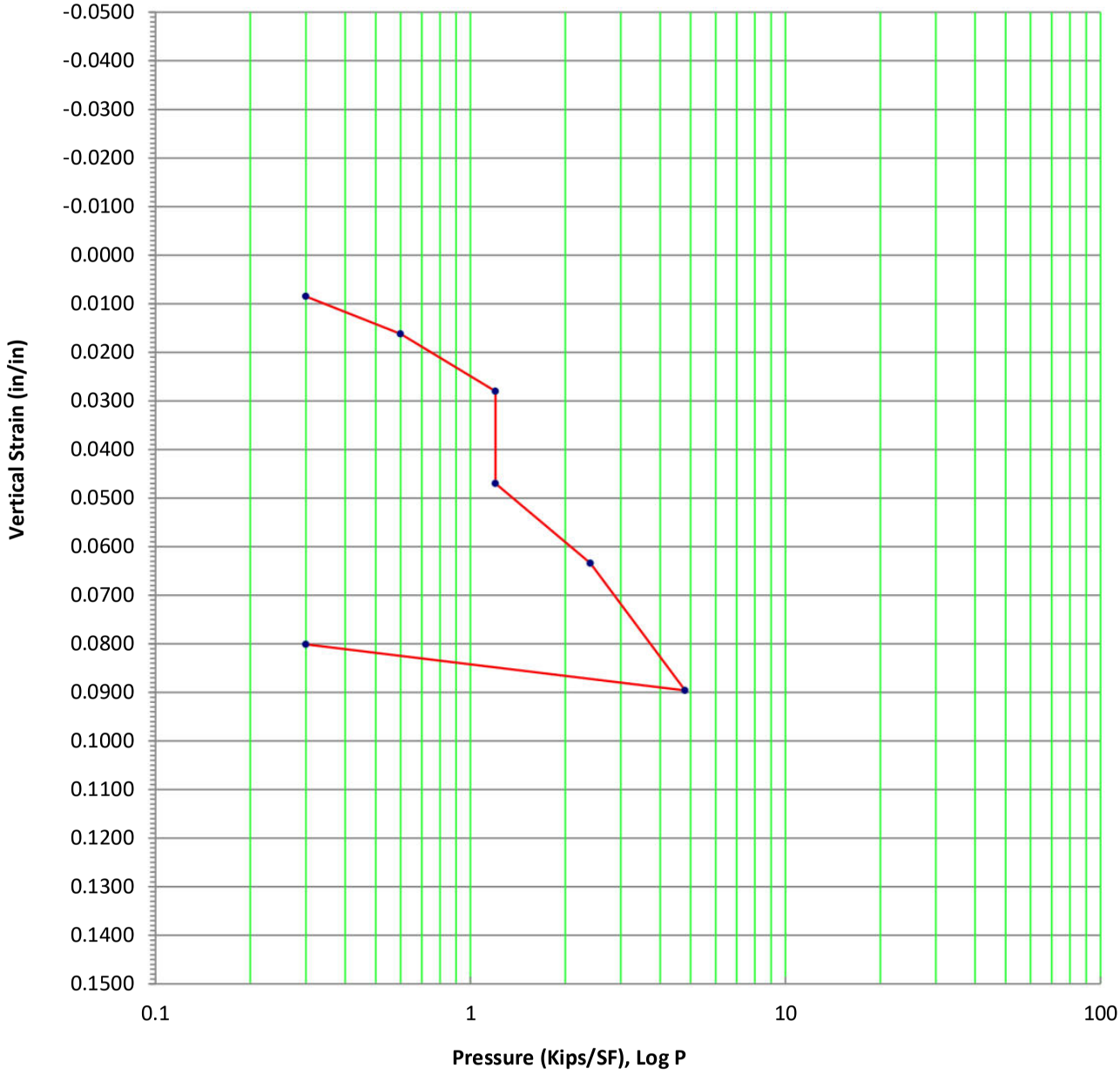
22-247	**Menifee, CA**



Sample location:	B4@8'	
Material:	SM	
Initial Dry Density:	109.0	PCF
Moisture Content:	9.4	%
% Hydroconsolidation:	1.9	%

* Test Method: ASTM D-2435

Consolidation Test

AES - Double Butte Storage

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est. 2004

22-247	**Menifee, CA**

ANAHEIM TEST LAB, INC

196 Technology Drive, Unit D
Irvine, CA 92618
Phone (949) 336-6544

TO:

Bruin Geotechnical Services, Inc.
44732 Yucca Avenue
Lancaster, CA 93534

DATE: 8/8/2022

P.O. NO.: Transmittal

LAB NO.: C-6223

SPECIFICATION: CA 301

MATERIAL: Brown, Sandy Clay

Project No.: 22-247
Job Name: AES Double Butte
Site Address: Matthews Rd/McLaughlin Rd
Site City & State: Menifee, CA
Boring ID: B8 Bulk @ 0-5'

ANALYTICAL REPORT
"R" VALUE

BY EXUDATION	BY EXPANSION
25	12

RESPECTFULLY SUBMITTED

WES BRIDGER LAB MANAGER

"R" VALUE CA 301

Client: Bruin Geotechnical Services, Inc. **ATL No.:** C 6223 **Date:** 8/8/2022

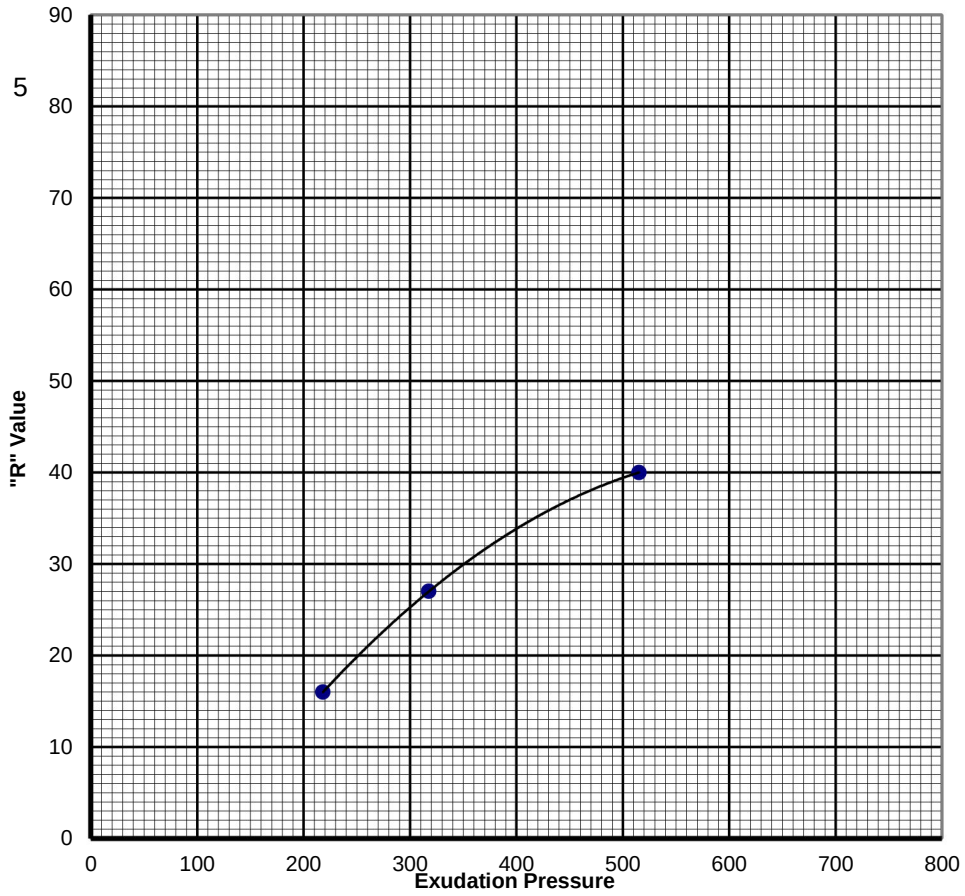
Client Reference No.: 22-247

Sample: B8 Bulk @ 0-5' **Soil Type:** Brown, Sandy Clay

.

TEST SPECIMEN		A	B	C	D
Compactor Air Pressure	psi	120	70	100	
Initial Moisture Content	%	4.3	4.3	4.3	
Moisture at Compaction	%	12.1	14.7	13.4	
Briquette Height	in.	2.51	2.54	2.49	
Dry Density	pcf	124.7	117.3	120.4	
EXUDATION PRESSURE	psi	515	218	318	
EXPANSION PRESSURE	psf	390	160	260	
Ph at 1000 pounds	psi	38	53	45	
Ph at 2000 pounds	psi	80	120	102	
Displacement	turns	3.76	4.43	3.89	
"R" Value		40	16	27	
CORRECTED "R" VALUE		40	16	27	

Final "R" Value	
BY EXUDATION: @ 300 psi	**25**
BY EXPANSION: TI = 5.0	**12**



SUMMARY OF LABORATORY TEST RESULTS
2023

SIEVE ANALYSIS

Percent passing individual sieves

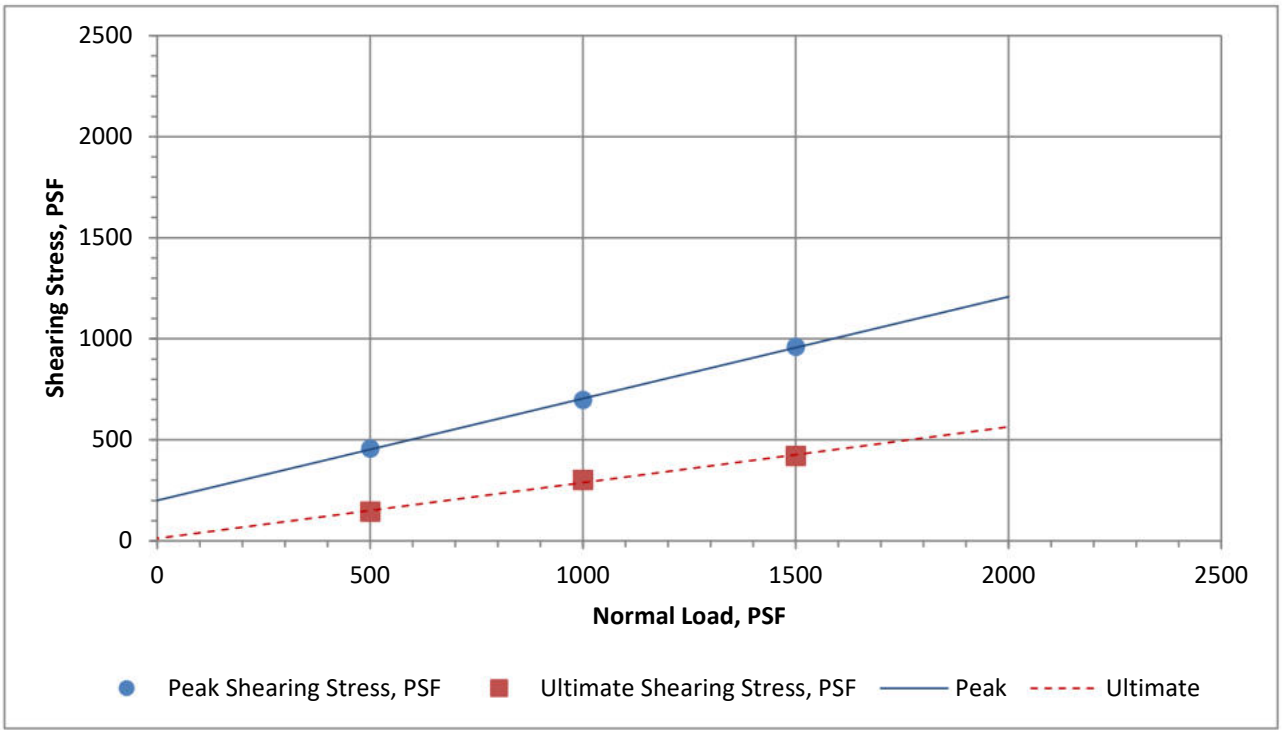
Sample I.D.	1/2"	3/8"	#4	#10	#40	#100	#200
B2@1			100	93	69	48	41
B1@2			100	98	83	60	46
B1@5		100	99	96	77	52	35
B2@6			100	96	76	53	41
B1@7		100	99	90	62	38	26
B2@9		100	98	89	58	35	26
B1@10	100	96	82	66	46	30	21
B2@12		100	99	92	67	35	25
B1@15			100	99	94	69	47
B2@15			100	97	88	69	46

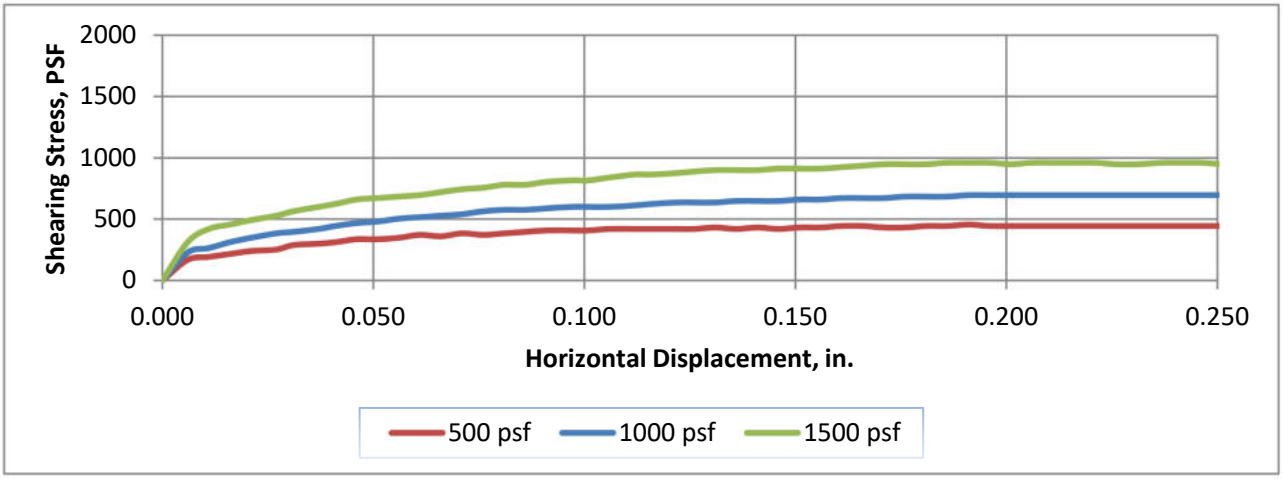
SAND EQUIVALENT

Sample I.D.	Sand Equivalent
B2@4	46
B1@6	15

EXPANSION INDEX

Sample I.D.	Expansion Index	Classification
B1@0-5’	10	Very Low





Sample Description: (SM) - Moderate brown very silty fine to medium sand w/ coarse sand & occ. #4 gravel

DIRECT SHEAR DATA (ASTM D-3080)

Sample ID	Symbol	Depth, feet	Dry Density, PCF	Average deg. of saturation
B1	●	3'	106	69
			Peak	Ultimate
Angle of friction, (degrees)			27	15
Cohesive Strength (PSF)			200	12

Direct Shear Test

AES - Double Butte

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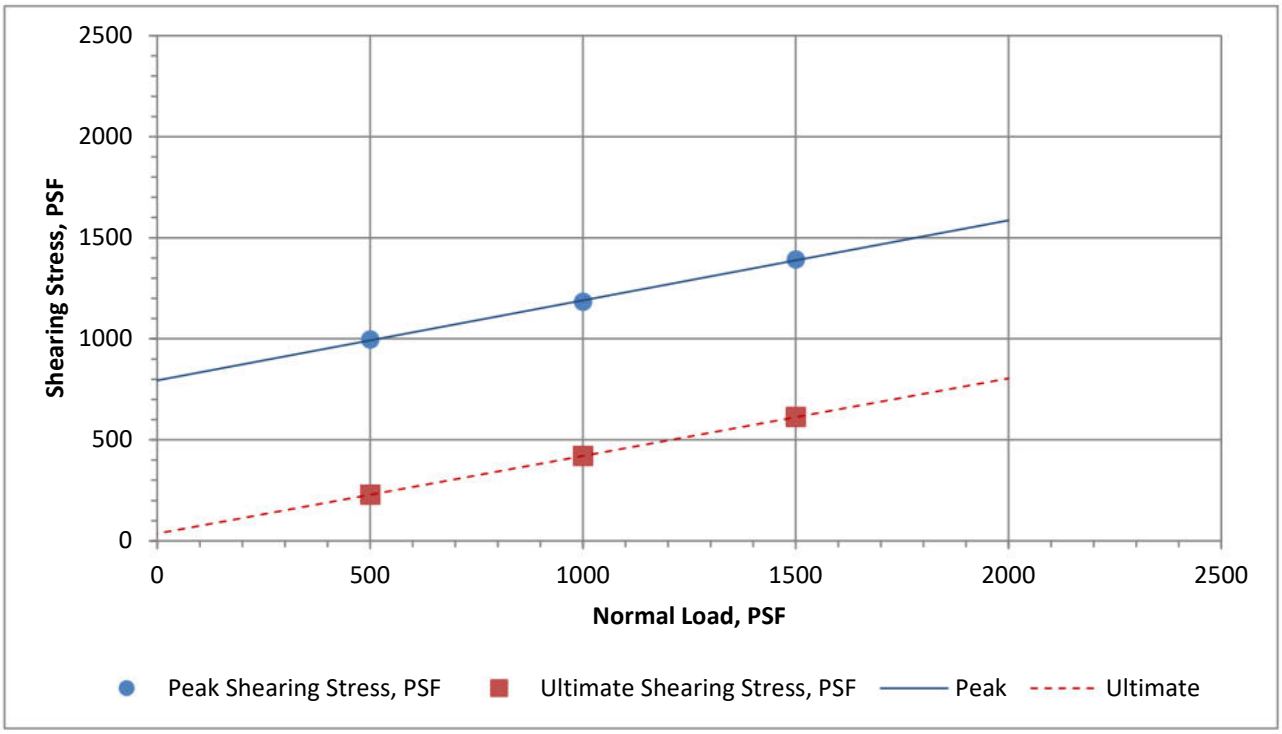
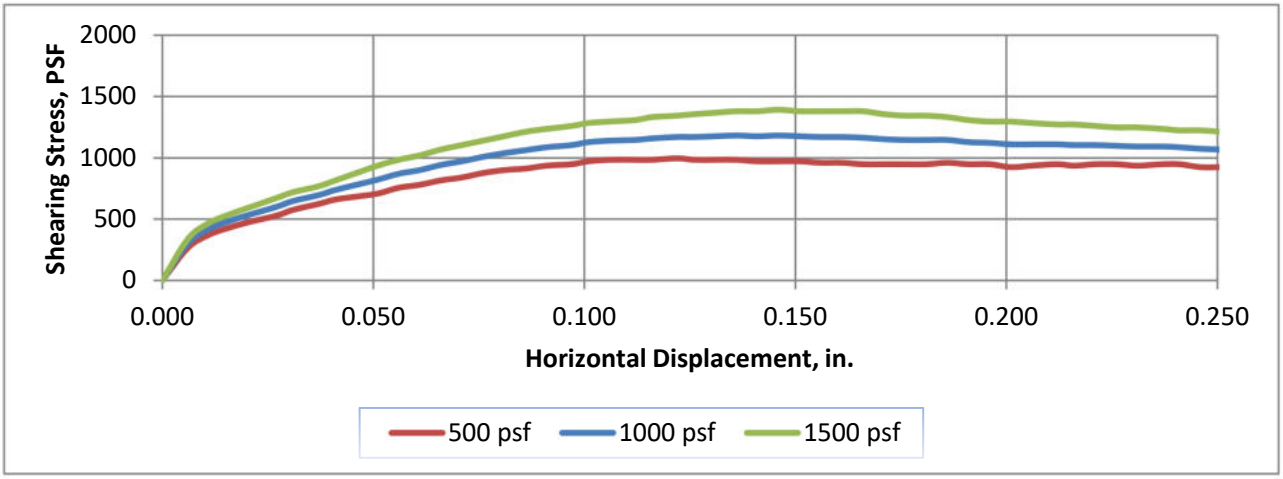
J.N. 22-247





Sample Description: (SC) - Brown clayey fine to coarse sand w/ slight #4-1/2" gravel

DIRECT SHEAR DATA (ASTM D-3080)

Sample ID	Symbol	Depth, feet	Dry Density, PCF	Average deg. of saturation
B2	●	5'	106	71

	Peak	Ultimate
Angle of friction, (degrees)	22	21
Cohesive Strength (PSF)	794	36

Direct Shear Test

AES - Double Butte

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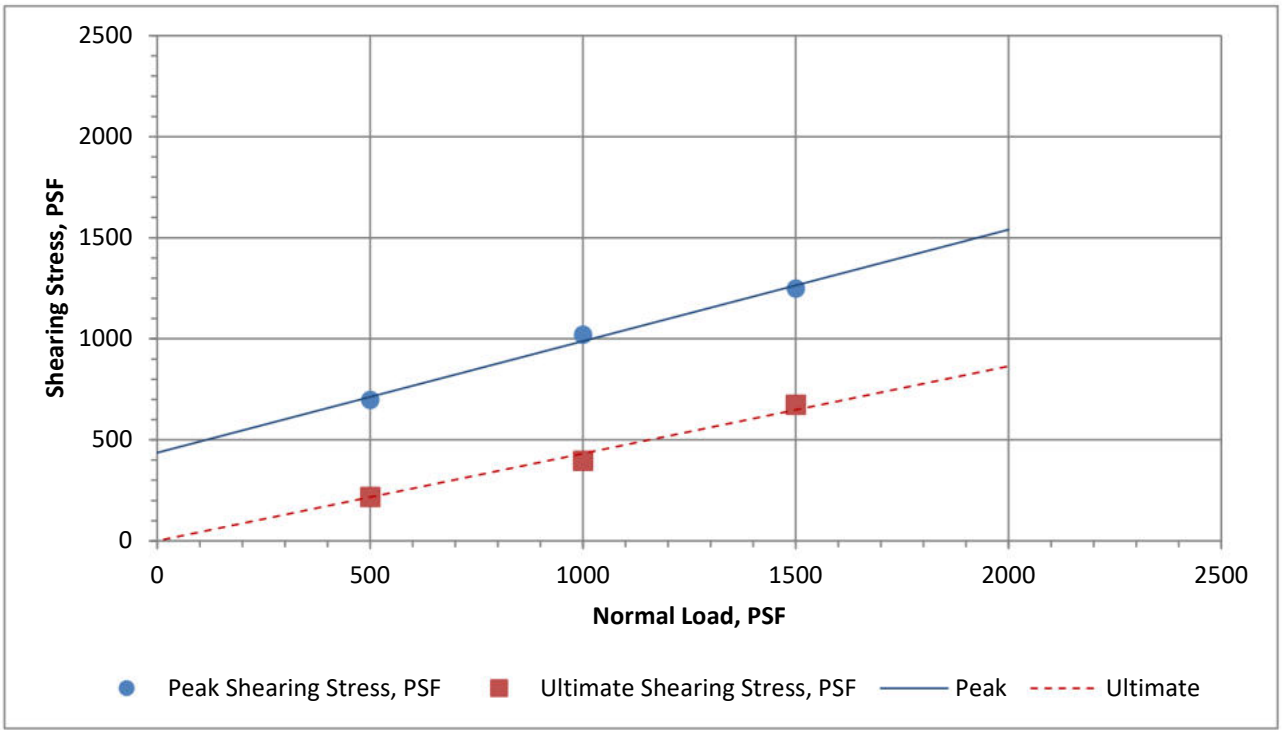
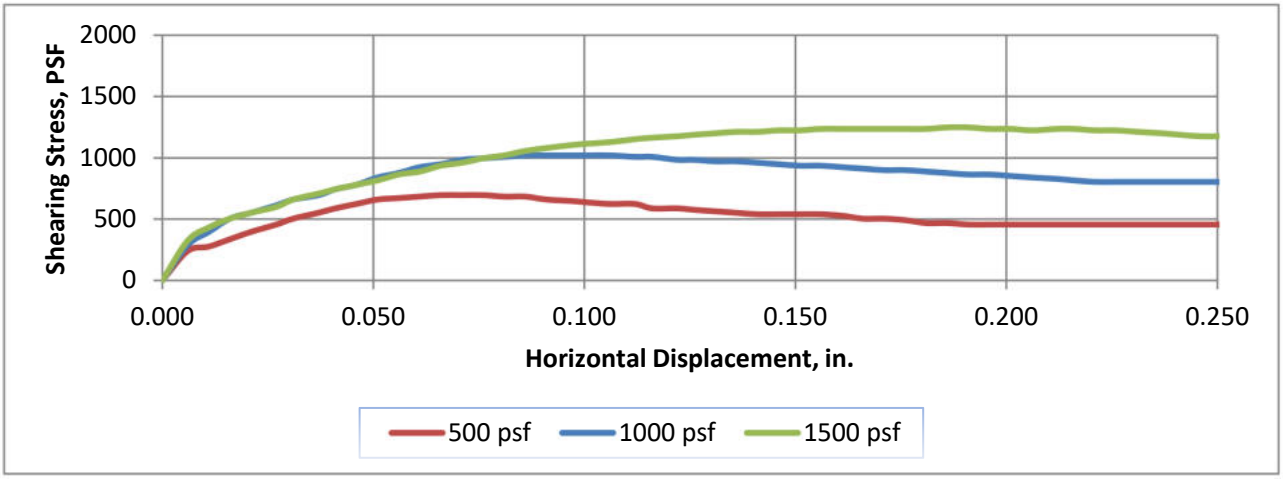
J.N. 22-247





Sample Description: (SM) - Brown silty fine to medium sand w/ coarse sand & occ. #4 gravel (Slightly Cemented)

DIRECT SHEAR DATA (ASTM D-3080)

Sample ID	Symbol	Depth, feet	Dry Density, PCF	Average deg. of saturation
B1	●	8'	113	81

	Peak	Ultimate
Angle of friction, (degrees)	29	25
Cohesive Strength (PSF)	436	0

Direct Shear Test

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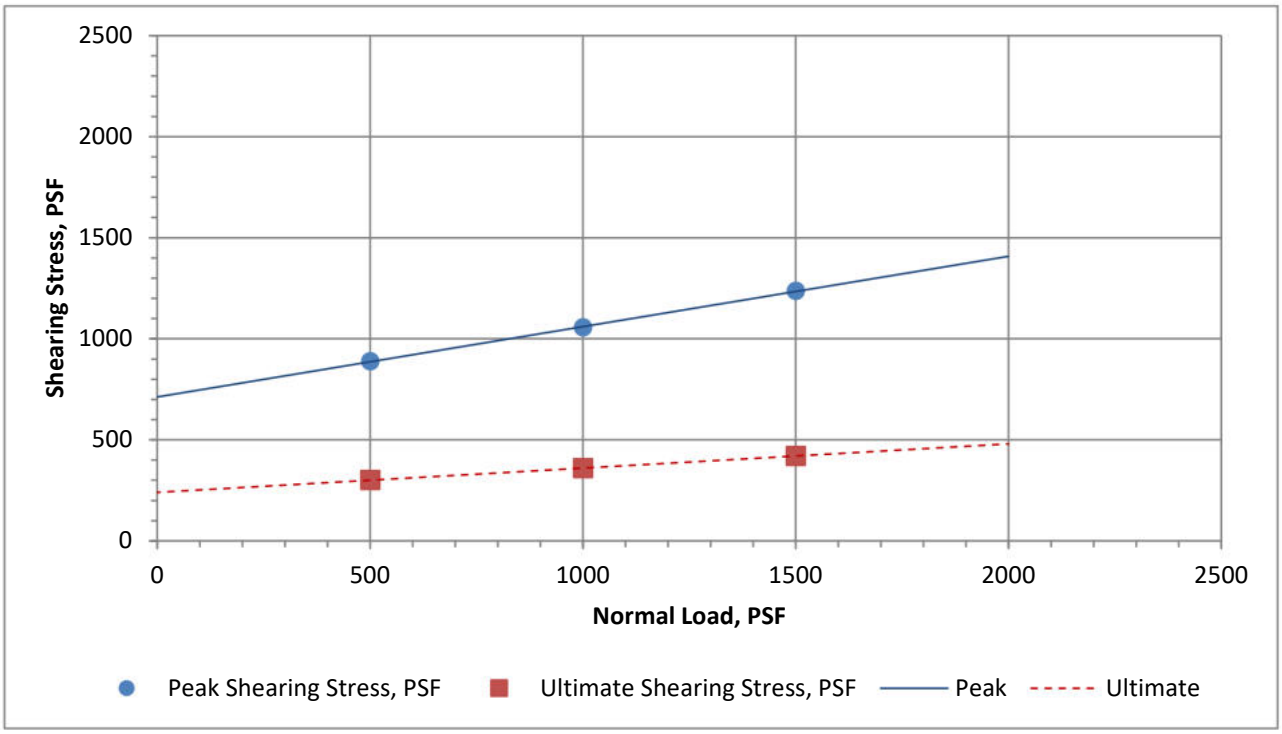

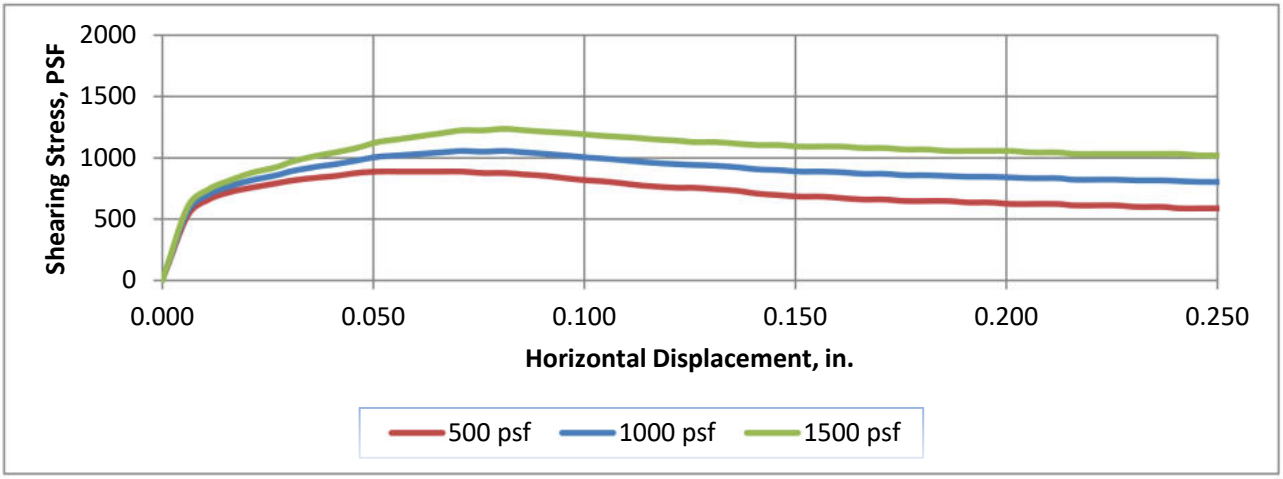

Sample Description: (ML) - Brown fine to medium sandy silt w/ occ. coarse sand

DIRECT SHEAR DATA (ASTM D-3080)

Sample ID	Symbol	Depth, feet	Dry Density, PCF	Average deg. of saturation
B2	●	10'	117	121
			Peak	Ultimate
Angle of friction, (degrees)			19	7
Cohesive Strength (PSF)			712	240

Direct Shear Test

AES - Double Butte

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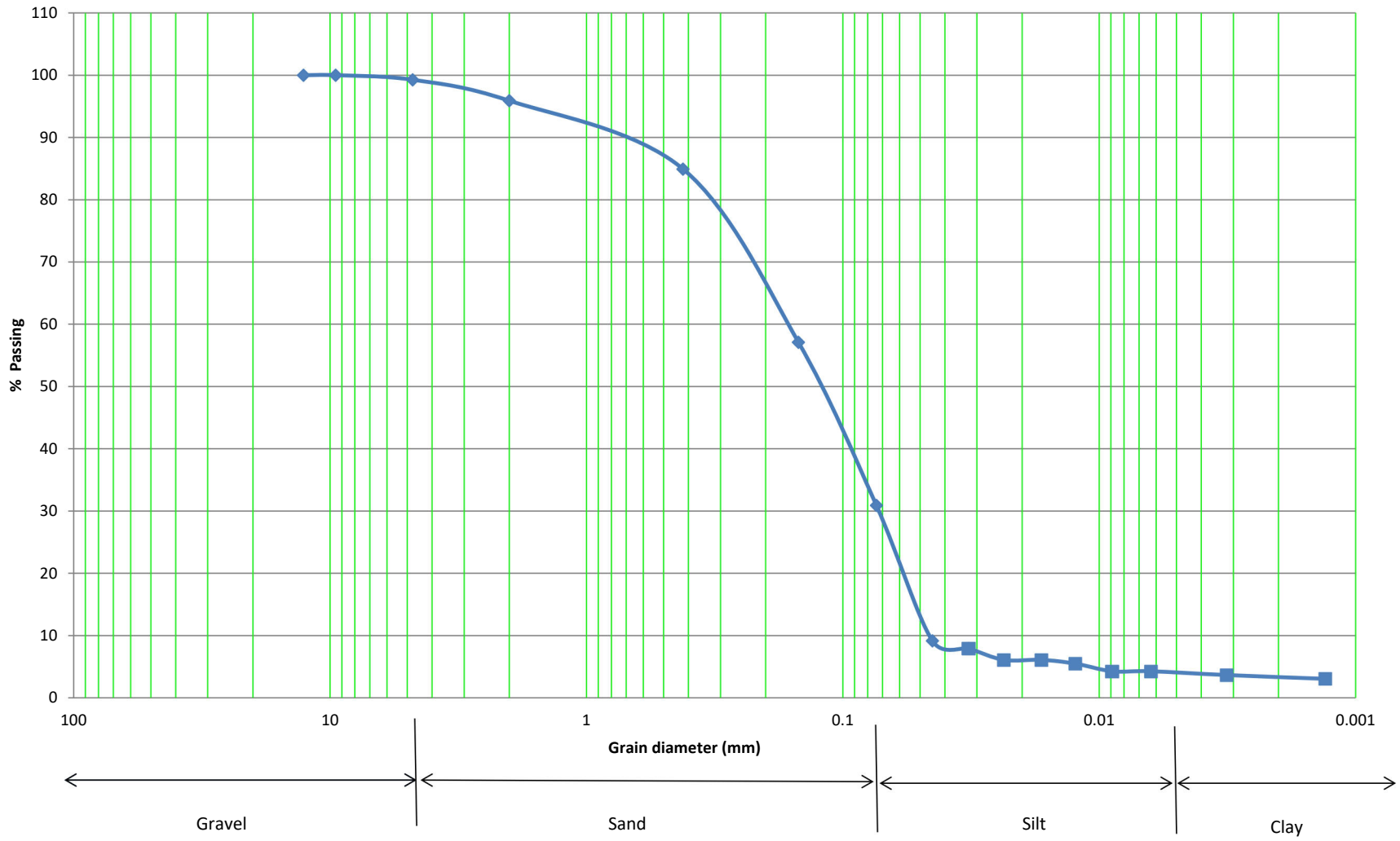
J.N. 22-247



Grain Size Distribution Curve (ASTM D422)

Job Number: 22-247
Client Name: AES-Double Butte
Sample I.D.: B1@1'

Coefficient of Uniformity, Cu: 3.73

Particle range, mm: 12.699

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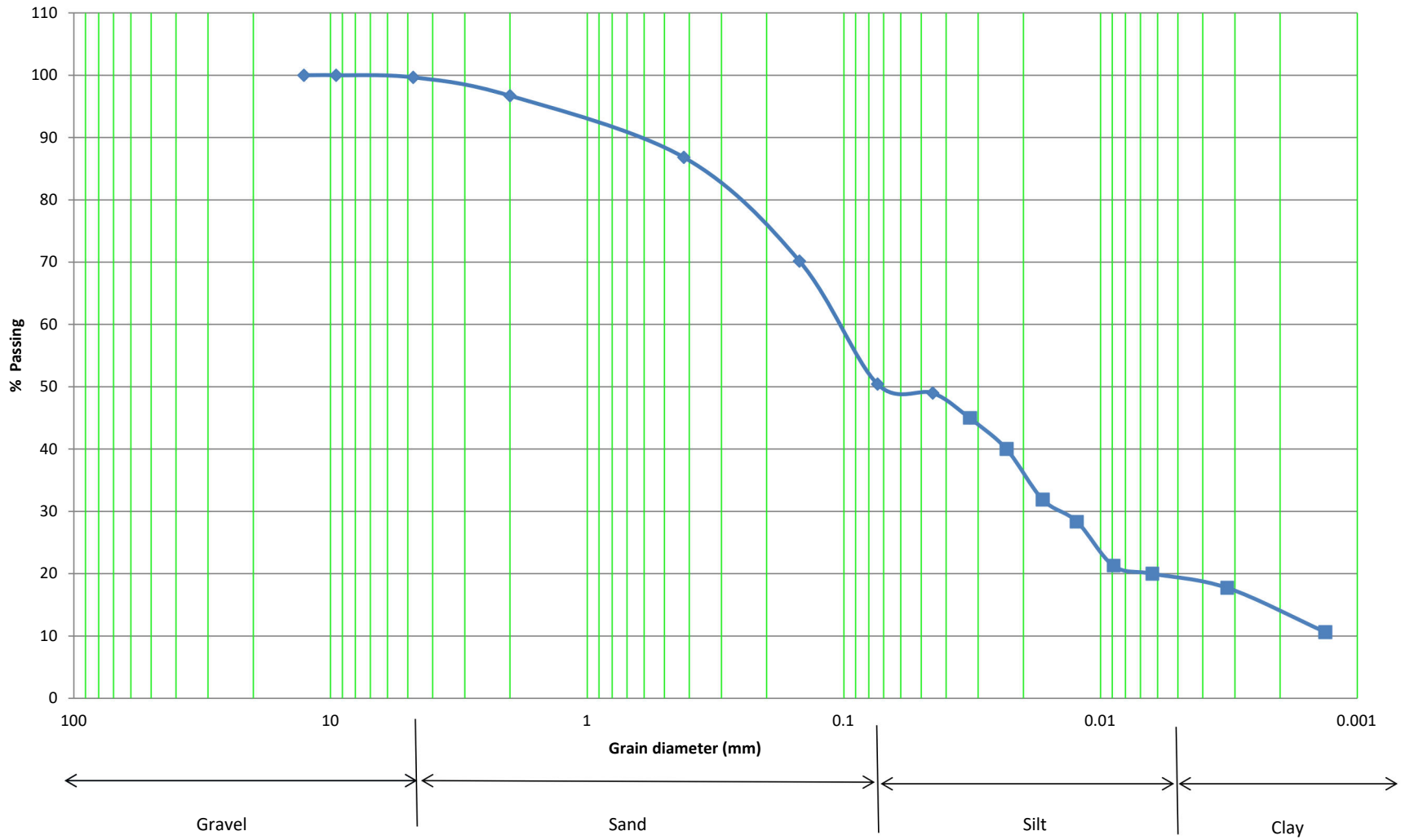


Grain Size Distribution Curve (ASTM D422)

Job Number: 22-247
Client Name: AES-Double Butte
Sample I.D.: B1@1'

Coefficient of Uniformity, Cu: 74.00

Particle range, mm: 12.699

BRUIN
GEOTECHNICAL SERVICES INC.
est. 2004

APPENDIX D

Corrosion Report
JDH Corrosion

8/24/2022

Mr. Mark Stevens

Director

Bruin Geotechnical Services Inc.

SUBMITTED TO

44732 Yucca Ave

Lancaster, CA 93534

2022254

August 24, 2022

Bruin Geotechnical Services Inc.
44732 Yucca Ave
Lancaster, CA 93534

Attention: **Mr. Mark Stevens**
Director

Subject: **Corrosion Engineering Services**
Field Electrical Resistivity Testing
Double Butte Storage
Sun City, CA

Dear Mr. Stevens,

Pursuant to your request, **JDH Corrosion Consultants, Inc**. has conducted a soil resistivity evaluation for the above referenced project site and we have provided herein the data required. The data is to be used for electrical grounding calculations and corrosivity recommendations for buried utilities and concrete foundations.

Our Scope of Work was:

1. Perform soil DC resistivity testing in accordance with ASTM G57 Wenner Four-Pin Method at four (4) locations at the project site.

2. Tests will be performed in two directions at the test location.

3. Electrode spacing “A” shall be recorded at 1, 2, 3, 5, 10, 20, 50 and 100 ft.

Soil Testing and Analysis

Soil Testing Results

Four (4) soil samples was collected from the site by **Bruin Geotechnical** and were transported to a state certified testing laboratory, **CERCO Analytical, Inc.** (certificate no. 2153) located in Concord, CA for chemical analysis. The sample was analyzed for pH, chlorides, resistivity (as received and @ 100% saturation), sulfates and Redox potential using ASTM test methods as detailed in the table below. The preparation of the soil sample for chemical analysis was in accordance with the applicable specifications.

Soil Analysis Test Methods

Chemical Analysis	ASTM Method
Chlorides	D4327
pH	D4972
Resistivity	G57
Sulfate	D4327
Redox Potential	D1498

The results of the chemical analysis are provided in the CERCO Analytical, Inc. reports dated August 11, 2022. The results are summarized as follows:

CERCO Analytical, Inc.
Laboratory Analysis

Chemical Analysis	Range of Results	Corrosion Classification*
Chlorides	N. D. – 16 (mg/kg)	Non-corrosive*
pH	7.80 – 8.39	Non-corrosive*
Resistivity (100% saturation)	2,800 – 3,300 ohms-cm	Moderately Corrosive*
Sulfate	21 – 36 (mg/kg)	Non-corrosive**
Redox Potential	280 - 370 mV	Mildly Corrosive*

* With respect to bare steel or ductile iron.
** With respect to mortar coated steel

Chemical Testing Analysis

The chemical analysis provided by **CERCO Analytical, Inc.** indicates that the soils are generally classified as “moderately corrosive” based on the saturated resistivities. The chloride levels indicate “non-corrosive” conditions to steel and ductile iron and the sulfate levels indicate “non-corrosive” conditions for concrete structures placed into these soils with regard to sulfate attack. The pH of the soils is alkaline which classifies them as “non-corrosive” to buried steel and concrete structures. The redox potential indicates aerobic soils and is considered to be “mildly corrosive” to steel and ductile iron.

In-Situ Soil Resistivity Measurements

The in-situ resistivity of the soil was measured at four (4) locations with orientations of approximately North/South and East/West at each location at the project site by **JDH Corrosion Consultants, Inc.** field personnel. Resistance measurements were conducted with probe spacing of 1, 2, 3, 5, 10, 20, 50 and 100-feet at each location. For corrosion analysis purposes we have calculated the resistivity of soil layers 0-1', 1'-2’, 2'-3', 3'-5' and 5'-10' using the Barnes Method as follows:

$\rho_{b-a} = KR_{(b-a)}$

Where;

ρ_{b-a}	=	soil resistivity of layer depth b-a (ohm-cm)
a	=	soil depth to top layer (ft)
b	=	soil depth to bottom layer (ft)
R_a	=	soil resistance read at depth a (ohms)
R_b	=	soil resistance read at depth b (ohms)
R_{b-a}	=	resistance of soil layer from a to b (ft)
K	=	layer constant = $60.96\pi(b-a)$ (cm)

and $\frac{1}{R_{b-a}} = \frac{1}{R_a} - \frac{1}{R_b}$

The visual diagrams below describe the Wenner 4-pin testing configuration.

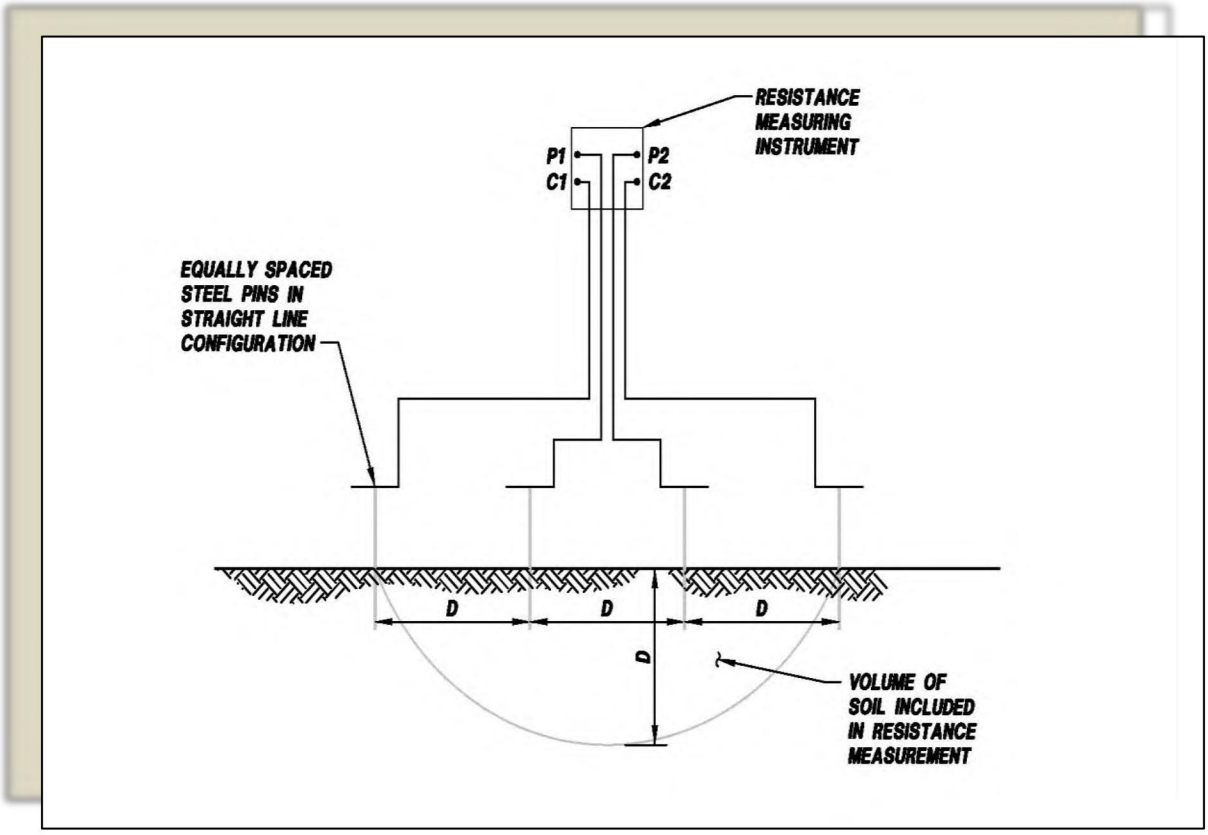


Fig 1: Wenner 4-Pin Resistivity Schematic No.1

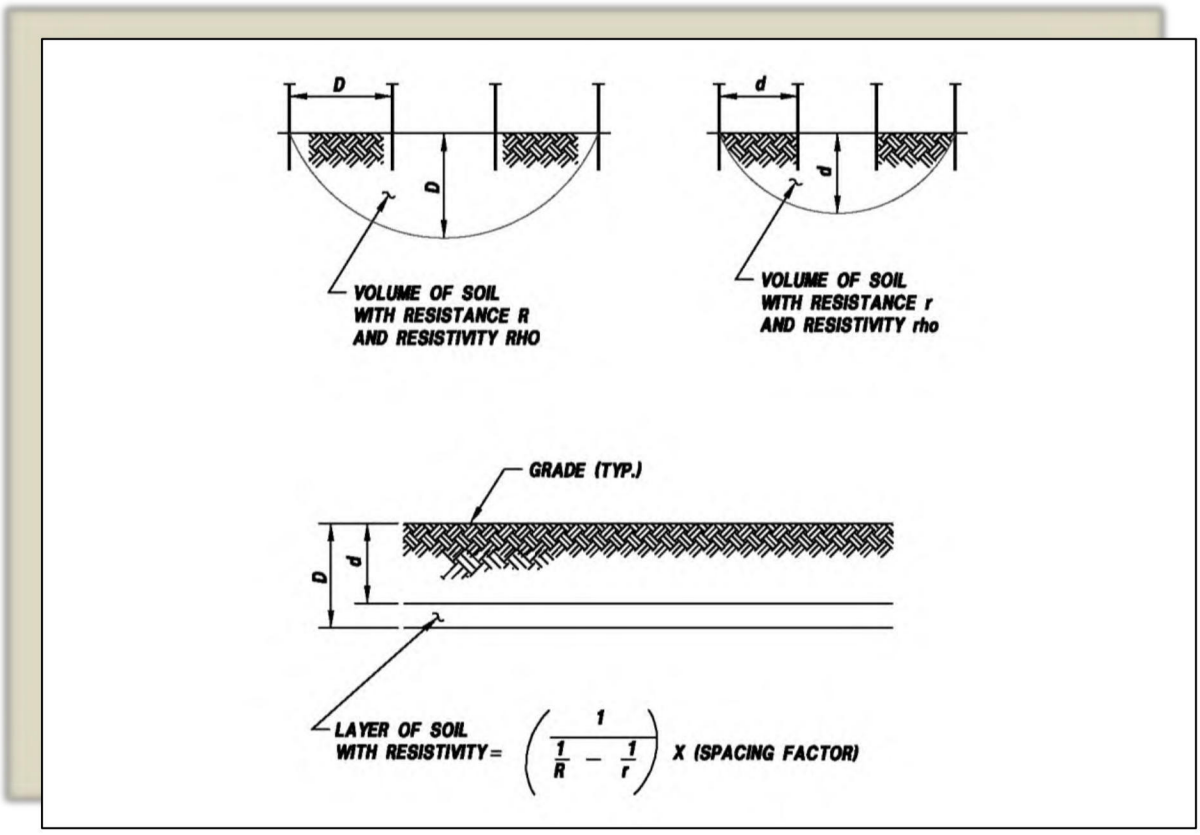


Fig 2: Illustration of Barnes Layer Calculations

In-Situ Soil Resistivity Analysis

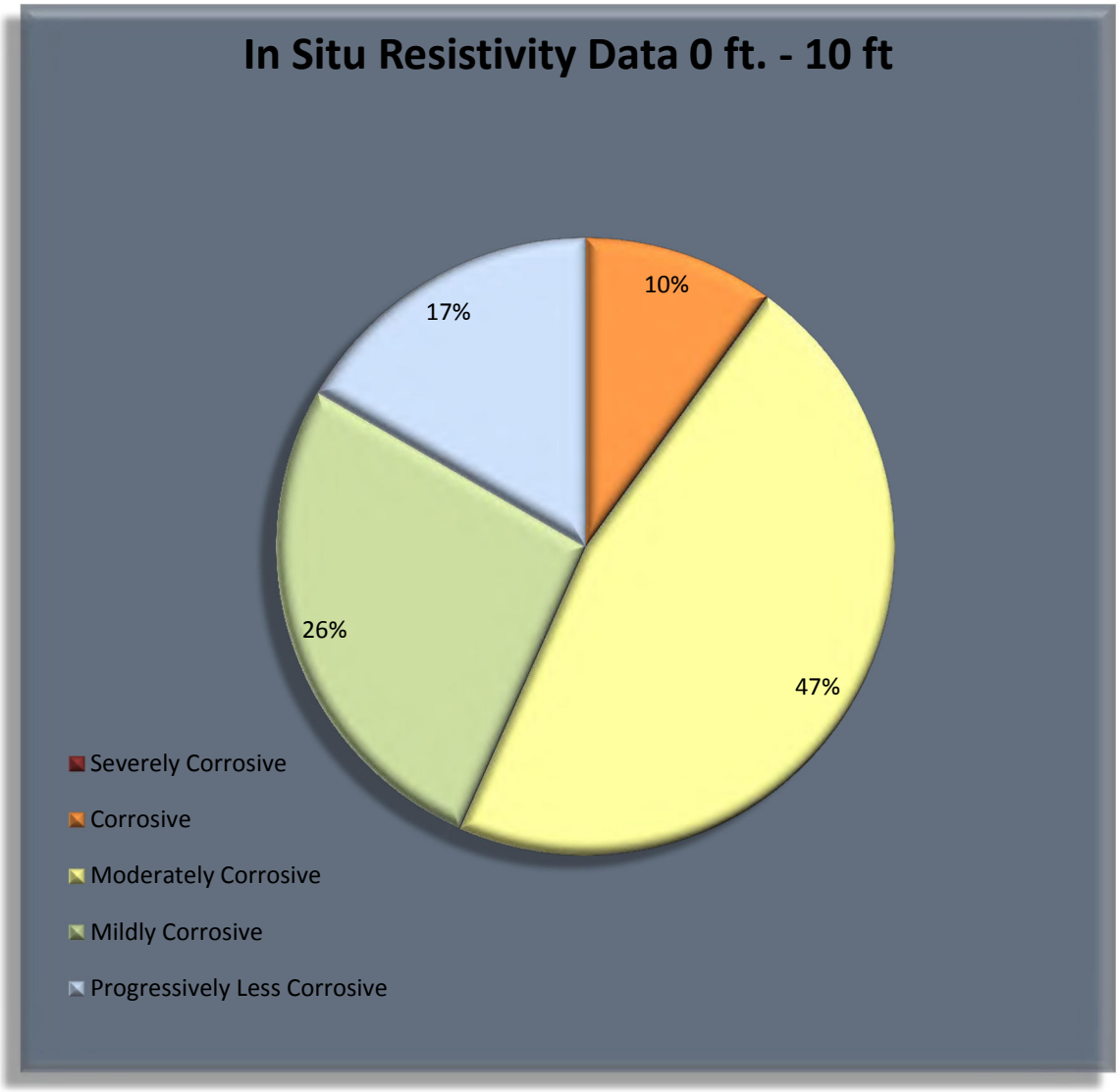
Corrosion of a metal is an electro-chemical process and is accompanied by the flow of electric current. Resistivity is a measure of the ability of a soil to conduct an electric current and is, therefore, an important parameter in consideration of corrosion data. Soil resistivity is primarily dependent upon the chemical content and moisture content of the soil mass.

The greater the amount of chemical constituents present in the soil, the lower the resistivity will be. As moisture content increases, resistivity decreases until maximum solubility of dissolved chemicals is attained. Beyond this point, an increase in moisture content results in dilution of the chemical concentration and resistivity increases. The corrosion rate of steel in soil normally increases as resistivity decreases. Therefore, in any particular group of soils, maximum corrosion will generally occur in the lowest resistivity areas. The following classification of soil corrosivity, developed by William J. Ellis, is used for the analysis of the soil data for the project site.

Resistivity (Ohm-cm)	Corrosivity Classification
0 – 500	Severely Corrosive
501 – 2,000	Corrosive
2,001 – 8,000	Moderately Corrosive
8,001 – 32,000	Mildly Corrosive
> 32,000	Progressively Less Corrosive

The above classifications are appropriate for the project site and the results are presented in the graph below. In general, the soils are classified as “corrosive to progressively less corrosive” with respect to corrosion of buried steel structures throughout the top 0 to 10 feet of the site.

The chart of the in-situ soil resistivity data for the soil layers 0 to 10 feet indicate that 10% of the soils are classified as “corrosive”, 47% of the soils are classified as “moderately corrosive”, 26% of the soils are classified as “mildly corrosive” and 17% of the soils are classified as “progressively less corrosive”.



Discussion

Reinforced Concrete Foundations

Due to the low levels of water-soluble sulfates found in these soils, there is no special requirement for sulfate resistant concrete to be used at this site. The type of cement used should be in accordance with California Building Code (CBC) for soils which have less than 0.10 percent by weight of water soluble sulfate (SO_4) in soil and the minimum depth of cover for the reinforcing steel should be as specified in CBC as well.

Underground Metallic Pipelines

The soils at the project sites are generally considered to be “corrosive to progressively less corrosive” to ductile/cast iron, steel and dielectric coated steel based on the in-situ resistivity measurements. Therefore, special requirements for corrosion control are required for buried metallic utilities at these sites depending upon the critical nature of the piping. Pressure piping systems such as domestic and fire water should be provided with appropriate coating systems and cathodic protection, where warranted. In addition, all underground pipelines should be electrically isolated from above grade structures, reinforced concrete structures and copper lines in order to avoid potential galvanic corrosion problems.

Recommendations

Reinforced Concrete Slab Foundations

1. We recommend using a Type II concrete mix with a water-to-cement ratio as specified in the 2019 California Building Code (CBC) for soils containing less than 0.10% water soluble sulfate by weight. Adhering to the minimum depth of cover for the reinforcing steel in the foundations as specified in the CBC is recommended for the subject structures as well.

Ductile Iron Pipe (Pressure Piping such as Domestic Water and Fire)

1. Direct buried ductile iron pipe should be encased in 8-mil polyethylene as specified in AWWA specification C-105. Epoxy coatings are also an acceptable alternative type of coating system for the pipe and/or fittings such as valves.

2. All rubber gasket joints, fusion-bonded epoxy coated flanges and flexible couplings on ductile iron pipelines should be bonded with insulated copper cable to insure electrical continuity of the pipeline and fittings.

3. Insulating flanges and/or couplings should be installed to electrically isolate the buried portion of pipeline from other metallic pipelines, reinforced concrete structures and above grade buildings or structures.

4. Test stations shall be installed on all ductile iron pipelines at a spacing of 800 to 1,000 feet. Bonding and test stations shall comply with NACE Standards.

5. A sacrificial type of cathodic protection utilizing ***magnesium*** anodes should be installed to protect the entire length of buried metallic pipeline. Cathodic protection should be designed in accordance with NACE Standard SP0169-13 and applicable local standards and included with the contract documents to permit installation along with the pipeline.

6. As an alternate, non-metallic piping may be used in lieu of ductile iron piping as allowed by State and local codes. Non-metallic piping does not require the implementation of any special type of corrosion prevention measures. However, all metallic valves, fittings and appurtenances on non-metallic piping will require protection as specified below.

Ductile Iron Fittings & Metallic Valves (On Plastic Pressure Piping)

1. All direct buried ductile iron fittings installed on non-metallic piping shall be provided with a bituminous coating from the factory and encased in an 8-mil polyethylene bag in the field in accordance with AWWA Specification C-105. All bolts, restraining rods, etc. shall be coated with bitumastic prior to encasement in the polyethylene bag.

2. All metallic valves shall be coated from the factory (i.e. using powdered epoxy or equivalent type of coating system) and all bolts shall be stainless steel.

3. A sacrificial type of cathodic protection utilizing ***magnesium*** anodes should be installed to protect the valves and fittings. Cathodic protection should be designed in accordance with NACE Standard SP0169-13 and applicable local standards and included with the contract documents to permit installation along with the pipeline.

Steel Pipelines (Natural Gas Pipelines & Risers)

1. A fusion-bonded epoxy coating system or a suitable tape coating should be applied to all buried steel pipelines in accordance with ANSI/AWWA C214-95, “AWWA Standard for Tape Coating Systems for the Exterior of Steel Water Pipelines.” Also, a tape coating per AWWA Standard C209-95 is recommended for special sections, connections and fittings.

2. Insulating flanges and/or couplings should be installed to electrically isolate the buried portions of steel pipelines from other metallic pipelines, reinforced concrete structures and above grade structures.

3. All rubber gasket joints, fusion epoxy coated flanges and flexible couplings should be bonded with insulated copper cable to insure electrical continuity of the pipeline and fittings.

4. A sacrificial type of cathodic protection using ***magnesium*** anodes should be installed to protect the buried portions of steel pipelines used for the natural gas piping systems. Cathodic protection should be designed in accordance with NACE Standard SP0169-13 and applicable local standards and included with the contract documents to permit installation along with the subject pipeline.

5. As an alternate, non-metallic piping may be used in lieu of steel piping as allowed by State and local codes. Non-metallic piping does not require the implementation of any special type of corrosion prevention measures.

Cast Iron (Gravity Sewer and Storm Drain Lines)

1. Sewer and storm drain lines should be wrapped in 8-mil polyethylene as specified in AWWA specification C-105, if they are under the building footprint.

Copper Water Pipelines (Service Lines)

1. Direct buried copper water service lines should be encased in 6-mil minimum polyethylene as specified in the AWWA specification C-105.

2. All copper water laterals shall be electrically isolated from metallic water mains via the use of insulating type corporation stops installed at the water main.

The required data was collected using a Digital Ground Resistance and Soil Resistivity Tester Model 6470 manufactured by AEMC Instruments and presented in the Data Tables attached.

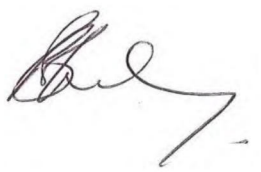
Weather conditions on 8/22-23/2022 at the time of testing was 90 – 101 degrees with winds at 1 mph from the east.
Extremely dry soil conditions with little soil moisture.

LIMITATIONS

The conclusions and recommendations contained in this report reflect the opinion of the author of this report and are based on the information and assumptions referenced herein. All services provided herein were performed by persons who are experienced and skilled in providing these types of services and in accordance with the standards of workmanship in this profession. No other warrantees or guarantees either expressed or implied are provided.

We thank you for the opportunity to be of assistance on this important project. If you have any questions concerning this report or the recommendations provided herein, please feel free to contact us at (925) 927-6630.

Respectfully submitted,



Brendon Hurley
JDH CORROSION CONSULTANTS, INC.
Field Technician

Mohammed Ali., P.E.
JDH Corrosion Consultants, Inc.
Senior Corrosion Engineer

CC: File 2022254

CERCO analytical
1100 Willow Pass Court, Suite A
Concord, CA 94520-1006
925 462 2771 Fax. 925 462 2775
www.cercoanalytical.com

Client: JDH Corrosion Consultants, Inc.
Client's Project No.: 2022254
Client's Project Name: AES Double Butte
Date Sampled: 15-Jul-22
Date Received: 2-Aug-22
Matrix: Soil
Authorization: Signed Chain of Custody

Date of Report: 11-Aug-2022

Job/Sample No.	Sample I.D.	Redox (mV)	pH	Resistivity (As Received) (ohms-cm)	Resistivity (100% Saturation) (ohms-cm)	Sulfide (mg/kg)*	Chloride (mg/kg)*	Sulfate (mg/kg)*
2208004-001	B2 @ 0-5'	370	7.80	>80,000	3,300	-	N.D.	36
2208004-002	B5 @ 0-5'	340	8.12	>80,000	3,100	-	N.D.	24
2208004-002	B5 @ 0-5'	300	8.12	>80,000	2,800	-	16	22
2208004-002	B8 @ 0-5'	280	8.39	>80,000	2,800	-	N.D.	21
						-		
						-		
						-		
						-		

Method:	ASTM D1498	ASTM D4972	ASTM G57	ASTM G57	ASTM D4658M	ASTM D4327	ASTM D4327
Reporting Limit:	-		-	-	50	15	15
Date Analyzed:	10-Aug-2022	10-Aug-2022	10-Aug-2022	10-Aug-2022	-	10-Aug-2022	10-Aug-2022

Sherri Moore
Chemist

* Results Reported on "As Received" Basis
N.D. - None Detected
(1) Detection limit is elevated to 75 mg/kg due to dilution

Quality Control Summary - All laboratory quality control parameters were found to be within established limits

Client: *Bruin Geotechnical*
Project: *Double Butte Storage*
Location: *Sun City, CA*
Date: *8/22-23/2022*
Subject: *In-Situ Soil Resistivity Data*

Severely Corrosive
Corrosive
Moderately Corrosive
Mildly Corrosive
Progressively Less Corrosive

*Test #	Location Description	Resistance Data From AEMC Meter (ohm)								Soil Resistivities (ohm-cm)							
		1'	2'	3'	5'	10'	20'	50'	100'	1'	2'	3'	5'	10'	20'	50'	100'
1	Traverse 1 N/S	46.00	9.092	5.712	7.097	3.752	1.374	0.190	0.186	8,809.00	3,482.24	3,281.54	6,795.38	7,185.08	5,262.42	1,819.25	3,561.90
2	Traverse 1 E/W	22.380	13.130	5.352	3.036	0.992	0.405	0.164	0.084	4,285.77	5,028.79	3,074.72	2,906.97	1,899.68	1,551.15	1,570.30	1,608.60
3	Traverse 2 N/S	146.90	25.17	315.40	165.30	54.73	55.74	0.182	0.233	28,131.4	9,640.11	181,197.30	158,274.75	104,807.95	213,484.20	1,742.65	4,461.95
4	Traverse 2 E/W	19.21	84.21	97.89	22.12	1.162	1.595	0.185	0.066	3,678.72	32,252.43	56,237.81	21,179.90	2,225.23	6,108.85	1,771.38	1,263.90
5	Traverse 3 N/S	29.69	175.40	259.3	122.60	115.60	0.520	0.188	0.225	5,685.64	67,178.20	148,967.85	117,389.50	221,374.00	1,991.60	1,800.10	4,308.75
6	Traverse 3 E/W	18.94	12.12	102.8	49.13	73.52	57.48	0.204	0.033	3,627.01	4,641.96	59,058.60	47,041.98	140,790.80	220,148.40	1,953.30	631.95
7	Traverse 4 N/S	52.21	21.43	19.23	39.70	7.673	13.91	0.271	0.121	9,998.22	8,207.69	11,047.64	38,012.75	14,693.80	53,275.30	2,594.83	2,317.15
8	Traverse 4 E/W	143.70	32.74	22.41	24.64	3.359	0.646	0.295	0.051	27,518.6	12,539.42	12,874.55	23,592.80	6,432.49	2,474.18	2,824.63	976.65

In-situ Locations

jdh corrosion consultants, inc.

APPENDIX E

Results from Geotherm USA

21239 FM529 Rd., Bldg. F
Cypress, TX 77433
Tel: 281-985-9344
Fax: 832-427-1752
info@geothermusa.com
http://www.geothermusa.com

August 15, 2022

Bruin Geotechnical Services Inc.
44732 Yucca Avenue
Lancaster, CA 93534
Attn: Mark Stevens

Re: Thermal Analysis of Native Soil Samples
AES Double Butte – Riverside, CA (Project No. 22-247)

The following is the report of thermal dryout characterization tests conducted on two (2) samples of native soil from the referenced project sent to our laboratory.

Thermal Resistivity Tests: The samples were tested at the 'optimum' moisture content and 90% of the modified Proctor dry density ***provided by Bruin***. The tests were conducted in accordance with the IEEE standard 442-2017. The results are tabulated below and the thermal dryout curves are presented in **Figures 1 and 2.**

Sample ID, Description, Thermal Resistivity, Moisture Content and Density

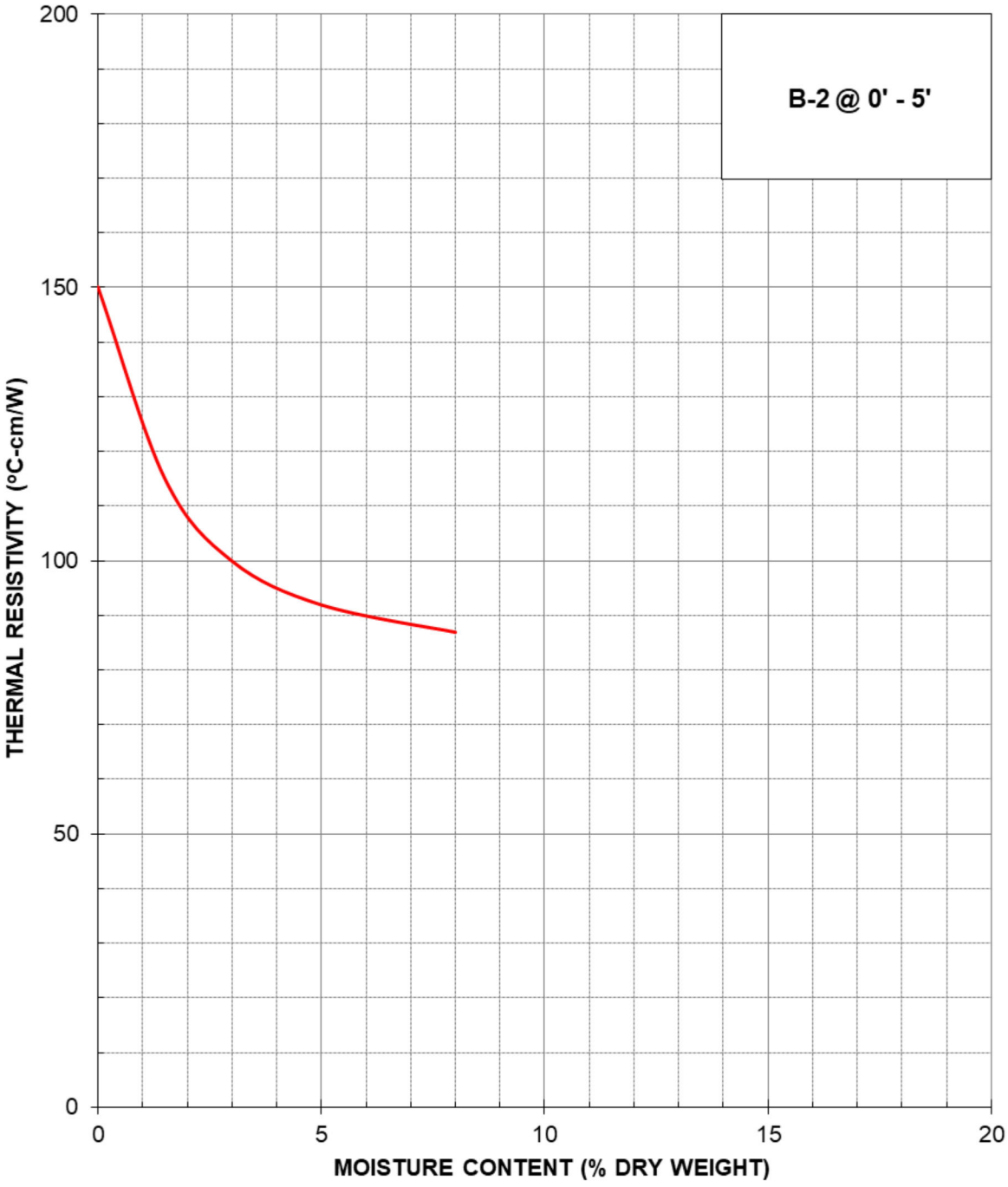
Sample ID	Depth (ft)	Description (*Bruin*)	Thermal Resistivity (°C-cm/W)		Moisture Content (%)	Dry Density (lb/ft^3)
			Wet	Dry		
B-2	0-5	Brown sandy f.m. clay w/ occ #4 gravel	87	150	8	120
B-5	0-5	Brown v. sandy clay w/ f.m. sand w/ clay bndr	83	169	11	116

Please contact us if you have any questions or if we can be of further assistance.

Geotherm USA

Nimesh Patel

THERMAL DRYOUT CURVE



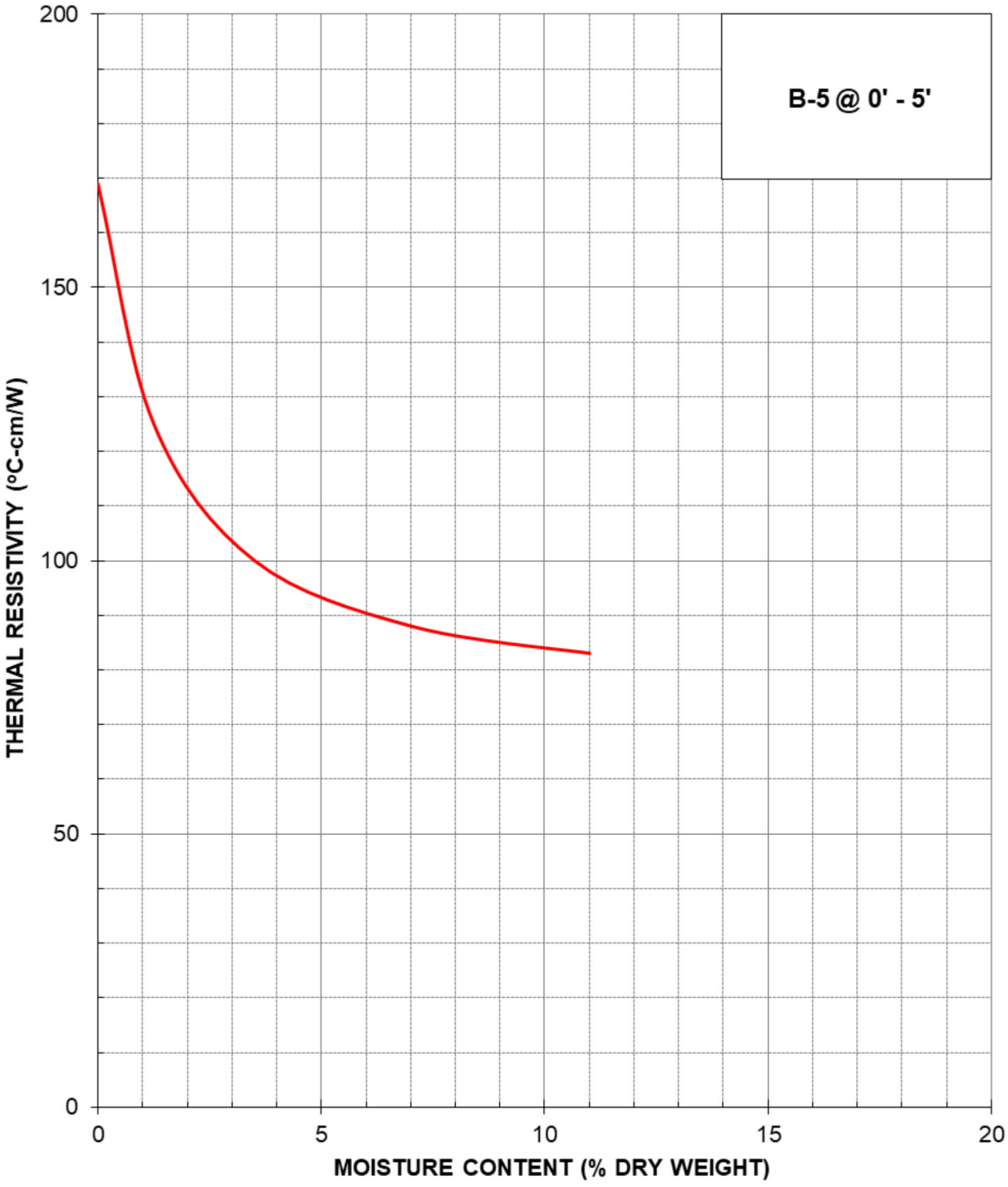
Terracon (Project No. 22-247)

AES Double Butte – Riverside, CA

Thermal Analysis of Native Soil Samples

August 2022 **Figure 1**

THERMAL DRYOUT CURVE



Terracon (Project No. 22-247)

AES Double Butte – Riverside, CA

Thermal Analysis of Native Soil Samples

August 2022 **Figure 2**

APPENDIX F

US Seismic Design Maps

22-247 AES - Double Butte

Latitude, Longitude: 33.74150302, -117.17036944

Date	8/18/2022, 11:04:36 AM
Design Code Reference Document	ASCE7-16
Risk Category	I
Site Class	D - Stiff Soil

Type	Value	Description
S_S	1.424	MCE_R ground motion. (for 0.2 second period)
S_1	0.529	MCE_R ground motion. (for 1.0s period)
S_{MS}	1.424	Site-modified spectral acceleration value
S_{M1}	null -See Section 11.4.8	Site-modified spectral acceleration value
S_{DS}	0.949	Numeric seismic design value at 0.2 second SA
S_{D1}	null -See Section 11.4.8	Numeric seismic design value at 1.0 second SA

Type	Value	Description
SDC	null -See Section 11.4.8	Seismic design category
F_a	1	Site amplification factor at 0.2 second
F_v	null -See Section 11.4.8	Site amplification factor at 1.0 second
PGA	0.5	MCE_G peak ground acceleration
F_{PGA}	1.1	Site amplification factor at PGA
PGA_M	0.55	Site modified peak ground acceleration
T_L	8	Long-period transition period in seconds
SsRT	1.424	Probabilistic risk-targeted ground motion. (0.2 second)
SsUH	1.525	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration
SsD	1.5	Factored deterministic acceleration value. (0.2 second)
S1RT	0.529	Probabilistic risk-targeted ground motion. (1.0 second)
S1UH	0.578	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration.
S1D	0.6	Factored deterministic acceleration value. (1.0 second)
PGAd	0.5	Factored deterministic acceleration value. (Peak Ground Acceleration)
PGA_{UH}	0.604	Uniform-hazard (2% probability of exceedance in 50 years) Peak Ground Acceleration
C_{RS}	0.934	Mapped value of the risk coefficient at short periods
C_{R1}	0.916	Mapped value of the risk coefficient at a period of 1 s
C_V	1.385	Vertical coefficient

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APPENDIX G

Pile Capacity and Skin Friction Values

PILE CAPACITY

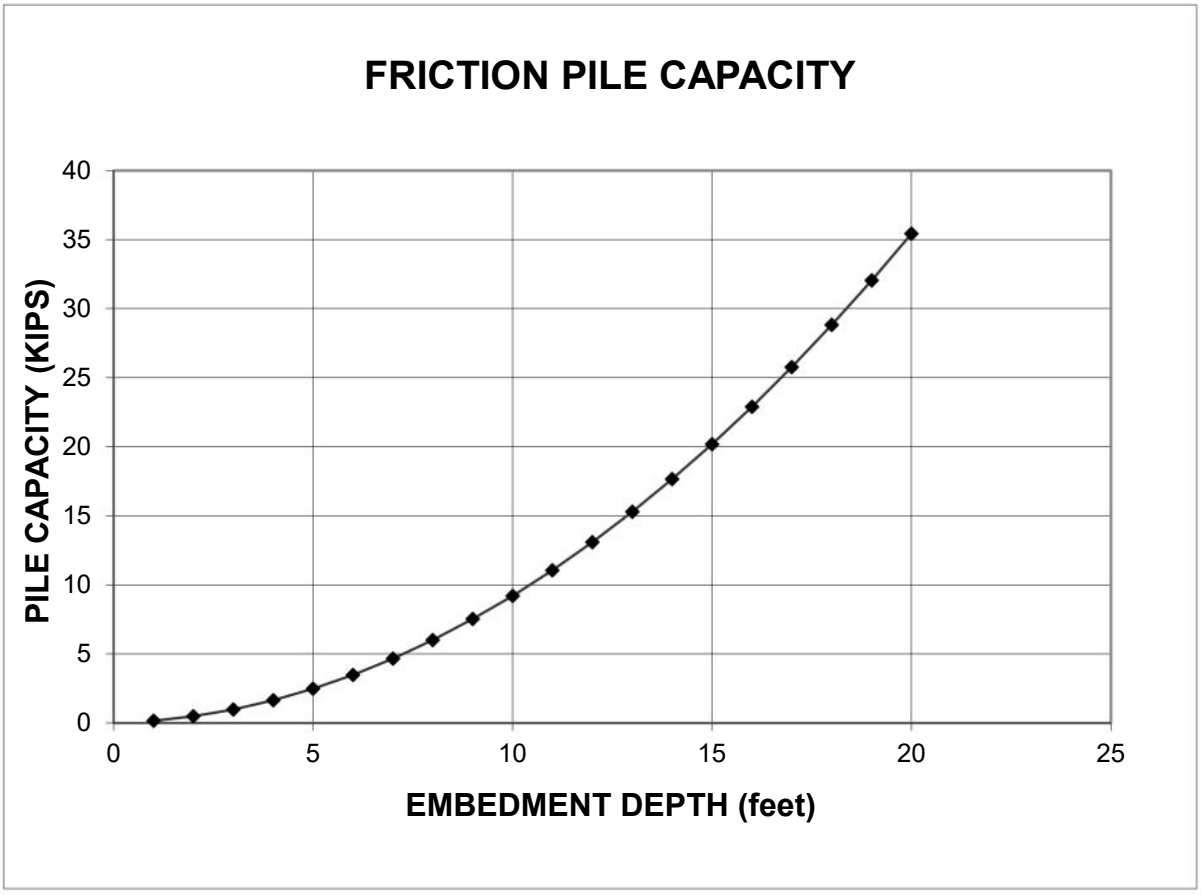
JN: **22-247** CONSULT: **Bruin GSI**
CLIENT **AES - Seguro**

CALCULATION SHEET # **2**

CALCULATE ALLOWABLE SKIN FRICTION RESISTANCE FOR DRILLED, CAST IN PLACE CONCRETE PILES. SKIN FRICTION IS TABULATED AS A FUNCTION OF EMBEDMENT DEPTH. (REFERENCES: NAVFAC DM-7.2, PAGES 193-193 AND J.E. BOWLES, "*FOUNDATION ANALYSIS AND DESIGN*," 1988.)

CALCULATION PARAMETERS

EARTH MATERIAL:	Native	PILE DIAMETER:	3 feet
SHEAR DIAGRAM:	0	INITIAL PILE DEPTH:	1 feet
COHESION:	30 psf	FINAL PILE DEPTH:	20 feet
PHI ANGLE:	25 degrees	EXTERNAL SURCHARGE:	0 pounds
DENSITY:	110 pcf	ADHESION VALUE:	0.5
SAFETY FACTOR:	2	PILE/SOIL FRICTION:	22.5 degrees
COMPRESSION/TENSION:	C	LATERAL COEFF. (Ko)	0.79
PILE TYPE:	COMPRESSION PILE	NO GROUNDWATER	0.00 feet



CONCLUSIONS:

THE CALCULATED CAPACITY OF 36 INCH DIAMETER PILES, AS A FUNCTION OF EMBEDMENT, ARE SHOWN IN THE GRAPH.

SKIN FRICTION TABLE

JN: **22-247** CONSULT: **Bruin GSI**
CLIENT **AES - Seguro**

CALCULATION SHEET # **1**

CALCULATE ALLOWABLE SKIN FRICTION RESISTANCE FOR DRILLED, CAST IN PLACE CONCRETE PILES. SKIN FRICTION IS TABULATED AS A FUNCTION OF EMBEDMENT DEPTH. (REFERENCES: NAVFAC DM-7.2, PAGES 193-194 AND J.E. BOWLES, "*FOUNDATION ANALYSIS AND DESIGN*," 1988.)

CALCULATION PARAMETERS

EARTH MATERIAL:	Native	PILE DIAMETER:	3 feet
SHEAR DIAGRAM:	0	INITIAL PILE DEPTH:	1 feet
COHESION:	30 psf	FINAL PILE DEPTH:	20 feet
PHI ANGLE:	25 degrees	EXTERNAL SURCHARGE:	0 pounds
DENSITY:	110 pcf	ADHESION VALUE:	0.5
SAFETY FACTOR:	2	PILE/SOIL FRICTION:	22.5 degrees
COMPRESSION/TENSION:	C	LATERAL COEFF. (Ko)	0.79
PILE TYPE:	COMPRESSION PILE	NO GROUNDWATER	0.0 feet

PILE EMBEDMENT DEPTH (feet)	CALCULATED AVERAGE SKIN FRICTION (psf)	PILE CAPACITY (kips)	AVERAGE NORMAL EARTH PRESSURE (psf)
1	16.5	0.2	43.6
2	25.5	0.5	87.1
3	34.6	1.0	130.7
4	43.6	1.6	174.3
5	52.6	2.5	217.8
6	61.6	3.5	261.4
7	70.7	4.7	305.0
8	79.7	6.0	348.5
9	88.7	7.5	392.1
10	97.7	9.2	435.6
11	106.7	11.1	479.2
12	115.8	13.1	522.8
13	124.8	15.3	566.3
14	133.8	17.7	609.9
15	142.8	20.2	653.5
16	151.9	22.9	697.0
17	160.9	25.8	740.6
18	169.9	28.8	784.2
19	178.9	32.0	827.7
20	188.0	35.4	871.3

CONCLUSIONS:

THE CALCULATED SKIN FRICTION AND PILE CAPACITY ARE SHOWN IN THE TABLE.

Appendix G
Preliminary Landscape Plan

LANDSCAPE PLANS FOR

aes

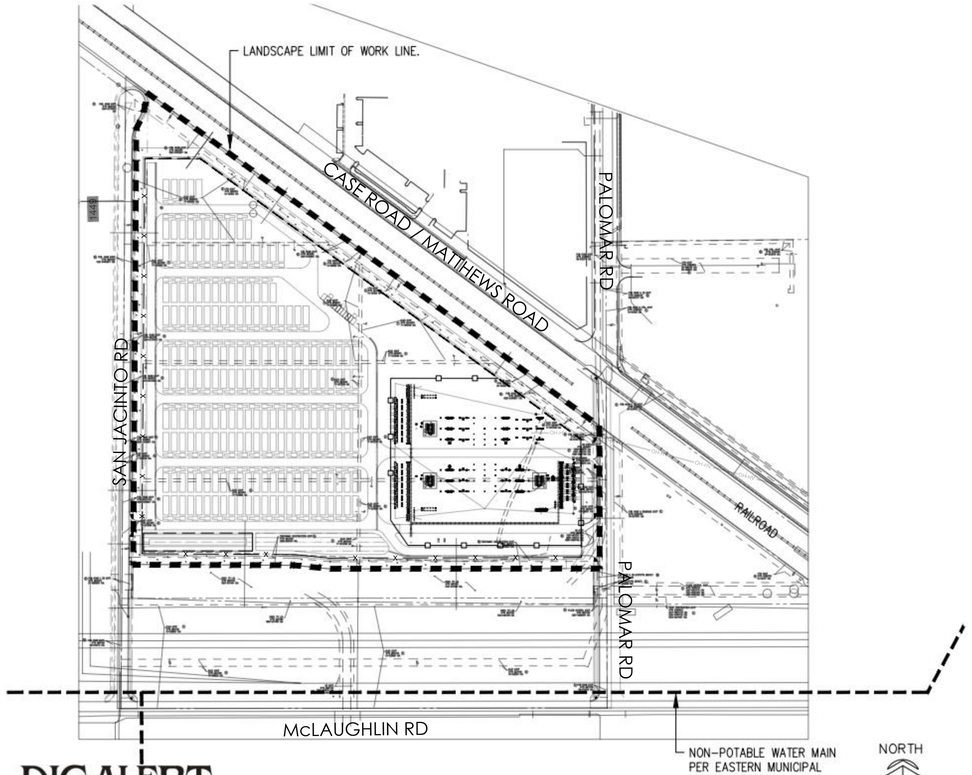
DOUBLE BUTTE STORAGE, LLC

CITY OF MENIFEE, CALIFORNIA
33.7412, -117.1563
CITY PLAN NUMBER: PLN22-0282

APN: 331-190-010, 331-190-011, 331-190-014,
331-190-017, 331-190-047, 331-190-056, 331-190-060

VICINITY MAP

NOT TO SCALE



DIGALERT
800-227-2600
Call 2 Full Working Days In Advance

LANDSCAPE CALCULATIONS

TOTAL PROJECT SITE AREA (GROSS AREA MINUS R/W):	27.3	AC
TOTAL LANDSCAPE AREA/ON SITE:	4.83	AC (210,500 S.F.)
LANDSCAPE AREA PERCENTAGE REQUIRED:	*	%
LANDSCAPE AREA PERCENTAGE PROVIDED:	100% OF REQD YARD	%
TOTAL OFF SITE AREA (PUBLIC R/W):	0	SF
TOTAL OFF SITE LANDSCAPE AREA (EXC. SIDEWALKS):	0	SF
TOTAL SITE PERIMETER LENGTH (ALL SIDES):	4,591	LF
TOTAL TREES REQUIRED TO SCREEN PERIMETER (1 TREE/30 LF):	153	EA
TOTAL PERIMETER SCREENING TREES PROVIDED:	158	EA
TOTAL PARKING SPACES PROVIDED:	12	EA
TOTAL PARKING LOT TREES REQUIRED (1 TREE/4 SP.)	3	EA
TOTAL PARKING LOT TREES PROVIDED:	3	EA
TOTAL STREET TREES REQUIRED (1 TREE/30 LF):	0	EA
TOTAL STREET TREES PROVIDED:	0	EA

* CITY'S BATTERY ENERGY STORAGE SYSTEM ORDINANCE (PENDING ADOPTION) STATES: NO LANDSCAPE IS REQUIRED ON THE INTERIOR SIDE OF THE SCREEN WALLS DESCRIBED IN SUBPARAGRAPH (A) ABOVE, REGARDLESS OF THE PERCENTAGE OF OPEN SPACE LANDSCAPE REQUIRED. THE MINIMUM REQUIRED OPEN SPACE, AS REQUIRED BY THIS TITLE, SHALL BE LIMITED TO THE PERIMETER LANDSCAPING SURROUNDING THE PERIMETER SCREENING WALL OR FENCING DESCRIBED IN SUBPARAGRAPH (A), ABOVE. SAID PERIMETER LANDSCAPING SHALL BE NO LESS THAN THE APPLICABLE REQUIRED YARD SETBACKS.

CITY OF MENIFEE NOTES

"PLAN SHALL COMPLY WITH CITY OF MENIFEE, LANDSCAPE WATER USE EFFICIENCY REQUIREMENTS, MMC 15.04; LANDSCAPING STANDARDS, MMC 9.195; STATE OF CALIFORNIA AB 1881, THE WATER CONSERVATION IN LANDSCAPING ACT (2015)"; AND THE MENIFEE NORTH SPECIFIC PLAN, NO. 260 AMENDMENT NO.1.

"CFD/OFF SITE IRRIGATION SYSTEMS (PUBLIC RIGHTS-OF-WAY) SHALL BE SEPARATE FROM ASSOCIATION/ PRIVATE ON SITE IRRIGATION SYSTEMS (CONTROLLERS, VALVES, MAIN LINE). OFF SITE AND ON SITE LANDSCAPE IMPROVEMENTS SHALL BE SEPARATED BY CONCRETE MOW CURBS (6" X 8") OR OTHER SUITABLE BARRIER ALONG PROPERTY LINES/RIGHTS-OF-WAY."

"ALL TREES WITHIN SIX (6) FEET OF HARDSCAPE OR STRUCTURES SHALL BE INSTALLED WITH LINEAR ROOT CONTROL BARRIER FROM DEEP ROOT CORPORATION (OR APPROVED SUBSTITUTION). ROOT BARRIER LENGTH SHALL BE 16 FEET MINIMUM, CENTERED ON TREE TRUNK. ROOT BARRIER SHALL BE PLACED IN A LINEAR INSTALLATION ADJACENT TO HARDSCAPE PER MANUFACTURER'S SPECIFICATIONS AND NOT ENCIRCLING ROOTBALL. ROOT CONTROL BARRIER DEPTH SHALL BE 18 INCHES MIN. ADJACENT TO FLATWORK AND 24 INCHES MIN. ADJACENT TO CURBS."

"ALL GROUND-MOUNTED ELECTRICAL/MECHANICAL EQUIPMENT SHALL BE EFFECTIVELY SCREENED WITH LANDSCAPING."

"ALL PARKING, BUILDINGS, AND ON SITE FACILITIES VISIBLE FROM ADJOINING PROPERTIES AND PUBLIC RIGHTS-OF-WAY (OFF SITE) SHALL BE EFFECTIVELY SCREENED WITH LANDSCAPING. SCREENING SHALL INCLUDE TREES, DENSE EVERGREEN SHRUBS, WALLS, EARTH BERMS OR A COMBINATION THEREOF."

"MINIMUM NURSERY CONTAINER SIZES FOR TREES SHALL BE 24-INCH BOX, ACCENT TREES/36-INCH BOX, SHRUBS/5 GALLON, AND GROUNDCOVERS/GRASSES/PERENNIALS/1 GALLON. A MINIMUM OF 10% OF TOTAL TREE QUANTITY SHALL BE SPECIMEN SIZE (36" BOX SIZE OR LARGER)."

IRRIGATION SYSTEM DESIGN STATEMENT

A PERMANENT AUTOMATIC IRRIGATION SYSTEM SHALL BE DESIGNED AND INSTALLED TO IRRIGATE ALL PLANTING AREAS. THE IRRIGATION CONTROLLER(S) SHALL BE EQUIPPED FROM THE MANUFACTURER WITH WEATHER/EVAPOTRANSPIRATION (ET) SENSING CAPABILITIES TO AUTOMATICALLY ADJUST WATERING SCHEDULES AND AMOUNTS. THE DESIGN OF THE IRRIGATION SYSTEM SHALL EMPHASIZE WATER CONSERVATION AND PROVIDE EFFICIENT AND UNIFORM DISTRIBUTION OF IRRIGATION WATER. IF THE SITE IS PLANNED TO UTILIZE RECYCLED WATER IN THE LANDSCAPE, THEN THE IRRIGATION SYSTEM SHALL BE DESIGNED IN ACCORDANCE WITH STATE OF CALIFORNIA AND EASTERN MUNICIPAL WATER DISTRICT (EMWD) RULES AND REGULATIONS FOR RECYCLED WATER USE.

DRIP AND/OR BUBBLER IRRIGATION, OR OTHER LOW-VOLUME, LOW-PRESSURE MICRO-IRRIGATION SYSTEM AS APPROVED BY THE CITY OF MENIFEE AND EMWD, SHALL BE INSTALLED IN PLANTER AREAS TO PROVIDE WATER DIRECTLY TO THE ROOT ZONE OF PLANTS. THE IRRIGATION SYSTEM MAY UTILIZE EFFICIENT ROTATOR NOZZLES IN LARGE PLANTING AREAS, SUBJECT TO THE APPROVAL OF EMWD AND THE CITY. THE AUTOMATIC IRRIGATION SYSTEM SHALL BE DESIGNED IN ACCORDANCE WITH THE CITY OF MENIFEE ORDINANCE NO. 2009-61, "LANDSCAPE WATER USE EFFICIENCY REQUIREMENTS," AND LANDSCAPE STANDARDS.

FOR SITES UTILIZING POTABLE WATER FOR LANDSCAPE IRRIGATION, A REDUCED PRESSURE BACKFLOW PREVENTER SHALL BE INSTALLED AFTER THE WATER METER TO PROTECT THE POTABLE WATER SUPPLY IN ACCORDANCE WITH STATE OF CALIFORNIA, CITY OF MENIFEE, AND EMWD STANDARDS AND REQUIREMENTS.

LANDSCAPE MAINTENANCE AND SEPARATION NOTE:

THE LANDSCAPE CONCEPT PLAN INDICATES LANDSCAPE IMPROVEMENTS FOR BOTH ON SITE AND OFF SITE (PUBLIC RIGHTS-OF-WAY, PARKS, ETC.) AREAS. THE PROPERTY OWNER SHALL MAINTAIN OFF SITE AREAS UNTIL SUCH TIME AS THE OFF SITE LANDSCAPE AREAS ARE ANNEXED INTO A SPECIAL DISTRICT (CFD OR L&LMD) AND ACCEPTED BY THE CITY FOR MAINTENANCE PURPOSES. THE PROPERTY OWNER ACKNOWLEDGES THAT SEPARATE WATER AND ELECTRIC METERS FOR IRRIGATION USE ARE REQUIRED TO BE INSTALLED BY THE OWNER PRIOR TO THE CITY'S ACCEPTANCE OF THE OFF SITE AREAS FOR MAINTENANCE BY THE SPECIAL DISTRICT. IN ADDITION, PROPERTY OWNER ACKNOWLEDGES THAT COSTS FOR ANNEXATION INTO THE SPECIAL DISTRICT, AND INSTALLATION OF THE IRRIGATION WATER AND ELECTRIC METERS, SHALL BE BORNE BY THE PROPERTY OWNER.

LANDSCAPE IMPROVEMENTS IN OFF SITE AREAS/PUBLIC RIGHTS-OF-WAY SHALL BE SEPARATED FROM PRIVATELY-MAINTAINED ON SITE LANDSCAPE AREAS WITH A CITY-STANDARD, CONTINUOUS CONCRETE MOW CURB (6" X 8") ALONG THE PROPERTY LINE (ON SITE).

☑ I HAVE PREPARED THESE PLANS IN COMPLIANCE WITH THE CRITERIA OF AB 1881 WATER CONSERVATION IN THE LANDSCAPE ORDINANCE AND WITH THE CITY MUNICIPAL CODE, AND HAVE APPLIED THEM ACCORDINGLY FOR THE EFFICIENT USE OF WATER IN THE IRRIGATION DESIGN PLAN.

LANDSCAPE ARCHITECT SIGNATURE DATE

INDEX OF DRAWINGS

PLP DRAWINGS

SHT.#	TITLE
L1	LANDSCAPE COVER SHEET
L2	PRELIMINARY LANDSCAPE PLAN – NORTH
L3	PRELIMINARY LANDSCAPE PLAN – SOUTH
L4	LANDSCAPE NOTES AND CALCULATIONS
L5	COLOR AND MATERIALS BOARD

REFERENCE DRAWINGS

G1–G3	CIVIL GRADING PLANS
XX	ARCHITECTURAL SITE PLAN

LOCATION MAP

NOT TO SCALE

CITY OF MENIFEE REQUIREMENTS MET

- ☑ SITE IS NOT WITHIN A RIVERSIDE COUNTY HIGH FIRE AREA
- ☑ 6' TALL DECORATIVE CMU NON-SCALEABLE WALL WITH ANTI-GRAFFITI COATING PROVIDED WHERE VISIBLE FROM PUBLIC VIEW IS REQUIRED. A 7' WALL IS PROVIDED PER NATIONAL ELECTRICAL SAFETY CODE.
- ☑ PARKING SHADE TREES TO BE 40' TALL AND 40' WIDE MINIMUM AT MATURITY
- ☑ 30% SHADE REQUIRED FOR 5-24 STALLS. 89% SHADE PROVIDED. SEE CALC – SHEET L4.
- ☑ 10% PARKING LOT LANDSCAPE REQUIRED. 2106 SF PARKING LOT = 210 SF LANDSCAPE REQD. 322 SF PROVIDED. MIN DIMENSION OF PARKING LOT PLANTER = 5'.
- ☑ 1 SHADE TREE PER 4 PARKING SPACES. 12 SPACES = 3 TREES REQUIRED AND PROVIDED.
- ☑ LANDSCAPE AT WALLS: MIN 42" TALL LANDSCAPE AT PERIMETER WALLS.
- ☑ 50% COVERAGE OF SCREENING WALLS REQUIRED IN 3 YEARS. VINES ARE ACCEPTABLE. 10' WIDE VINES (AT MATURITY) ARE PROVIDED AT 20' AND 30' OC. ON ENTIRE PERIMETER
- ☑ 10% OF NEW TREES TO BE 36" BOX OR LARGER. 161 NEW TREES X 0.10 = (16) 36" BOX TREES REQUIRED. (30) 36" BOX TREES PROVIDED
- ☑ SIGHT VISIBILITY TRIANGLES AT COMMERCIAL DRIVEWAYS, PLANTS AND BOULDERS 30" HT MAX.
- ☑ NO INVASIVE PLANTS PROPOSED FROM MSHCP OR CAL-IPC LIST.
- ☑ ALL PLANTS PROPOSED ARE LISTED ON THE RIVERSIDE COUNTY COMPREHENSIVE PLANT LIST
- ☑ NO TREES ARE PROPOSED IN EASEMENTS
- ☐ PROJECT TO USE NON-POTABLE WATER FOR IRRIGATION FROM EASTERN MUNICIPAL WATER DISTRICT AS AVAILABLE. OWNER TO SUBMIT PLANS AND APPLICATION TO THE DISTRICT AND PROVIDE THE CITY OF MENIFEE A WILL-SERVE LETTER ONCE APPROVED BY THE DISTRICT OR OWNER WILL PROVIDE A LETTER OF 'NON-CANDICACY' IF PROJECT IS REJECTED. SEE VICINITY MAP THIS SHEET FOR NON-POTABLE WATER MAIN FROM EMWD.
- ☐ PER CITY REQUIREMENTS, THE IRRIGATION PLAN SHALL BE SUBMITTED FOR APPROVAL. (THE IRRIGATION PLAN WILL BE SUBMITTED AFTER THE CITY'S PRELIMINARY APPROVAL OF THE PLANTING PLAN)

aes
2180 South 1300 East, Suite 600
Salt Lake City, UT 84106-2749
(801) 679 - 3500

Stantec
38 TECHNOLOGY DRIVE, SUITE 200
IRVINE, CA 92618
949.923.6000 stantec.com

PE STAMP:

KEY PLAN:

SUBMITTAL LOG

NO.	DATE	DESCRIPTION
	11/29/22	SUBMITTAL #1
	11/06/23	SUBMITTAL #2

PROJECT TITLE:
DOUBLE BUTTE STORAGE
CITY PROJECT NUMBER: PLN22-0282

PROJECT LOCATION:
CITY OF MENIFEE, CA
33.7412, -117.1563

SHEET TITLE & DESCRIPTION:
LANDSCAPE COVER SHEET

500 MW / 2,000 MWh BESS

PROJ NUM:	185805659
DES:	GM
DWN:	GM/BO
CHK:	
APV:	
DATE:	11/21/2022

SCALE AT 24" x 36":
AS NOTED

SHEET NO: L1 REV:

AES Tillerock 2AX3N v2102019

SITE/POWER LEGEND

- BATTERY SEGMENT
- EQUIPMENT PAD
- 24' INTERIOR ROADS - EARTHEN LAYDOWN AREA
- ON-SITE YARD LIGHTS
- PARKING

CITY OF MENIFEE SCREENING NOTE:
ALL PARKING, BUILDINGS, AND ON-SITE FACILITIES VISIBLE FROM ADJOINING PROPERTIES AND PUBLIC RIGHTS-OF-WAY (OFFSITE) SHALL BE EFFECTIVELY SCREENED WITH LANDSCAPING. SCREENING SHALL INCLUDE TREES, DENSE EVERGREEN SHRUBS, WALLS, EARTH BERMS OR A COMBINATION THEREOF.

CITY OF MENIFEE MINIMUM NURSERY CONTAINER SIZES:

TREES	24" BOX
ACCENT TREES	36" BOX
SHRUB	5 GALLON
GROUND COVERS/GRASSES/PERENNIALS	1 GALLON

A MINIMUM OF 10% OF TOTAL TREE QUANTITY SHALL BE SPECIMEN SIZE (36" BOX SIZE OR LARGER).

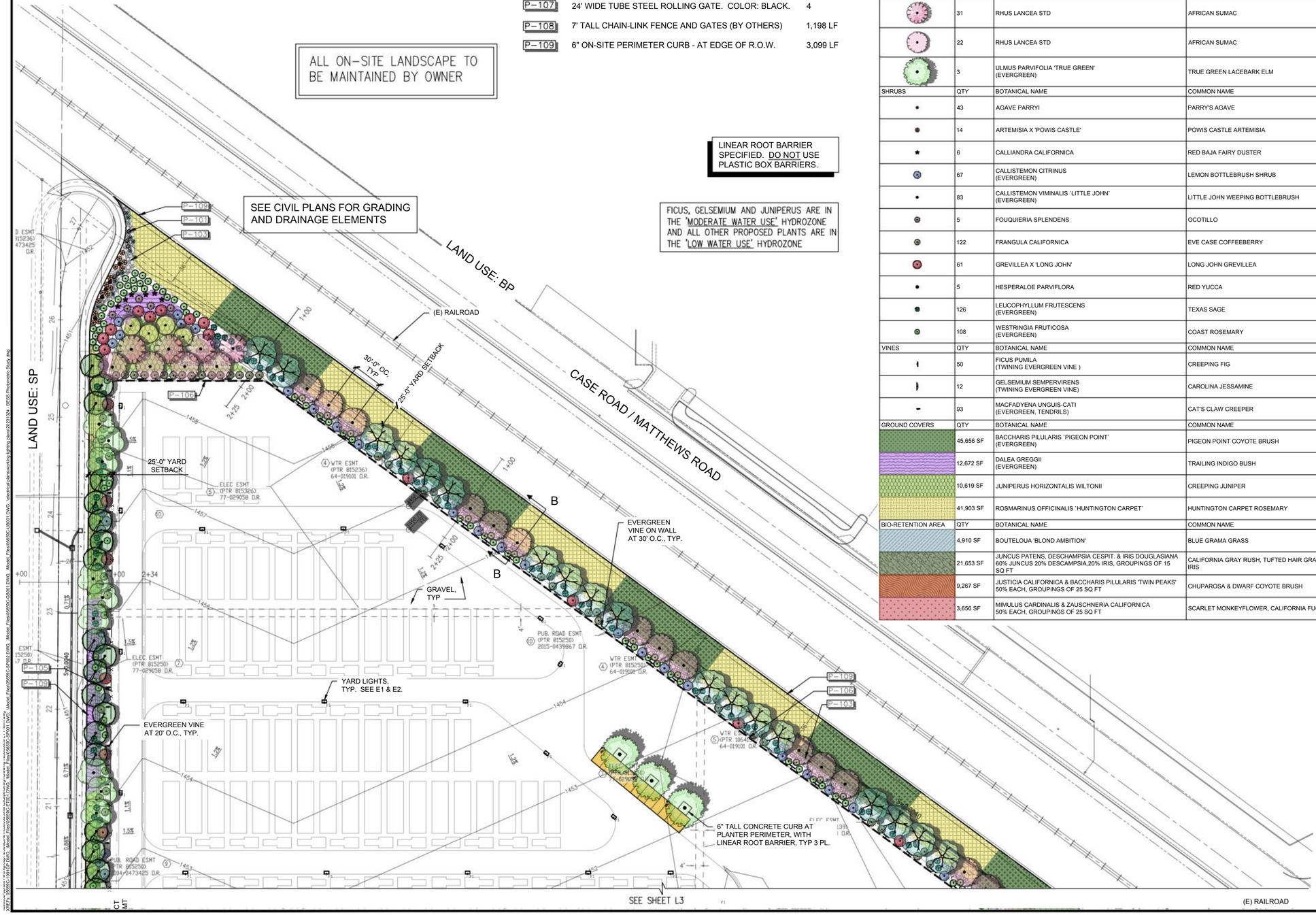
REFERENCE NOTES SCHEDULE

SYMBOL	PLANTING DESCRIPTION	QTY
P-101	LANDSCAPE BOULDERS 3' WIDE BY 24-30" TALL (MAX 30" TALL)	27
P-102	FREESTANDING STEEL TRELLIS. COLOR: BLACK	2
P-103	3"-4" DIA COBBLE, 6" DEEP, OVER MW700 MIRIFI FABRIC	7,811 SF
P-104	STEEL EDGING. COLOR: BLACK	226 LF
P-105	8' TALL TUBE STEEL FENCE. COLOR: BLACK.	2,565 LF
P-106	7' TALL CMU NON-SCALEABLE WALL WITH ANTI-GRAFFITI COATING	1,478 LF
P-107	24' WIDE TUBE STEEL ROLLING GATE. COLOR: BLACK.	4
P-108	7' TALL CHAIN-LINK FENCE AND GATES (BY OTHERS)	1,198 LF
P-109	6" ON-SITE PERIMETER CURB - AT EDGE OF R.O.W.	3,099 LF

ALL ON-SITE LANDSCAPE TO BE MAINTAINED BY OWNER

LINEAR ROOT BARRIER SPECIFIED. DO NOT USE PLASTIC BOX BARRIERS.

FICUS, GELSEMIUM AND JUNIPERUS ARE IN THE 'MODERATE WATER USE' HYDROZONE AND ALL OTHER PROPOSED PLANTS ARE IN THE 'LOW WATER USE' HYDROZONE



PLANT SCHEDULE

TREES	QTY	BOTANICAL NAME	COMMON NAME	CONT	HT X WIDTH	WATER USE	
	8	CERCIDIUM MICROPHYLLUM (PARKINSONIA MICROPHYLLUM)	LITTLE LEAF PALO VERDE	36"BOX	20'X20'	LOW	
	2	EXISTING ON-SITE TREE TO REMOVE		EXISTING			
	15	GEIJERA PARVIFLORA	AUSTRALIAN WILLOW	24"BOX	30'X20'	LOW	
	35	LAURUS X `SARATOGA` (EVERGREEN)	SARATOGA HYBRID LAUREL	24"BOX	35'X25'	LOW	
	29	PINUS CANARIENSIS	CANARY ISLAND PINE	24"BOX	60'X35'	LOW	
	18	QUERCUS ILEX (EVERGREEN)	HOLLY OAK	24"BOX	40'X40'	LOW	
	31	RHUS LANCEA STD	AFRICAN SUMAC	24"BOX	40'X35'	LOW	
	22	RHUS LANCEA STD	AFRICAN SUMAC	36"BOX	40'X35'	LOW	
	3	ULMUS PARVIFOLIA 'TRUE GREEN' (EVERGREEN)	TRUE GREEN LACEBARK ELM	24"BOX	50'X50'	LOW	
SHRUBS	QTY	BOTANICAL NAME	COMMON NAME	CONT	HT X WIDTH	WATER USE	
	43	AGAVE PARRYI	PARRY'S AGAVE	5 GAL	30"X30"	LOW	
	14	ARTEMISIA X 'POWIS CASTLE'	POWIS CASTLE ARTEMISIA	5 GAL	3'X5'	LOW	
	6	CALLIANDRA CALIFORNICA	RED BAJA FAIRY DUSTER	5 GAL	5'X5'	LOW	
	67	CALLISTEMON CITRINUS (EVERGREEN)	LEMON BOTTLEBRUSH SHRUB	5 GAL	15'X15'	LOW	
	83	CALLISTEMON VIMINALIS `LITTLE JOHN` (EVERGREEN)	LITTLE JOHN WEEPING BOTTLEBRUSH	5 GAL	30"X30"	LOW	
	5	FOUQUIERIA SPLENDENS	OCOTILLO	5 GAL	10'HX12'W	LOW	
	122	FRANGULA CALIFORNICA	EVE CASE COFFEEBERRY	5 GAL	8'X8'	LOW	
	61	GREVILLEA X 'LONG JOHN'	LONG JOHN GREVILLEA	5 GAL	10'HX12'W	LOW	
	5	HESPERALOE PARVIFLORA	RED YUCCA	5 GAL	4'X4'	LOW	
	126	LEUCOPHYLLUM FRUTESCENS (EVERGREEN)	TEXAS SAGE	5 GAL	6'X6'	LOW	
	108	WESTRINGIA FRUTICOSA (EVERGREEN)	COAST ROSEMARY	5 GAL	4'X8'	LOW	
VINES	QTY	BOTANICAL NAME	COMMON NAME	CONT	HT X WIDTH	WATER USE	
	50	FICUS PUMILA (TWINING EVERGREEN VINE)	CREEPING FIG	5 GAL	6'X10'	MODERATE	
	12	GELSEMIUM SEMPERVIRENS (TWINING EVERGREEN VINE)	CAROLINA JESSAMINE	5 GAL	6'X10'	MODERATE	
	93	MACFADYENA UNGUIS-CATI (EVERGREEN, TENDRILS)	CAT'S CLAW CREEPER	5 GAL	6'X10'	LOW	
GROUND COVERS	QTY	BOTANICAL NAME	COMMON NAME	CONT	HT X WIDTH	WATER USE	SPACING
	45,656 SF	BACCHARIS PILULARIS `PIGEON POINT` (EVERGREEN)	PIGEON POINT COYOTE BRUSH	1 GAL	2'X8'	LOW	60" o.c.
	12,672 SF	DALEA GREGGII (EVERGREEN)	TRAILING INDIGO BUSH	1 GAL	1.5'X7'	LOW	60" o.c.
	10,619 SF	JUNIPERUS HORIZONTALIS WILTONII	CREEPING JUNIPER	1 GAL	1'X6'	MODERATE	48" o.c.
	41,903 SF	ROSMARINUS OFFICINALIS `HUNTINGTON CARPET`	HUNTINGTON CARPET ROSEMARY	1 GAL	1'X6'	LOW	48" o.c.
BIO-RETENTION AREA	QTY	BOTANICAL NAME	COMMON NAME	CONT	HT X WIDTH	WATER USE	SPACING
	4,910 SF	BOUTELOUA 'BLOND AMBITION'	BLUE GRAMA GRASS	1 GAL	2'X2'	LOW	30" o.c.
	21,653 SF	JUNCUS PATENS, DESCHAMPSIA CESPIT. & IRIS DOUGLASIANA 60% JUNCUS 20% DESCAMPSIA,20% IRIS, GROUPINGS OF 15 SQ FT	CALIFORNIA GRAY RUSH, TUFTED HAIR GRASS & IRIS	1 GAL	2'X2'	LOW	24" o.c.
	9,267 SF	JUSTICIA CALIFORNICA & BACCHARIS PILULARIS 'TWIN PEAKS' 50% EACH, GROUPINGS OF 25 SQ FT	CHUPAROSA & DWARF COYOTE BRUSH	5 GAL	4'X4'	LOW	36" o.c.
	3,656 SF	MIMULUS CARDINALIS & ZAUSCHNERIA CALIFORNICA 50% EACH, GROUPINGS OF 25 SQ FT	SCARLET MONKEYFLOWER, CALIFORNIA FUCHSIA	1 GAL	3'X3'	LOW	36" o.c.

TOTAL ON-SITE LANDSCAPE AREA: 210,500 S.F.
TURF: 0 SF
IRRIGATED LANDSCAPE: 202,691 S.F.

0 25' 50' 75' 100'
1" = 50'

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Salt Lake City, UT 84106-2749
(801) 679 - 3500

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IRVINE, CA 92618
949.923.6000 stantec.com

PE STAMP:

KEY PLAN:

SUBMITTAL LOG

NO.	DATE	DESCRIPTION
	11/29/22	SUBMITTAL #1
	11/06/23	SUBMITTAL #2

PROJECT TITLE:
DOUBLE BUTTE STORAGE
CITY PROJECT NUMBER: PLN22-0282

PROJECT LOCATION:
CITY OF MENIFEE, CA
33.7412, -117.1563

SHEET TITLE & DESCRIPTION:
PRELIMINARY LANDSCAPE PLAN - NORTH

500 MW / 2,000 MWh BESS

PROJ NUM: 185805659
DES: GMADDOCK
DWN:
CHK:
APV:
DATE: 11/21/2022
SCALE AT 24" x 36":
AS NOTED
SHEET NO: L2
REV:

AES Tillerlock 2AX3N v2102209
xrefs: ..\00-CIVIL\...\Base.dwg ..\..\..\..\Users\...\Base_Fire.dwg ..\..\..\..\Users\...\Base_Fire.dwg ..\..\..\..\Users\...\Base_Fire.dwg
Model: Fire05850C-EB001.DWG Model: Fire05850C-EB001.DWG Model: Fire05850C-EB001.DWG
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Model: Fire05850C-EB001.DWG Model: Fire05850C-EB001.DWG Model: Fire05850C-EB001.DWG
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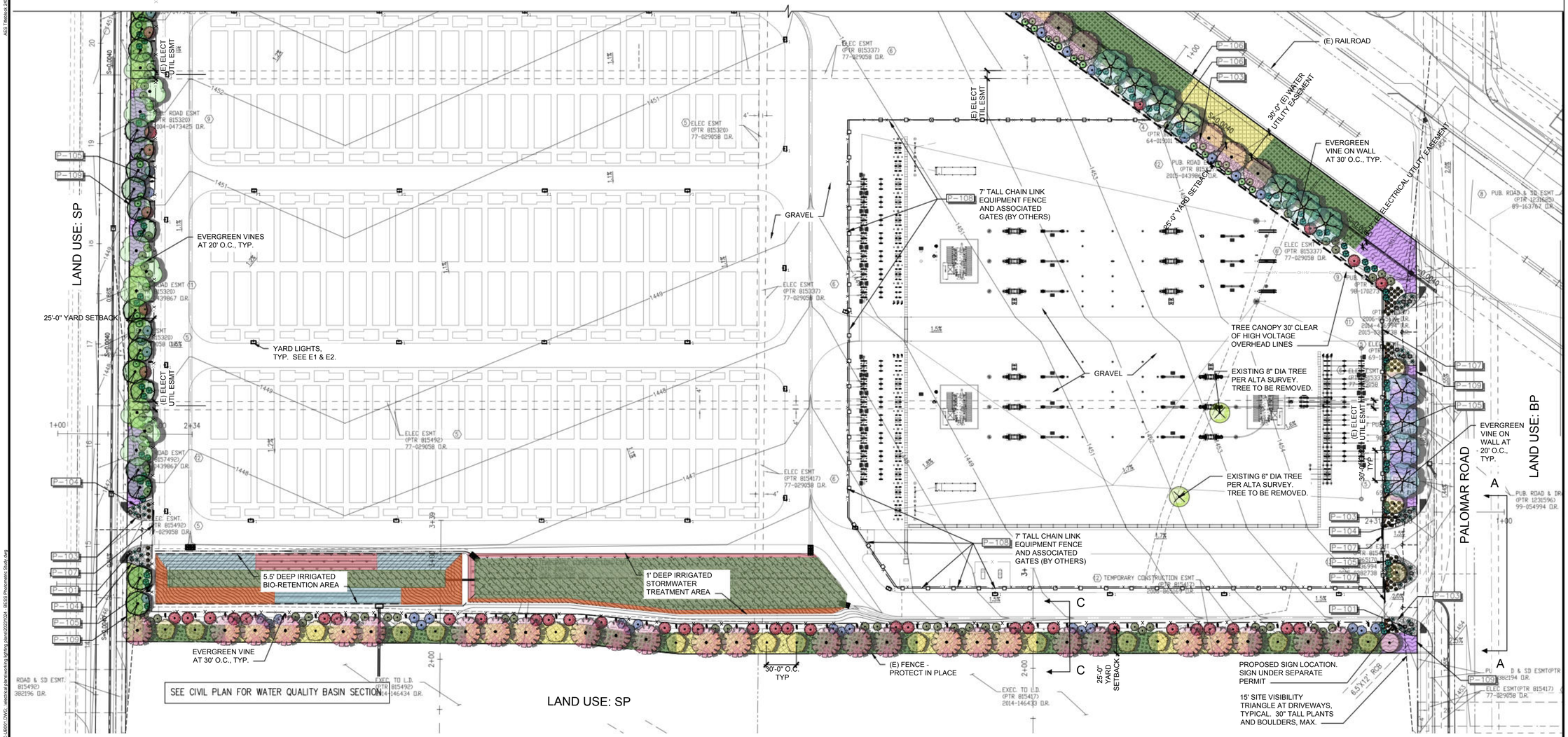
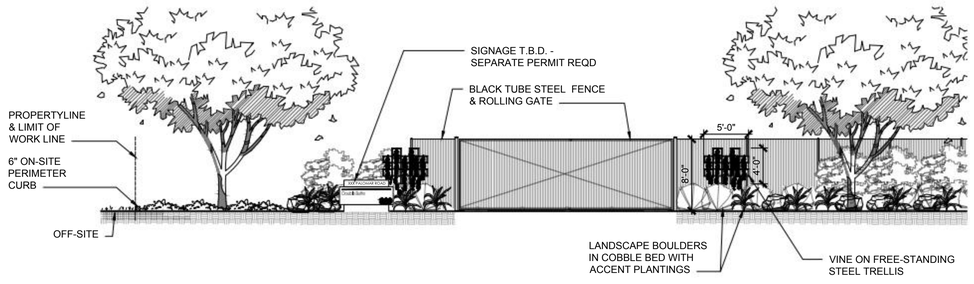
LINEAR ROOT BARRIER, TYP 3 PL.
SEE SHEET L2



ALL ON-SITE LANDSCAPE TO BE MAINTAINED BY OWNER

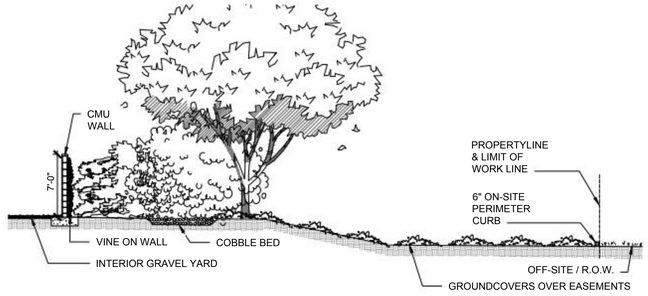
SIGHT DISTANCE TRIANGLES BASED ON DESIGN SPEED OF 25 MPH WITH A 275' CORNER SIGHT DISTANCE, USING THE CITY OF MENIFEE STD PLAN 818. NO TREES, WALLS, MONUMENTS, OR LANDSCAPE OVER 30" TALL IS ALLOWED WITHIN THE SIGHT TRIANGLE.

0 25' 50' 75' 100'
1" = 50'



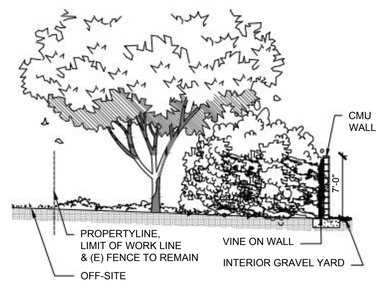
ELEVATION A-A @ ENHANCED MAIN ENTRY - EAST

SCALE: 1-1/2" = 1'-0"



SECTION B-B NORTH-EAST

SCALE: 1-1/2" = 1'-0"



SECTION C-C SOUTH

SCALE: 1-1/2" = 1'-0"

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949.923.6000 stantec.com

PE STAMP:

KEY PLAN:

SUBMITTAL LOG

NO.	DATE	DESCRIPTION
	11/29/22	SUBMITTAL #1
	11/06/23	SUBMITTAL #2

PROJECT TITLE:

DOUBLE BUTTE STORAGE
CITY PROJECT NUMBER: PLN22-0282

PROJECT LOCATION:

CITY OF MENIFEE, CA
33.7412, -117.1563

SHEET TITLE & DESCRIPTION:

PRELIMINARY LANDSCAPE PLAN - SOUTH

500 MW / 2,000 MWh BESS

PROJ NUM:	185805659
DES:	GMADDOCK
DWN:	
CHK:	
APV:	
DATE:	11/21/2022

SCALE AT 24" x 36":

AS NOTED

SHEET NO: L3 REV: -

AES Tilebrick 2AX36-2412039
\\aesnv-fpsvr01\projects\Projects\185805659\Civil\Drawings\Layout Tabs\Double Butte Storage - Preliminary Landscape Plan - South.dwg, 11/21/2022 10:37:10 AM, GMaddock, Model, Field(s)Modified:8/30/23 DWG: Model, Field(s)Modified:8/30/23 DWG: Model, Field(s)Modified:8/30/23 DWG: electrical plan/electrical lighting plan/20231024_BESS Photometric Study.dwg

ESTIMATED TOTAL WATER USE

PROJECT: Menifee (Dbl Butte)

ETWU = (ETo) x (0.62) x [(PF x HA)/IE + SLA]

Irrigation Efficiency Value =	
Bubblers	0.81
Laser Tube (Drip)	0.81
Rotary / Rotor	0.75
Spray	0.75

MAWA=	3,242,056.73	Maximum Allowable Water Use
ETWU =	2,780,196	Estimated total water use per year
ETo =	57.33	Reference Evapotranspiration (inches per year)
PF =	See Table at Left	Plant Factor from WUCOLS* or equivalent reference
HA =	See Table Below	Hydrozone Area (square feet)
SLA =	0	Special Landscaped Area (square feet)
0.62 =		Conversion Factor (to gallons per square foot)
IE =	See Table at Left	Irrigation Efficiency (minimum 0.75)

Plant Water Use Type	Plant Factor		
Low	0.10	0.20	0.30
Moderate	0.40	0.50	0.60
High	0.70	0.80	0.90
SLA	1.00		

HYDROZONE TABLE

Hydrozone	Plant Water Use Type(s) (low, moderate, high)	Plant Factor (PF)	Irrigation Type	Hydrozone Area (HA) (sq ft)	PF x HA (sq ft)	ETWU 100 CF/ Year	ETWU Gallons / Year
1	Low	0.30	Laser Tube (Drip)	187,997	56,399	3,308.71	2,474,918
2	Low	0.30	BUBBLERS	4,075	1,223	71.72	53,646
3	Low	0.20	Rotary / Rotor	0	0	0.00	0
4	Moderate	0.50	Laser Tube (Drip)	10,619	5,310	336.41	251,632
5	Moderate	0.50	Bubblers	0	0	0.00	0
6	High	0.80	Laser Tube (Drip)	0	0	0.00	0
7	High	0.80	Rotary / Rotor	0	0	0.00	0
8	High	0.90	Spray	0	0	0.00	0
	SLA	1			0		
		Sum		202,691	62,931	3,716.84	2,780,196

RESULTS				ETWU =	(ETo) x (0.62) x [(PF x HA)/IE + SLA]	100 CF/Year	Gal./year
MAWA =			3,242,057	ETWU =		3,717	2,780,196

ETWU must be less than or equal to MAWA **ETWU complies with MAWA**

MAXIMUM APPLIED WATER ALLOWANCE

PROJECT #: Menifee (Dbl Butte)

MAWA = (ETo) x (0.62) x [(0.45 x LA)+(0.55 x SLA)]

ETo**	57.33	ETo (inches/year)
Enter total project Landscaped Area	202,691.00	LA (square feet)
Enter Special Landscaped Area	0.00	SLA (square feet)
RESULTS:		
	3,242,057	MAWA (gallons/year)
	4,334.30	MAWA (100 CF/year)

** Eto Values derived from Appendix A of the CA Model Water Efficient Landscape Ordinance, CA Dept. of Water

MAWA Maximum applied water allowance (gallons per year)
Eto Reference Evapotranspiration (inches per year)
0.45 ET Adjustment Factor (ETAF) per AB1881
LA Planted landscaped area including SLA and not including hardscapes. Also include surface area of water features not
0.62 Conversion Factor (to gallons per square foot)
SLA Portion of the Landscaped Area identified as Special Landscaped Area. Also include surface area of water features using recycled
0.55 The additional ET Adjustment Factor for SLA (1.0 - 0.45 = 0.55)

WATER CONSERVATION CONCEPT

A COMBINATION OF SUB-SURFACE LOW FLOW DRIP, BUBBLERS, AND/OR LOW VOLUME HUNTER MP ROTATOR SPRAYS SHALL BE INSTALLED IN ALL PLANTERS.

PLANTS ARE GROUPED INTO "HYDROZONES" AND IRRIGATED SEPARATELY FROM THOSE WITH DIFFERENT WATER REQUIREMENTS.

IRRIGATION SYSTEM SHALL BE EQUIPPED WITH A WEATHER TRACK CONTROLLER CAPABLE OF DUAL PROGRAMMING. FLOW SENSOR LEAK DETECTION AND AUTOMATIC SHUT-OFF TO BE PROVIDED AT POC.

PROPOSED PLANTINGS IN BIORETENTION BASIN

IRIS

JUNCUS

DESCHAMPSIA

MIMULUS

ZAUSCHNERIA

JUSTICIA

BACCHARIS

BOUTELOUA

GENERAL NOTES

1. ALL PLANTING AREAS SHALL HAVE A 2" LAYER OF ORGANIC COMPOST ROTOTILLED TO A DEPTH OF 4", THEN COVERED WITH RECYCLED PAPER AS A BIODEGRADABLE WEED SUPPRESSANT AND TOPDRESSED WITH A 3" (MINIMUM) DEEP LAYER OF 3/4" MINUS WOOD CHIP MULCH.
2. REFER TO ARCHITECTURAL AND CIVIL PLANS FOR DESCRIPTIONS OF ELEMENTS NOT IDENTIFIED ON THIS PLAN.
3. OBSERVE THE FOLLOWING MINIMUM SETBACK DISTANCES FOR TREE PLANTING :

   BETWEEN STREET TREES = 30 FT.
   DRIVEWAY CUTS AND FIRE HYDRANTS = 7 FT.
   UTILITY BOXES, MANHOLE AND OTHER UTILITY VAULTS, TELEPHONE AND OTHER UTILITY POLES, GAS AND WATER METER, AND MAINS = 5 FT.

4. ALL SURFACE AND SUB-SURFACE SWALES, DRAINAGE STRUCTURES AND PATTERNS SHALL BE MAINTAINED.
5. A LICENSED LANDSCAPE MAINTENANCE CONTRACTOR WILL BE RETAINED TO PERFORM ROUTINE MAINTENANCE DUTIES.
6. LOCATIONS AND QUANTITIES OF EXISTING TREES TO BE REMOVED ARE APPROXIMATE.
7. PLANTER SOIL SHALL BE AMENDED AS DESCRIBED BY A LABORATORY SOIL ANALYSIS. ORGANIC COMPOST AND AMENDMENT TO BE USED.
8. LANDSCAPE CONSTRUCTION WASTE TO BE RECYCLED PER LOCAL CODES AND REQUIREMENTS.
9. NO PLANTS SELECTED REQUIRE SHEARING
10. OBTAIN ALL MATERIALS LOCALLY (WITHIN 50 MILES) AS POSSIBLE.
11. CONTRACTOR TO ARRANGE FOR CERTIFICATION AND AUDIT PER CITY REQUIREMENTS.

PROPOSED PERIMETER, ENTRY & PARKING LOT PLANTINGS

BACCHARIS

GEIJERA

JUNIPERUS

AGAVE

LAURUS

CALLISTEMON 'LITTLE JOHN'

HESPERALOE

CALLISTEMON CITRINUS

DALEA

ROSEMARY

MACFADYENA

FICUS

QUERCUS

ARTEMESIA

FOUQUIERIA

GELSEMIUM

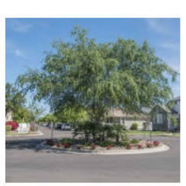
FRANGULA

GREVILLEA

CERCIDIUM

CALLIANDRA

LEUCOPHYLLUM


ULMUS

RHUS

WESTRINGIA

PINUS

PARKING LOT SHADING CALCULATION

AREA	DIAM (FT)	TREE TYPE	SYMBOL	FULL (100%)	THREE-QTR (75%)	HALF (50%)	ONE-QTR (25%)
1256	40	ULMUS PARVIF.		0 @ 1,256 = 0	0 @ 942 = 0	3 @ 628 = 1,884	0 @ 314 = 0
			SUBTOTALS:	0	0	1,884	0

TOTAL PARKING LOT AREA:	2,106	SF	100%
SHADE AREA REQUIRED:	632	SF	30%
SHADE AREA PROVIDED:	1,884	SF	89%

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949.923.6000 stantec.com

PE STAMP:

KEY PLAN:

SUBMITTAL LOG

NO.	DATE	DESCRIPTION
	11/29/22	SUBMITTAL #1
	11/06/23	SUBMITTAL #2

PROJECT TITLE:

DOUBLE BUTTE STORAGE
CITY PROJECT NUMBER: PLN22-0282

PROJECT LOCATION:

CITY OF MENIFEE, CA
33.7412, -117.1563

SHEET TITLE & DESCRIPTION:

LANDSCAPE NOTES AND CALCULATIONS

500 MW / 2,000 MWh BESS

PROJ. NUM:	185805659
DES:	GMADDOCK
DWN:	
CHK:	
APV:	
DATE:	11/21/2022

SCALE AT 24" x 36":

NONE

SHEET NO: L4 REV:

AES Tillerock 2A/2K v2022/09
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SITE LIGHTING

MATERIAL: METAL COLOR: WHITE
SEE SHEETS EL1 AND EL2 FOR LIGHTING PLAN

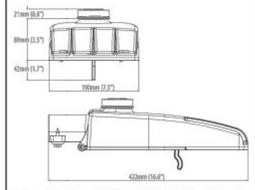
Autobahn Series ATBMicro
Roadway Lighting

PRODUCT OVERVIEW

Applications:

- Roadways
- Off ramps
- Residential streets
- Parking lots

DIMENSIONS



Effective Projected Area (EPA): The EPA for the ATBMicro is 0.36 sq. ft.
Approx. Wt. = 8 lbs.

STANDARDS

DesignLights Consortium® (DLC) Premium qualified product. Not all versions of this product may be DLC Premium qualified. Please check the DLC Qualified Products List at www.designlights.org/QPL to confirm which versions are qualified.

Color temperatures of ≤ 3000K must be specified for International Dark-Sky Association certification.

Rated for -40°C to 40°C ambient
CSA Certified to U.S. and Canadian standards
Complies with ANSI: C136.2, C136.10, C136.14, C136.31, C136.15, C136.37

BUY AMERICAN ACT — Product with the BAA option is assembled in the USA and meets the Buy America(n) government procurement requirements under FAR, DFARS and DOT regulations. Please refer to www.acuitybrands.com/buy-american for additional information.

Note: Specifications subject to change without notice. Actual performance may differ as a result of end-user environment and application.

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Features:

OPTICAL

The Autobahn's new molded silicone optics provide exceptional performance. Silicone optics are superior to other polymeric materials in the areas of; optical efficiency, thermal performance, and reduction in dirt accumulation, all of which can lead to long term lumen degradation and a shift in optical distribution. Also, because silicone allows for the molding of fine details as well as thick sections, it produces the most crisp, clean and well-defined lighting distributions available. Silicone optics paired with modern LED's allow the Autobahn to take full advantage of both technologies.

Same Light: Performance is comparable to 70-150W HPS roadway luminaires.

White Light: Correlated color temperature - 4000K, or optional 2700K, 3000K or 5000K, all 70 CRI minimum.

Unique IP66 rated LED light engines provided 0% uplight and restrict backlight to within sidewalk depth, providing optimal application coverage and optimal pole spacing. Available in Type II, III and V roadway distributions.

ELECTRICAL

Expected Life: LED light engines are rated >100,000 hours at 25°C, L70. Electronic driver has an expected life of 100,000 hours at a 25°C ambient.

Lower Energy: Saves an expected of 40-60% over comparable HID luminaires.

Robust Surge Protection: Two different surge protection options provide a minimum of ANSI C136.2 10kV/5kA protection. 20kV/10kA protection is also available.

Luminaire ships with a 0-10v dimmable driver. Luminaire is continuous and step dimming capable via AO option or controls installed on P7 photocontrol receptacle option.

MECHANICAL

Includes standard AEL lineman-friendly features such as tool-less entry, 3 station terminal block and quick disconnects. Bubble level located inside the electrical compartment for easily leveling at installation.

Rugged die-cast aluminum housing and door are polyester powder-coated for durability and corrosion resistance. Rigorous five-stage pre-treating and painting process yields a finish that achieves a scribe creepage rating of 7 (per ASTM D1654) after over 5000 hours exposure to salt fog chamber (operated per ASTM B117).

Mast arm mount is adjustable for arms from 1-1/4" to 2" (1-5/8" to 2-3/8" O.D.) diameter. Provides a 3G vibration rating per ANSI C136.31

CONTROLS

NEMA 3 pin photocontrol receptacle is standard, with the Acuity designed ANSI standard 7 pin receptacle optionally available.

Premium solid state locking style photocontrol - PCSS (10 year rated life) Extreme long life solid state locking style photocontrol - PCLL (20 year rated life).

Optional onboard Adjustable Output module allows the light output and input wattage to be modified to meet site specific requirements, and also can allow a single fixture to be flexibly applied in many different applications.

Autobahn Series ATBMicro
Roadway Lighting

ORDERING INFORMATION

Series	Performance Packages	Voltage	Optics
ATBMic Autobahn LED Roadway	**P101** 2,889 lumens nominal [6] **P102** 3,480 lumens nominal **P103** 4,016 lumens nominal **P104** 4,959 lumens nominal **P105** 5,897 lumens nominal **P106** 6,755 lumens nominal **P151** 4,320 lumens nominal **P152** 5,077 lumens nominal **P153** 6,041 lumens nominal **P154** 7,399 lumens nominal **P155** 8,158 lumens nominal **P156** 8,786 lumens nominal	**MVOLT** Multi-volt, 120-277V **347** 347V [4,5] **480** 480V [4,5]	**R2** Roadway Type II **R3** Roadway Type III **R4** [3] Roadway Type IV **R5** Roadway Type V

Options

Color Temperature (CCT)
- **(Blank)** 4000K CCT, 70 CRI Min.
- **27K** 2700K CCT, 70 CRI Min.
- **3K** 3000K CCT, 70 CRI Min.
- **5K** 5000K CCT, 70 CRI Min.

Paint
- **(Blank)** Gray (Standard)
- **BK** Black
- **BZ** Bronze
- **DDB** Dark Bronze
- **GI** Graphite
- **WH** White
- **GN** Green

Surge Protection
- **(Blank)** Standard 20kV/10kA SPD [1]
- **MP** MOV Pack 10kV/5kA

Terminal Block
- **(Blank)** Termisal Block (Standard)

Misc.
- **BL** External Bubble Level
- **HSS** House-Side Shield
- **NL** Nema Label
- **XL** Not CSA Certified
- **UMR-XX** 8' Horizontal Arm for Round Pole, Painted to match Fixture
- **UMS-XX** 8' Horizontal Arm for Square Pole, Painted to match Fixture
- **BAA** Buy America(n) Act Compliant
- **UMR-GALV** 8' Horizontal Arm for Round Pole, Galvanized
- **UMS-GALV** 8' Horizontal Arm for Square Pole, Galvanized
- **PW#** Pre-wire, # indicates wire length in one foot increments from 1' thru 10' (e.g. PW4 = 4' of pre-wire)

Controls
- **(Blank)** 3 Pin NEMA Photocontrol Receptacle (Standard)
- **P7** [2] 7 Pin Photocontrol Receptacle (Dimmable Driver Included)
- **NR** No Photocontrol Receptacle
- **AO** Field Adjustable Output
- **PCSS** [1] Solid State Lighting Photocontrol (120-277V)
- **PCLL** Solid State Long Life Photocontrol
- **SH** Shorting Cap

Packaging
- **(Blank)** Single Unit (Standard)
- **JP** Job Pack (90/pallet)

Accessories:
House side shields for field installation
- **ATBMICP10XR2/R5HSS** for use with P101 - P106, R2 & R5 distribution
- **ATBMICP10XR3/R4HSS** for use with P101 - P106, R3 & R4 distribution
- **ATBMICP15XR2/R5HSS** for use with P151 - P156, R2 & R5 distribution
- **ATBMICP15XR3HSS** for use with P151 - P156, R3 distribution

Notes
1. Not available in 347 or 480V.
2. Not available with NR.
3. Not available with P151 - P156 performance packages.
4. Not available with P101 performance package
5. Must select MP surge protection option
6. Not available with 347V or 480V

American Electric Lighting®
AEL Headquarters, 3825 Columbus Road, Granville, OH 43023
www.americanelectriclighting.com
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Warranty Five-year limited warranty. This is the only warranty provided and no other statements in this specification sheet create any warranty of any kind. All other express and implied warranties are disclaimed. Complete warranty terms located at: www.acuitybrands.com/support/warrantyterms-and-conditions
Actual performance may differ as a result of end-user environment and application. All values are design or typical values, measured under laboratory conditions at 25 °C. Specifications subject to change without notice.

Please contact your sales representative for the latest product information.

BATTERY UNIT

MATERIAL: METAL COLOR: GREY

INVERTER

MATERIAL: METAL COLOR: WHITE

TRANSFORMER

MATERIAL: METAL COLOR: WHITE

CASE ROAD SCREEN WALL CONCEPT - CMU 7' HEIGHT

MATERIAL: CONCRETE MASONRY UNIT WITH ANTI-GRAFFITI COATING

7' TALL CHAIN LINK INTERIOR EQUIPMENT FENCE (BY OTHERS)

MATERIAL: METAL CHAIN LINK COLOR: SILVER

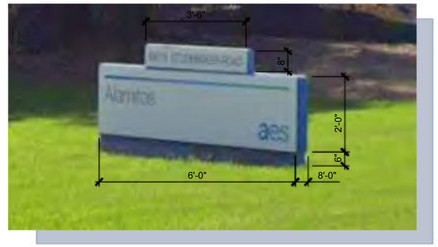
PERIMETER 8' TALL TUBE STEEL FENCE

MATERIAL: TUBE STEEL COLOR: BLACK

FIRE DEPT GATE REQUIREMENTS

GATES SHALL BE AUTOMATIC MINIMUM 24 FEET IN WIDTH. GATE ACCESS SHALL BE EQUIPPED WITH A RAPID ENTRY SYSTEM TO INCLUDE OPTICOM AND KNOX ELECTRIC SWITCHES. PLAN SHALL BE SUBMITTED TO THE FIRE DEPARTMENT FOR APPROVAL PRIOR TO INSTALLATION. AUTOMATIC/MANUAL GATE PINS SHALL BE RATED WITH SHEAR PIN FORCE, NOT TO EXCEED 30 POUNDS. AUTOMATIC GATES SHALL BE EQUIPPED WITH EMERGENCY BACKUP POWER. GATES ACTIVATED BY THE RAPID ENTRY SYSTEM SHALL REMAIN OPEN UNTIL CLOSED BY THE RAPID ENTRY SYSTEM.

REPRESENTATIVE PHOTO OF PROPOSED SIGNAGE (SIGNAGE UNDER SEPARATE PERMIT)



(1) SINGLE-SIDED SIGN WITH 12 SF AREA
(NOT INCLUDING ADDRESS)

CITY CODE 9.220.130-1 INDUSTRIAL ZONE:
(1) SIGN PER STREET FRONTAGE, 32 SF AREA MAX, 8 FT MAX HEIGHT

aes
2180 South 1300 East, Suite 600
Salt Lake City, UT 84106-2749
(801) 679 - 3500

Stantec
38 TECHNOLOGY DRIVE, SUITE 200
IRVINE, CA 92618
949.923.6000 stantec.com

PE STAMP:

KEY PLAN:

SUBMITTAL LOG

NO.	DATE	DESCRIPTION
	11/29/22	SUBMITTAL #1
	11/06/23	SUBMITTAL #2

PROJECT TITLE:
DOUBLE BUTTE STORAGE
CITY PROJECT NUMBER: PLN22-0282

PROJECT LOCATION:
CITY OF MENIFEE, CA
33.7412, -117.1563

SHEET TITLE & DESCRIPTION:
COLOR AND MATERIALS BOARD

500 MW / 2,000 MWh BESS

PROJ NUM: 185805659
DES: GMADDOCK
DWN:
CHK:
APV:
DATE: 11/21/2022
SCALE AT 24" x 36": NTS

SHEET NO: L5
REV:

AES Tilebrick 2A/3A v2.0209
AES Photometric Study.dwg
Model_Files\6666C-LB001.DWG Model_Files\6666C-SR002.DWG Model_Files\6666C-LB001.DWG electrical plan\working\plotting plans\20231004_BESS Photometric Study.dwg

Outlook

FW: [EXTERNAL] RE: Double Butte - DBESP Transmittal #1

From Keith Carwana <kcarwana@dudek.com>
Date Tue 9/30/2025 5:45 PM
To Ken Koch <ken.koch@AES.COM>; Luke Rogers <luke.rogers@AES.COM>; Alan Sims <alan.sims@AES.COM>
Cc Cindi Hoover <choover@dudek.com>

CAUTION: This email originated from outside AES. Do not click links or open attachments unless you recognize the sender.

Hi Ken, Luke, and AJ,

Some good news for a Tuesday afternoon, the DBESP is approved.

Keith Carwana
Project Manager

O: 949 373 8325 **C:** 760 889 9498
dudek.com

From: Thiede, James H <james_thiede@fws.gov>
Sent: Tuesday, September 30, 2025 5:39 PM
To: Ryan Fowler <rfowler@cityofmenifee.us>
Cc: Fulgencio, Enola@Wildlife <enola.fulgencio@wildlife.ca.gov>; Machuca, Breanna@Wildlife <breanna.machuca@wildlife.ca.gov>; Cleary-Rose, Karin <Karin_Cleary-Rose@fws.gov>; Beck, Carly@Wildlife <carly.beck@wildlife.ca.gov>; Keith Carwana <kcarwana@dudek.com>
Subject: Re: [EXTERNAL] RE: Double Butte - DBESP Transmittal #1

Thank you, Ryan, for incorporating the Wildlife Agencies' requested edits into the DBESP.

After reviewing the September 3, 2025, version of the DBESP, the Wildlife Agencies agree that the September 3, 2025, DBESP would provide mitigation offsets that would be biologically equivalent or superior to a complete avoidance alternative for the MSHCP Section 6.1.2 resources (riparian/riverine and vernal pool) present on the proposed development site for the Double Butte Battery Energy Storage Project.

The DBESP is hereby approved.

Sincerely,

James Thiede
Senior Biologist
U.S. Fish & Wildlife Service
Palm Springs Fish & Wildlife Office

and

Enola Fulgencio
Environmental Scientist

Inland Deserts Region
California Department of Fish and Wildlife
3602 Inland Empire Blvd., Suite C-220
Ontario, CA 91764

From: Ryan Fowler <rfowler@cityofmenifee.us>
Sent: Monday, September 29, 2025 2:19 PM
To: Thiede, James H <james_thiede@fws.gov>
Cc: Fulgencio, Enola@Wildlife <enola.fulgencio@wildlife.ca.gov>; Machuca, Breanna@Wildlife <breanna.machuca@wildlife.ca.gov>; Cleary-Rose, Karin <Karin_Cleary-Rose@fws.gov>; Beck, Carly@Wildlife <carly.beck@wildlife.ca.gov>; Keith Carwana <kcarwana@dudek.com>
Subject: RE: [EXTERNAL] RE: Double Butte - DBESP Transmittal #1

Hi Jim,

I just wanted to make sure we closed the loop on this and provided you everything you needed on this one.
This is the clean, final version of the DBESP for Double Butte per your request. See link below:
https://dudek.sharefile.com/public/share/web-s5cc3da0adadd45519e851409aa2bb664

Ryan.

From: Ryan Fowler
Sent: Wednesday, September 3, 2025 9:09 AM
To: Thiede, James H <james_thiede@fws.gov>
Cc: Fulgencio, Enola@Wildlife <enola.fulgencio@wildlife.ca.gov>; Machuca, Breanna@Wildlife <breanna.machuca@wildlife.ca.gov>; Cleary-Rose, Karin <Karin_Cleary-Rose@fws.gov>; Beck, Carly@Wildlife <carly.beck@wildlife.ca.gov>
Subject: FW: [EXTERNAL] RE: Double Butte - DBESP Transmittal #1

Jim,

The Applicant has supplied the “clean” MS Word and PDF versions of the DBESP for Double Butte. See link below:
https://dudek.sharefile.com/public/share/web-s5cc3da0adadd45519e851409aa2bb664

Ryan.

From: Keith Carwana <kcarwana@dudek.com>
Sent: Wednesday, August 27, 2025 11:07 AM
To: Ryan Fowler <rfowler@cityofmenifee.us>
Cc: Nicolo Di Jerlando <ndijerlando@dudek.com>
Subject: RE: [EXTERNAL] RE: Double Butte - DBESP Transmittal #1

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Hi Ryan,

To follow-up on the email chain below, we have corrected the errors found in the “clean” MS Word and PDF versions of the DBESP. Copies of the updated documents can be found at the link below:

https://dudek.sharefile.com/public/share/web-s5cc3da0adadd45519e851409aa2bb664

Please let me know if you have any issues accessing the files and/or have any comments/questions.

Thanks,

Keith Carwana
Project Manager

O: 949 373 8325 **C:** 760 889 9498
dudek.com

From: Thiede, James H <james_thiede@fws.gov>
Sent: Monday, August 25, 2025 11:00 AM
To: Ryan Fowler <rfowler@cityofmenifee.us>
Cc: Fulgencio, Enola@Wildlife <enola.fulgencio@wildlife.ca.gov>; Machuca, Breanna@Wildlife <breanna.machuca@wildlife.ca.gov>; Cleary-Rose, Karin <Karin_Cleary-Rose@fws.gov>; Beck, Carly@Wildlife <carly.beck@wildlife.ca.gov>
Subject: Re: [EXTERNAL] RE: Double Butte - DBESP Transmittal #1

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Hi Ryan,

Thank you for the Revised DBESP that the City transmitted to the Wildlife Agencies on August 21, 2025 (DBESP version #3, dated 8-11-2025). You sent us three copies of the Revised DBESP: a "redline" version in Microsoft Word displaying changes made to the text, a "clean" copy in MS Word displaying the proposed final text, and a pdf version of the latter. The Wildlife Agencies had made clarifying edits (on pages 12 and 14) to the Revised DBESP back in July, and we had requested (on July 30, 2025) that the City incorporate those clarifying edits into the text, and return the Revised DBESP to the Wildlife Agencies for our concurrence.

However, after reviewing the Revised DBESP (version 3, prepared on August 11, 2025), only the "redline" copy contains the Wildlife Agencies' July 30 clarifying edits. The "clean" copy in

MS Word and the pdf copy both contain the prior version of the text.

The Wildlife Agencies request that our clarifying edits be incorporated into the pdf and "clean" copies of the DBESP, as well, so that all copies of the final DBESP will agree with one another, and that there will be no confusion for future readers about which mitigation strategy was approved by the Wildlife Agencies.

Sincerely,

Jim

James Thiede
Senior Biologist
U.S. Fish & Wildlife Service
Palm Springs Fish & Wildlife Office

and

Enola Fulgencio
Environmental Scientist
Inland Deserts Region
California Department of Fish and Wildlife
3602 Inland Empire Blvd., Suite C-220
Ontario, CA 91764

From: Ryan Fowler <rfowler@cityofmenifee.us>
Sent: Thursday, August 21, 2025 10:51 AM
To: Thiede, James H <james_thiede@fws.gov>
Cc: Fulgencio, Enola@Wildlife <enola.fulgencio@wildlife.ca.gov>; Machuca, Breanna@Wildlife <breanna.machuca@wildlife.ca.gov>; Cleary-Rose, Karin <Karin_Cleary-Rose@fws.gov>; Beck, Carly@Wildlife

<carly.beck@wildlife.ca.gov>
Subject: RE: [EXTERNAL] RE: Double Butte - DBESP Transmittal #1

Good morning, Jim.

Below is the link to the revised reports addressing your last round of comments:
2025 August DBESP Revsised Reports

Please let me know if this satisfies the wildlife agencies' comments.

Ryan.

From: Thiede, James H <james_thiede@fws.gov>
Sent: Thursday, July 31, 2025 3:15 PM
To: Ryan Fowler <rfowler@cityofmenifee.us>
Cc: Fulgencio, Enola@Wildlife <enola.fulgencio@wildlife.ca.gov>; Machuca, Breanna@Wildlife <breanna.machuca@wildlife.ca.gov>; Cleary-Rose, Karin <Karin_Cleary-Rose@fws.gov>; Beck, Carly@Wildlife <carly.beck@wildlife.ca.gov>
Subject: Re: [EXTERNAL] RE: Double Butte - DBESP Transmittal #1

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Thank you, Ryan. We look forward to finalizing this DBESP with the City.

Best Regards,

Jim

James Thiede
Senior Biologist
U.S. Fish & Wildlife Service
Palm Springs Fish & Wildlife Office

From: Ryan Fowler <rfowler@cityofmenifee.us>
Sent: Thursday, July 31, 2025 3:09 PM
To: Thiede, James H <james_thiede@fws.gov>
Cc: Fulgencio, Enola@Wildlife <enola.fulgencio@wildlife.ca.gov>; Machuca, Breanna@Wildlife <breanna.machuca@wildlife.ca.gov>; Cleary-Rose, Karin <Karin_Cleary-Rose@fws.gov>; Beck, Carly@Wildlife <carly.beck@wildlife.ca.gov>
Subject: RE: [EXTERNAL] RE: Double Butte - DBESP Transmittal #1

Received. Thank you, Jim. We will make those edits and re-send as you describe below.

From: Thiede, James H <james_thiede@fws.gov>
Sent: Wednesday, July 30, 2025 3:37 PM
To: Ryan Fowler <rfowler@cityofmenifee.us>
Cc: Fulgencio, Enola@Wildlife <enola.fulgencio@wildlife.ca.gov>; Machuca, Breanna@Wildlife <breanna.machuca@wildlife.ca.gov>; Cleary-Rose, Karin <Karin_Cleary-Rose@fws.gov>; Beck, Carly@Wildlife <carly.beck@wildlife.ca.gov>
Subject: Re: [EXTERNAL] RE: Double Butte - DBESP Transmittal #1

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Hi Ryan,

Thank you for the Revised DBESP that the City transmitted to the Wildlife Agencies on June 2, 2025 (DBESP version #2, dated 3-18-2025). The Wildlife Agencies have reviewed the Revised DBESP. Most of the changes that we requested to the original DBESP in our February 19, 2025, comment letter were made in the revision received on June 2.

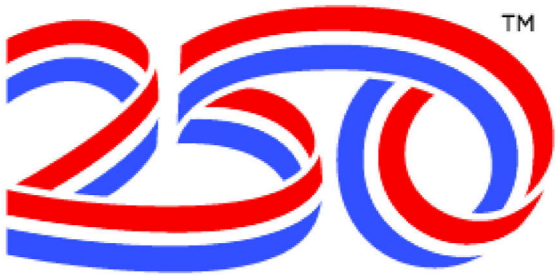
After reviewing the Revised DBESP, the Wildlife Agencies made clarifying edits (on pages 12 and 14) to the Revised DBESP (attached). We request that the City incorporate those clarifying edits into the text, and return the Revised DBESP to the Wildlife Agencies (both a pdf copy and a redline/Track Changes copy, please), and then then we would be able to respond shortly thereafter with a concurrence message to the City, thereby finalizing the DBESP.

Sincerely,

James Thiede
Senior Biologist
U.S. Fish & Wildlife Service
Palm Springs Fish & Wildlife Office

and

Enola Fulgencio
Environmental Scientist
Inland Deserts Region
California Department of Fish and Wildlife
3602 Inland Empire Blvd., Suite C-220
Ontario, CA 91764



From: Ryan Fowler <rfowler@cityofmenifee.us>
Sent: Monday, June 2, 2025 8:58 AM
To: Beck, Carly@Wildlife <carly.beck@wildlife.ca.gov>
Cc: Siless, Ryan M <ryan_siless@fws.gov>; Thiede, James H <james_thiede@fws.gov>; Fulgencio, Enola@Wildlife <enola.fulgencio@wildlife.ca.gov>; Brandon Cleary <bcleary@cityofmenifee.us>; Machuca, Breanna@Wildlife <breanna.machuca@wildlife.ca.gov>; Tenorio, Claudia@Waterboards <Claudia.Tenorio@Waterboards.ca.gov>; Freshwater, Jason@Waterboards <Jason.Freshwater@Waterboards.ca.gov>; Cleary-Rose, Karin <Karin_Cleary-Rose@fws.gov>
Subject: [EXTERNAL] RE: Double Butte - DBESP Transmittal #1

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Carly,

Thank you for your comments on the DBESP for the Double Butte project (attached for reference).

The consultant has amended the DBESP to address your comments. I am attaching the track changes Word file for your team. The PDF version is large, so I am providing a link to it below:
PC2

Please let me know if there are any questions the Wildlife Agencies have regarding the modifications.

Ryan.

RYAN FOWLER | Principal Planner
Community Development Department
"Creating a HEALTHY, VIBRANT, and CONNECTED community for everyone."
City of Menifee | 29844 Haun Road | Menifee, CA 92586
City Hall: (951) 672-6777 | Direct: (951) 723-3740
rfowler@cityofmenifee.us | cityofmenifee.us

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From: Beck, Carly@Wildlife <Carly.Beck@wildlife.ca.gov>
Sent: Wednesday, February 19, 2025 8:28 PM
To: Ryan Fowler <rfowler@cityofmenifee.us>; Brandon Cleary <bcleary@cityofmenifee.us>
Cc: Siless, Ryan M <ryan_siless@fws.gov>; Thiede, James H <james_thiede@fws.gov>; Fulgencio, Enola@Wildlife <Enola.Fulgencio@Wildlife.ca.gov>; Machuca, Breanna@Wildlife <Breanna.Machuca@Wildlife.ca.gov>; Tenorio, Claudia@Waterboards <Claudia.Tenorio@Waterboards.ca.gov>; Freshwater, Jason@Waterboards <Jason.Freshwater@Waterboards.ca.gov>; Karin Cleary-Rose <Karin_Cleary-Rose@fws.gov>
Subject: Double Butte - DBESP Transmittal #1

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Hello,

Please find the attached letter for the Double Butte-DBESP.

Cheers,

Carly Beck
Senior Environmental Scientist (Supervisor)
Inland Deserts Region
California Department of Fish and Wildlife
3602 Inland Empire Blvd., Suite C-220
Ontario, CA 91764
951-218-2940

And

Karin Cleary-Rose (she/her)
Inland Division Supervisor
Palm Springs Fish and Wildlife Office

777 East Tahquitz Canyon Way, Suite 208
Palm Springs, CA 92262
(760) 322 2070 ext 406
(760) 331 8844 cell
email is best

*****Please note that a Lake and Streambed Agreement does not provide incidental take for the candidate species Crotch's Bumble Bee (Bombus crotchii) nor is it a covered species under the Western Riverside Multiple Species Habitat Conservation Plan. If a project has the potential to affect suitable habitat for the species CDFW recommends following the guidelines as provide https://wildlife.ca.gov/Conservation/CESA.**