Attachment A

Mitigated Negative Declaration

Available at: ww5.cityofpasadena.net/planning/category/environmental-notices/.

Initial Study/
Mitigated Negative Declaration

Berkshire Creek Area Improvements Project
City of Pasadena, California

Prepared for | City of Pasadena Public Works Department
100 North Garfield Avenue
Pasadena, California 91101

Prepared by | Psomas
225 South Lake Avenue, Suite 1000
Pasadena, California 91101
T: (626) 351-2000

May 2019

TABLE OF CONTENTS

TABLES

EXHIBITS

APPENDICES

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CITY OF PASADENA
100 NORTH GARFIELD AVENUE PASADENA, CA 91101

INITIAL STUDY

In accordance with the Environmental Policy Guidelines of the City of Pasadena, this analysis, the associated “Master Application Form,” and/or Environmental Assessment Form (EAF) and supporting data constitute the Initial Study (IS) pursuant to the California Environmental Quality Act (CEQA) for the subject proposed Berkshire Creek Area Improvements Project (Project). This IS provides the assessment for a determination whether the Project may have a significant effect on the environment.

SECTION 1.0 PROJECT INFORMATION

1. **Project Title:** Berkshire Creek Area Improvements Project

2. **Lead Agency Name and Address:** City of Pasadena Public Works Department
100 North Garfield Avenue
Pasadena, California 91101

3. **Contact Person and Phone Number:** Brent Maue, P.E., Assistant City Engineer
(626) 744-4307

4. **Project Location:** 4550 Oak Grove Drive
Pasadena, California 91103
(south of the intersection with Foothill Boulevard)
See Exhibits 1 and 2.

5. **Project Sponsor’s Name and Address:** City of Pasadena
Public Works Department
100 North Garfield Avenue
Pasadena, California 91101

6. **General Plan Designation:** Parks

7. **Zoning:** OS (Open Space)

8. **Description of the Project:**

The proposed Project site includes approximately 4.7 acres within the Oak Grove area of the City of Pasadena’s (City’s) approximate 1,300-acre Hahamongna Watershed Park (HWP). The Oak Grove area is situated in the southwestern portion of the *Hahamongna Watershed Park Master Plan* (Master Plan) area; and the Master Plan area is, in turn, an approximate 300-acre portion of the HWP that includes open space extending northward from Devil’s Gate Dam into the Arroyo Seco Canyon.

The Project site is located at 4550 Oak Grove Drive in the northwest portion of the City immediately north of Interstate (I) 210, north and east of Oak Grove Drive, and south of where Foothill Boulevard crosses into the HWP and becomes an unnamed street. The site is located on City parkland, which is open daily from 6:00 AM to sunset. It is fully accessible to the public via public and private transportation routes, as well as by various trails for pedestrians, bicyclists, and equestrians. Exhibit 1, Regional Location and Local Vicinity, and Exhibit 2, Project Site Context, illustrate the Project site location and surrounding uses.

Regional Location and Local Vicinity

Exhibit 1

Berkshire Creek Area Improvements Project

N W E S

500 250 0 500 Feet

PSOMAS

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Project Site Context

Exhibit 2

Berkshire Creek Area Improvements Project

N W E S

800 400 0 800 Feet

PSOMAS

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Background

In July 2012, an IS and a Notice of Preparation (NOP) were prepared for a project known as the Hahamongna Multi-Benefit/Multi-Use (MBMU) project. Subsequent to distribution of the IS/NOP, Community and Scoping Meetings were conducted. The MBMU project components reflected those presented in the HWP Master Plan within the Oak Grove area. In response to comments received on the IS/NOP and at the meetings, the City elected not to move forward with two of the MBMU project components: (1) Sycamore Grove Field and (2) habitat restoration within the Devil's Gate basin. The removal of these two components substantively changed the scope of the MBMU project and, as a result, the environmental review process for the MBMU project was stopped. The community was informed the environmental process would resume once the work plan for the Oak Grove area was better known.

In September 2014, the City presented to the Hahamongna Watershed Park Advisory Committee (HWPAC) an overview of the Oak Grove Area Improvement (OGAI) design process, including an announcement of the group of community stakeholder members formed to develop an OGAI design concept. After four stakeholder group meetings and one public input meeting, a design concept was created and refined. The resulting design concept reflects the input received.

While portions of the OGAI design concept matched, or were very similar to, the HWP Master Plan, some components changed in design, location, or both. This is most evident in the elimination of the two formerly proposed sports fields and the related parking lot expansion (i.e., Sycamore Grove Field). Other proposed design changes included the proposed location of a park restroom and the proposed modifications to the disc golf course footprint to eliminate conflicts. The proposed Berkshire Creek Area Improvements Project is more limited in physical extent than the OGAI design concept. Specifically, the Berkshire Creek Area Improvements Project includes enhancements within approximately the southern third of the Oak Grove area and focuses on repairing Berkshire Creek and improving habitat values and recreation resources in areas to the north and south of the creek.

Based on the substantive difference between the proposed Project and the improvements to the Oak Grove area included in the HWP Master Plan, the CEQA review for the Project is not being tiered from the Master Plan Master Environmental Impact Report (EIR). Moreover, despite the proposed Project's geographic proximity to other improvement projects called for in the OGAI design concept, the proposed project is independent and distinct from such improvement projects in terms of purpose, utility, and function and, thus, is being evaluated with its own CEQA document.

In November 2017, it should be noted, that the County of Los Angeles Board of Supervisors approved a reduced-scale version of the Devil's Gate Reservoir Sediment Removal and Management Project (Devil's Gate Project). The Devil's Gate Reservoir and Dam is located adjacent to the east of the OGAI Project (see Exhibit 1). The Devil's Gate Project began implementation in November 2018. Additionally, a separate Habitat Restoration Project was implemented by the City in early 2019 as a separate action to accommodate near-term grant funding deadlines. The Habitat Restoration Project was prepared consistent with the HWP Master Plan and OGAI design concept and encompassed the central third of the Oak Grove area.

Project Components

The primary goal of the Project is to improve the ecological, hydrological, and recreational conditions throughout the lower third of the Oak Grove area. This would be achieved by addressing the degraded conditions downstream of the Berkshire Place Storm Drain No. 12 storm drain outlet, defined as Berkshire Drain in the HWP Master Plan; replacing asphalt with a permeable surface and native meadow garden at the equestrian picnic area; installing interpretive signage; and conducting habitat restoration. Exhibit 3, Proposed Project Components, illustrates the location and extent of the areas proposed to be enhanced with Project implementation. For clarity in this Initial Study/Mitigated Negative Declaration (IS/MND), the Project has been broken down into three components, and each is described below: (1) Berkshire Creek restoration, (2) equestrian picnic area improvements, and (3) California sage scrub (CSS) and oak woodland habitat restoration.

Berkshire Creek Restoration

As discussed in the HWP Master Plan, the Berkshire Drain is a five-foot-diameter (60-inch-diameter) concrete drain that discharges immediately west of the service road that runs south from a location near the Oak Grove Maintenance Office. This storm drain discharge has created the scoured soft-bottom drainage area referred to as Berkshire Creek. The Berkshire Drain crosses under the service road as a 30-inch-diameter concrete drain. The past widening and realignment of Oak Grove Drive increased the number of drain inlets and the volume of surface area contributing runoff into these drains, which include the Berkshire Drain. This, in turn, increased the volume of runoff being released at these drains. At the Berkshire Drain, these changes have resulted in excessive damage to the existing conditions downstream of the outfall (i.e., Berkshire Creek). The damage includes flooding on the adjacent service road and the trail crossing across the creek, severe erosion in Berkshire Creek, and water pollution in the creek and downstream at the Devil's Gate basin. This outlet drains a portion of the Foothill Freeway, Oak Grove Drive, and Berkshire Place; the adjacent church parking lot; and portions of the La Cañada High School property (Pasadena 2003). Berkshire Drain currently drains an approximate 59-acre watershed, as shown on Exhibit 4, Berkshire Creek Watershed. Exhibit 4 also illustrates that the Berkshire Creek watershed is within and near the southern boundary of the larger Upper Arroyo Seco Watershed.

The condition of Berkshire Creek remains largely unchanged from the general description contained in the adopted HWP Master Plan. However, in the years since adoption of the HWP Master Plan, erosion in the creek has worsened. The Project proposes to implement the HWP Master Plan recommendation that the outlet location be extended downstream allowing the damage to the creek, downstream of the current outlet, repaired. In addition to the engineering concept to manage outlet flow rates and locations, the approximate 0.41-acre Berkshire Creek restoration area includes installation of a multi-use bridge crossing and riparian habitat restoration. Exhibit 5, Berkshire Creek Concept Plan View, illustrates the proposed engineering concept; and Exhibit 6, Berkshire Creek Concept Rendering, illustrates a cross-section view of the proposed Project.

The proposed engineering concept would replace the existing 30-inch-diameter drain pipe beneath the surface road with two separate drain pipes with different sizes, lengths, angles, and outfall locations, one for low flows and one for high flows. The low flow outlet has been sized to convey the volume and velocity of runoff that would have occurred within the Berkshire Drain watershed prior to land development. The low flow drain would consist of approximately 49 linear feet (lf) of 24-inch-diameter reinforced concrete pipe (RCP) at a shallow grade that would outlet immediately downstream of the service road. The high flow drain would consist of approximately 45 feet (ft) of 48-inch diameter RCP at a steeper grade connecting to a 7-ft diameter precast concrete manhole, situated near the low flow outfall, which then connects to approximately 170 lf of a 5-ft-wide by 2-ft-high segmental precast concrete box culvert. The box culvert would follow the existing drainage path of Berkshire Creek and outlet approximately 50 ft downstream of the proposed multi-use bridge crossing (discussed further below). This high flow outlet represents extending the outlet location downstream, as described in the HWP Master Plan, and consequently allowing for habitat restoration to repair the damage within the incised creek bed. An arroyo stone apron would be placed at the high-flow outlet to reduce runoff velocity and thereby protect the stream bed from further erosion. The service road would be reconstructed once the new drainage infrastructure beneath the road is installed.

After installation of the high-flow box culvert, the creek bed would be raised through placement of approximately 870 cubic yards (cy) of earth material to repair the incised condition and provide slope stabilization in preparation for habitat restoration. The banks of the newly contoured creek would be covered in jute mesh or a similar product that can allow native plant installation and is biodegradable. This material would be covered with topsoil and mulch and would not be visible at the surface; however, it would help reduce surficial erosion while the newly installed plants are established.

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Proposed Project Components

Exhibit 3

Berkshire Creek Area Improvements Project

N W E S

150 75 0 150 Feet

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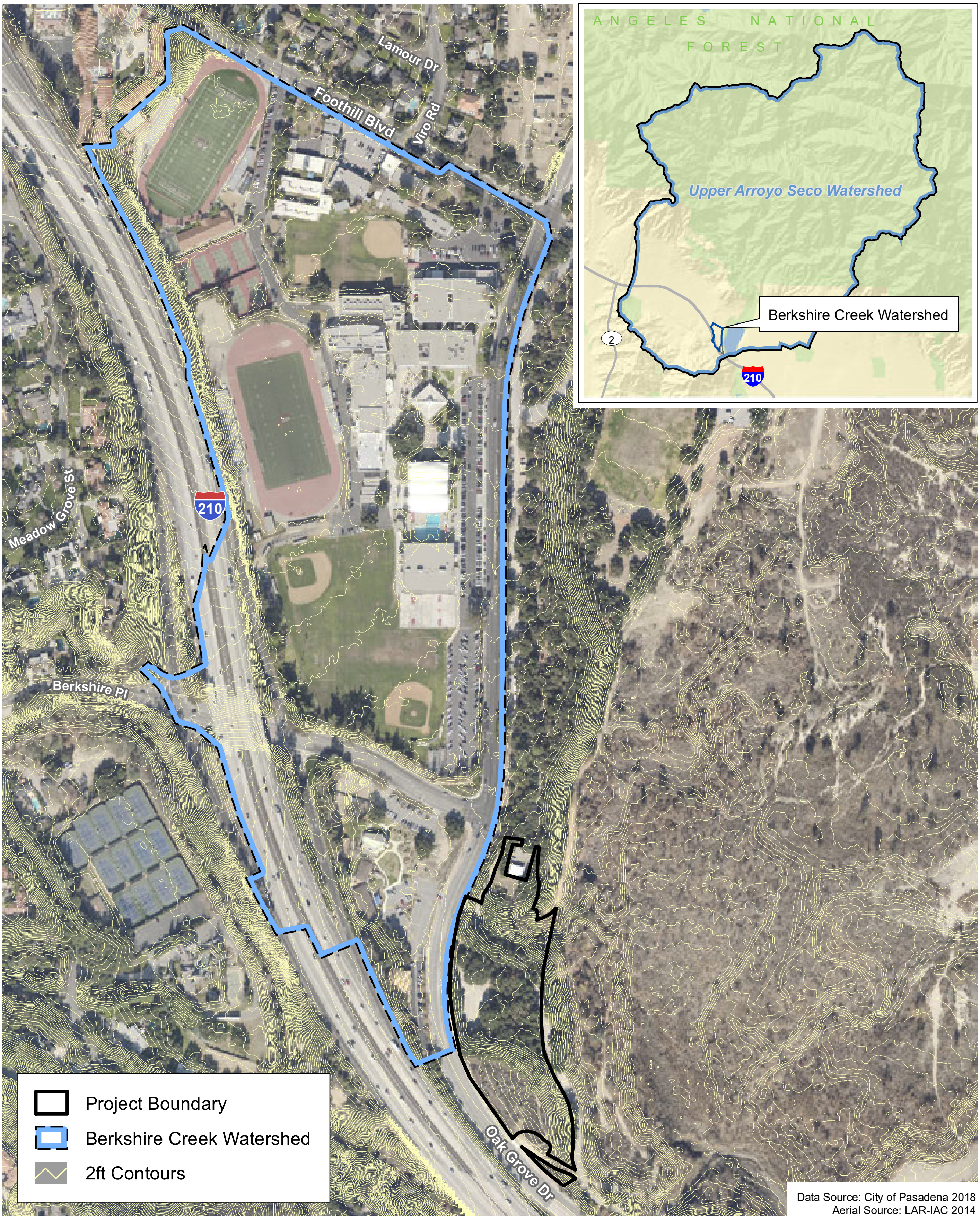

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Berkshire Creek Watershed

Exhibit 4

Berkshire Creek Area Improvements Project

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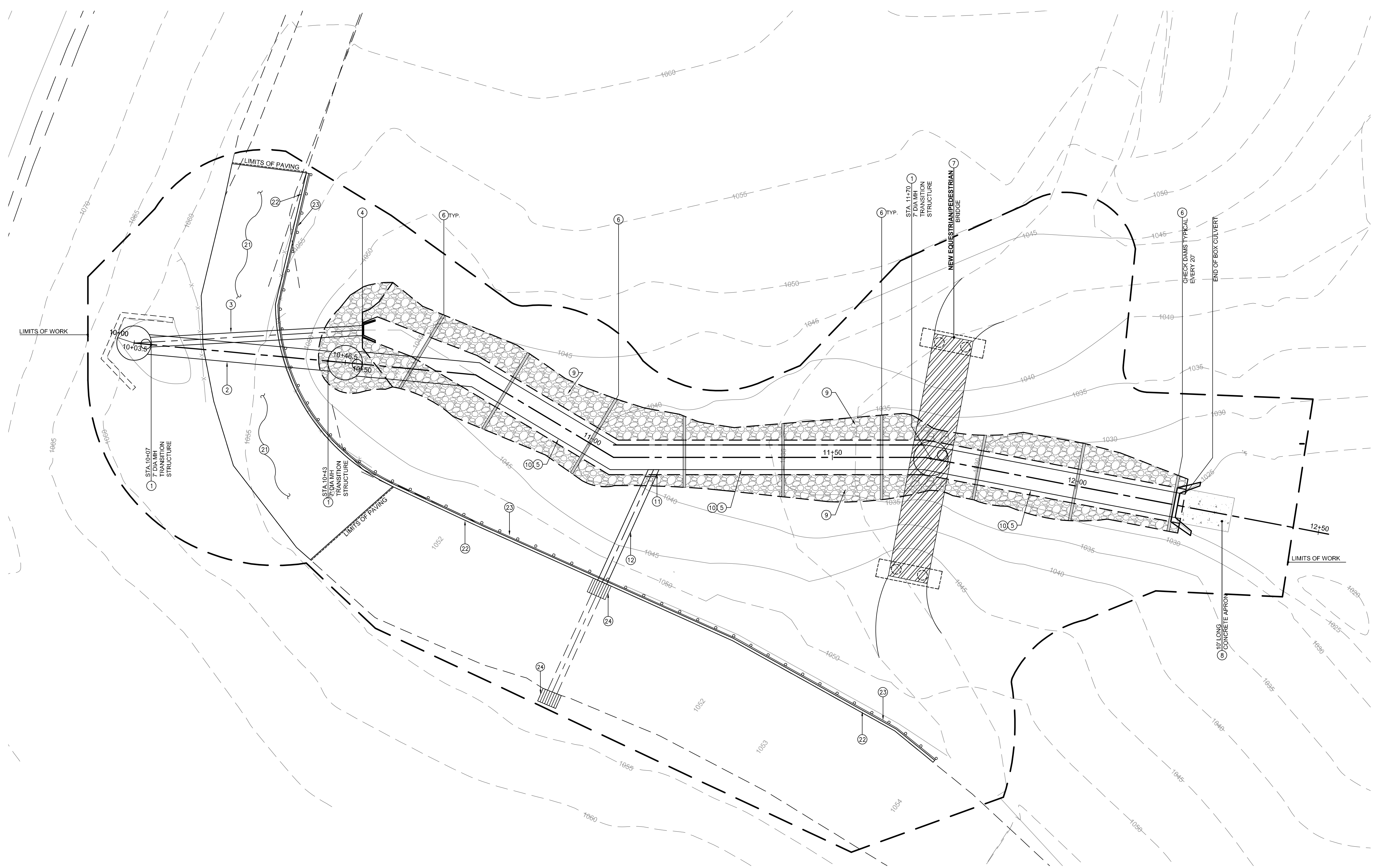

CONSTRUCTION NOTES

CREEK IMPROVEMENTS

1. CONSTRUCT 7' DIA MH TRANSITION STRUCTURE SEE DETAIL 1, SHEET XX FOR DETAILS
2. CONSTRUCT 48" RCP SEE PROFILE ON SHEET XX AND DETAIL 2, SHEET XX FOR DETAILS
3. CONSTRUCT 24" RCP SEE PROFILE ON SHEET XX AND DETAIL 2, SHEET XX FOR DETAILS
4. CONSTRUCT CONCRETE HEADWALL SEE DETAIL 3, SHEET XX FOR DETAILS
5. CONSTRUCT 5'X2' CONCRETE BOX CULVERT SEE DETAIL 4, SHEET XX FOR DETAILS
6. CONSTRUCT GRADE CONTROL STRUCTURE SEE DETAIL 5, SHEET XX FOR DETAILS
7. CONSTRUCT EQUESTIAN BRIDGE SEE STRUCTURAL PLANS, SHEET XX FOR DETAILS
8. CONSTRUCT CONCRETE APRON WITH LARGE BOULDERS (24" TO 48") SEEDETAIL 6, SHEET XX FOR DETAILS
9. INSTALL MEDIUM SIZE BOULDERS FOR BANKS OF CREEK (18" TO 24")
10. INSTALL RIVER ROCK (3" TO 12") FOR BOTTOM OF CREEK BED
11. CONSTRUCT PIPE TRANSITION TO BOX CULVERT
12. CONSTRUCT 18" RCP SD LATERAL

ROAD IMPROVEMENTS

21. CONSTRUCT 4" ASPHALT ON 4" CMB PAVEMENT SEE DETAIL X, SHEET XX FOR DETAILS (EXISTING 3" AC & NO BASE)
22. CONSTRUCT 6" CONCRETE CURB SEE DETAIL X, SHEET XX FOR DETAILS
23. CONSTRUCT TIMBER BARRIER ON POST AND FOOTINGS SEE DETAILS X, SHEET XX
24. CONSTRUCT 24" X 24" GRATE INLET SEE DETAIL X, SHEET XX FOR DETAILS
25. CONSTRUCT CONCRETE TRANSITION TO GRATE

Source: City of Pasadena 2019

Berkshire Creek Concept Plan View

Exhibit 5

Berkshire Creek Area Improvements Project

N
W E
S

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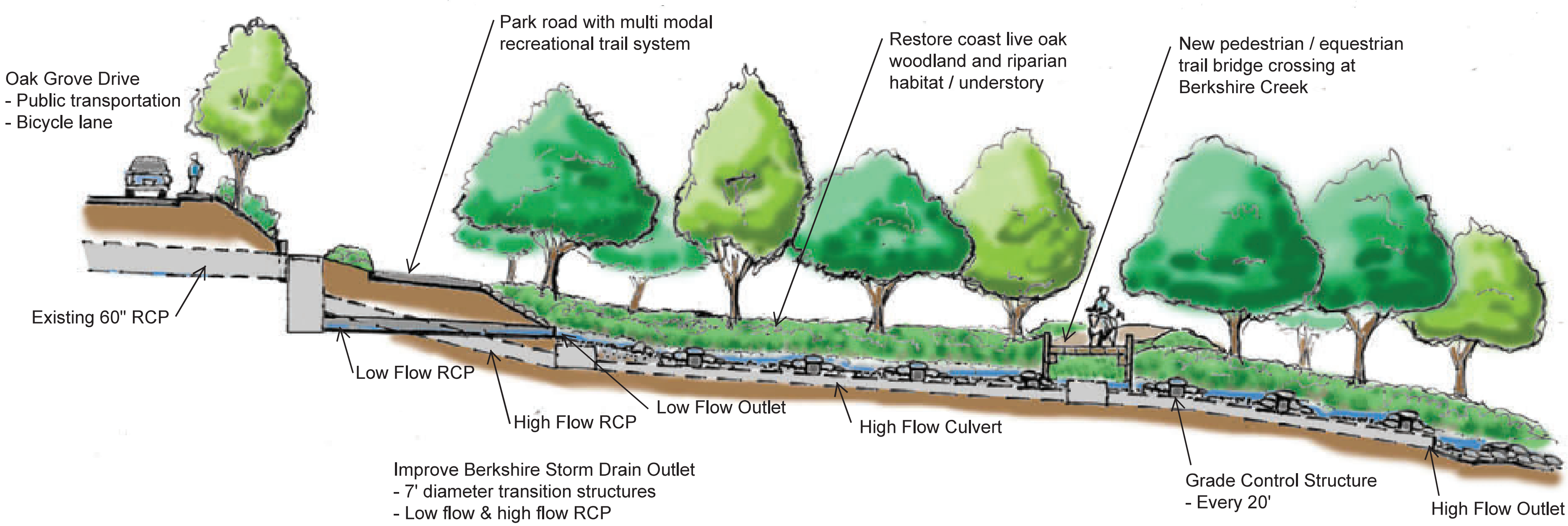

Source: City of Pasadena 2019

Berkshire Creek Concept Rendering

Exhibit 6

Berkshire Creek Area Improvements Project

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A grade control structure with an approximate two-foot step height would be installed at the surface, approximately every 20 ft from the low flow outlet to the end of the Berkshire Creek drainage, within City jurisdiction, to help reduce surface water runoff velocity that could result in erosion of restored habitat. The grade control structures would be constructed of cast-in-place concrete and camouflaged with Arroyo Stone, drawn from an existing stockpile that has been collected over more than 20 years by the City of Pasadena and used in City projects only. Eventually, the grade control structures would be mostly covered in silt and sand conveyed in the low-flow (i.e., surface) runoff, further improving the stabilization and naturalization of the creek. The same stone would be used to armor (i.e., protect) the channel bottom and side slopes to a height just above the modeled peak flood stage. The Berkshire Creek restoration concept, including use of materials, is intended to present a naturalized visual and ecological condition at the surface while adequately managing the high runoff volumes and velocities that occur at the Berkshire Drain outlet.

This engineering concept would stabilize Berkshire Creek and create sustainable long-term hydrologic conditions consistent with the hydrologic regime present in the Berkshire Creek watershed prior to land development (i.e., impervious surfaces). These improvements, in turn, would enhance water quality compared to the current condition, allowing for riparian habitat restoration by reducing surface flows that scour the creek, and eliminating flooding on the service road and the Berkshire Creek trail crossing. The elimination of flooding also increases accessibility and safety for park users during the wet season.

As shown on Exhibits 5 and 6, a bridge would be installed over Berkshire Creek, approximately 100 ft downstream of the low flow outfall and immediately upstream of the high flow outfall, in a location similar to the existing Berkshire Creek trail crossing. The segments of the Perimeter Trail extending from the proposed bridge on either side would be adjusted slightly, if needed, to smoothly connect the paths. The proposed bridge would be a glulam[1]-supported timber structure with the abutments likely placed on spread footings, 8 ft in width and 50 ft in length. The bridge would be multi-purpose, accommodating pedestrians and equestrians, but not motor vehicles. The bridge design would be based on a National Forest Service standard plan for a glulam stringer trail bridge. Details of bridge design and selection of materials for the bridge surface that are appropriate and/or preferred for equestrian passage and to ensure appropriate maintenance have been considered. This bridge is intended to improve the Oak Grove area trail experience and provide the all-weather route at Berkshire Creek described in the HWP Master Plan.

The Berkshire Creek component of the Project would also include restoration of an approximate 0.41-acre of riparian habitat. Because of the steep and scoured slopes present on the banks of Berkshire Creek, native plant species have had difficulty establishing, apart from several mature coast live oaks (*Quercus agrifolia*) at the top of the stream bank. However, non-native species have established readily in this area. The riparian habitat restoration activities would involve:

- Establishment of up to 10 new willows (*Salix* sp.), 10 new sycamores (*Platanus racemosa*), and 15 new oaks (*Quercus* sp.) via the direct sowing of locally-collected oak acorns and the planting of oak seedlings in protective exclosures (cages) with subterranean root guards. The new oaks include locations where large oak trees have been lost to wind storms and/or pest problems; where recruitment is lacking or insufficient for the oak woodland to persist; and where proposed native (4 trees) and non-native (50 trees/saplings) would be removed for this component of the Project.
    a. Each oak exclosure installation is assumed to involve an 8-foot diameter disturbance area.

[1] Glued laminated timber, also called glulam, is a type of structural engineered wood product comprising several layers of dimensional lumber bonded together with durable, moisture-resistant structural adhesives.

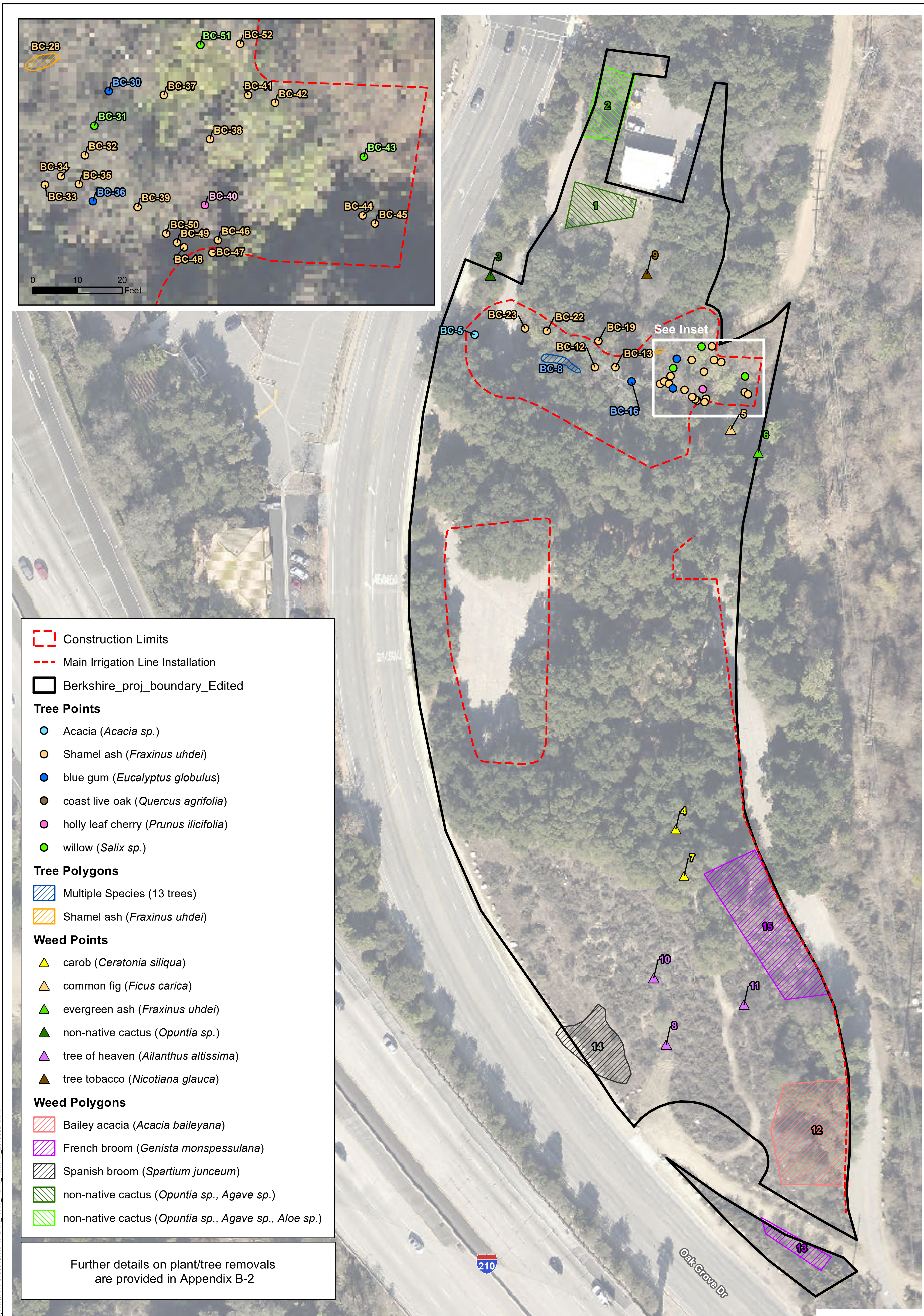
- Establishment of native understory plant species, including up to 200 shrub and herbaceous container plants propagated from cuttings/seeds of local genetic origin.
    a. The understory planting activity is assumed to involve an approximate 0.41-acre disturbance area.
- Installation of a new irrigation system and aboveground electrical box to support the restored habitat.
    a. Irrigation system installation is assumed to involve a 4-foot-wide disturbance area for trenching the approximate 820-lf main line, and a 2-foot-wide disturbance area for trenching the lateral lines. All other irrigation components (e.g., bubblers, flow sensors, valves) would be within the disturbance area assumed for the understory planting.
- Non-native plant species removal, including a total of 50 non-native trees/saplings as well as weedy shrubs/herbs/grasses. Refer to Exhibit 7, Proposed Tree and Plant Removals, for removal locations, delineated with a red dot.
    a. Removal of trees is assumed to involve an 8-foot diameter disturbance area, which represents an average of the disturbance occurring from removal of varying sized trees.
    b. Non-native tree species to be removed include: Bailey acacia (*Acacia baileyana*), Eucalyptus (*Eucalyptus globulus*), palm (*Washingtonia robusta*), and shamel ash (*Fraxinus uhdei*). These non-native tree removals would reduce further spread of invasive species in the Project areas.

Equestrian Picnic Area Improvements

In the equestrian picnic area, the asphalt paving would be removed and replaced with a permeable material, such as gravel, within a smaller footprint that continues to provide adequate parking in this area of the park based on use patterns in recent years. The southernmost portion of the existing asphalt lot would be converted to a native meadow garden. This area is the low point of the existing paving and runoff currently pools in this area. The existing asphalt lot covers approximately 14,500 square ft (sf), and the proposed permeable parking lot and meadow garden would cover approximately 11,700 sf. One purpose of reducing the paved area is to create additional area of oak woodland habitat, which is discussed further below. In addition, sections of asphalt along the trail extending to the southeast from the southeast corner of the equestrian picnic area would be removed.

California Sage Scrub and Oak Woodland Habitat Restoration

Within in the remainder of the site, outside of the Berkshire Creek component and the hardscape changes described above, the Project would implement habitat restoration. The existing oak woodland areas on the Project site include numerous mature coast live oak trees (*Quercus agrifolia* var. *agrifolia*), as well as other native oak tree and shrub species, and natural oak hybrids. As is often the case in California's woodland habitats, much of the OGAI oak woodland restoration area is currently deficient in: (1) smaller oak individuals (i.e., there is insufficient 'recruitment' of oak seedlings and saplings of various age classes to provide mature trees for the future); and (2) native understory vegetation (i.e., shrubs, vines, perennials) that provides important ecological values including wildlife food and cover resources. Instead of a native understory, the majority of the oak woodland currently supports invasive weedy herbs and grasses at ground level, while other areas have only bare ground between the trunks of the oaks. For these reasons, restoration activities are proposed to improve oak woodland habitat quality and resulting ecological values within the Project site. The existing CSS is in relatively good quality, particularly with its location adjacent to a major road and a heavily used recreation area. The presence of volunteer trails and some non-native plant establishment are the primary adverse conditions within the Sunrise Overlook area, which is the slope and prominence at the southern end of the site along Oak Grove Drive.



Proposed Tree and Plant Removals

Exhibit 7

Berkshire Creek Area Improvements Project

N W E S

75 37.5 0 75 Feet

PSOMAS

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Specifically, the Project would restore and protect approximately 2.55 acres of oak woodland habitat and approximately 0.72 acres of CSS habitat. While the majority of the Oak Grove area is comprised of oak woodland habitat, Sunrise Overlook's southern exposure has supported the development of CSS habitat. Generally, habitat restoration would encompass replacement of non-native plant species with native, locally-appropriate species and temporary erosion control measures, such as straw wattles and mulching. Areas adversely affected by human activity, such as by volunteer trails, would be restored by eliminating the trail and installing new plants. Additionally, an estimated 3 to 4 interpretive signs and 6 to 7 trail signs would be installed in and around the newly restored habitat and improved trails to provide park user education and foster stewardship of the restored areas. The signage design and installation would be consistent with the HWP Master Plan.

The oak woodland and CSS habitat restoration activities would involve:

- Restoration of an approximate 2.64-acre oak woodland area through establishment of up to 55 new oaks via the direct sowing of locally-collected oak acorns and the planting of oak seedlings in protective exclosures (cages) with subterranean root guards. The new oaks include locations where large oak trees have been lost to wind storms and/or pest problems and where recruitment is lacking or insufficient for the oak woodland to persist.
    a. Each oak exclosure installation is assumed to involve an 8-foot diameter disturbance area.

- Restoration of an approximate 0.73-acre CSS area via establishment of appropriate native plant species through the collection and broadcast of seeds of local genetic origin throughout the coastal sage scrub area.
    a. Within the 0.73-acre CSS area, the understory planting activity would occur within a 0.42-acre disturbance area.

- Installation of a new irrigation system and aboveground electrical box to support the restored habitat.
    a. Irrigation system installation is assumed to involve a 4-foot-wide disturbance area for trenching the approximately 820-lf main line, and a 2-foot-wide disturbance area for trenching the lateral lines. All other irrigation components (e.g., bubblers, flow sensors, valves) would be within the disturbance area assumed for the understory planting.

- Non-native plant species removal, including a total of 31 non-native trees/saplings; 80 non-native plants, including two large non-native cactus patches (*Opuntia* sp., *Agave* sp., and/or *Aloe* sp.), one individual non-native cactus plant (*Opuntia* sp.), and other selected non-native invasive species; and weedy shrubs/herbs/grasses. Refer to Exhibit 7 for all tree and plant removal locations.
    a. Removal of trees/cactus is assumed to involve an 8-foot diameter disturbance area, which represents an average of the disturbance occurring from removal of varying sized trees.
    b. Non-native tree species to be removed include: Bailey acacia (*Acacia baileyana*), carob (*Ceratonia siliqua*), common fig (*Ficus carica*), tree of heaven (*Ailanthus altissima*), and shamel ash (*Fraxinus uhdei*). These non-native tree removals would reduce further spread of invasive species in the Project areas.

Construction Activities

The proposed Project would be constructed beginning in Fall 2019 over a period of three months and would be completed in a single phase. Because the Project includes discrete activities across a moderately-sized geographic area, it is expected that some or all these components would be completed separately and/or sequentially. However, to provide both flexibility for the City during Project implementation and a worst-case scenario for environmental analysis, this IS/MND assumes that completion of the proposed components would all start together and overlap.

Construction and demolition debris and soil to be exported would be disposed at Scholl Canyon Landfill, located approximately 8 miles from the site, at 3001 Scholl Canyon Road in Glendale. Project construction is anticipated to occur from Monday through Saturday, without activity on Sundays or federal holidays, within an 8-hour period between the hours of 7:00 AM to 7:00 PM Monday through Friday and 8:00 AM to 5:00 PM on Saturday. Also, consistent with the City's *Construction and Demolition Waste Management Ordinance* (Section 8.62 et. seq. of the PMC), a minimum of 75 percent of the construction and demolition debris generated during construction would be diverted through recycling or reuse.

Large construction equipment would be transported to the Project site on a semi-trailer and would include equipment such as a small excavator using various attachments (e.g., breaker, bucket), truck-mounted drill rig, small crane, trenching machine, chipper, paver, and self-propelled roller. Construction materials would also be transported to the site, as needed, from a temporary storage location in a City-owned maintenance yard and transported on either a semi-trailer or in trucks. Private construction worker vehicles/pickup trucks would arrive and depart the Project site each workday. Equipment staging and parking for construction workers would be within City of Pasadena property, either on the equestrian picnic area parking lot (prior to asphalt replacement) or on the maintenance access road located generally parallel to the south side of Berkshire Creek. Construction would not require staging along adjacent public roadways or other areas that would disrupt existing traffic patterns. The main point of ingress and egress for construction traffic, including import and export of materials, would be via the nearest public access on Oak Grove Drive, immediately north of the intersection with Berkshire Place.

The buffers used to estimate the disturbance area for habitat restoration are conservative and anticipated to overstate the physical disturbance that would occur. For instance, approximately 20 percent of the 35-foot by 35-foot understory planting area would be subject to physical disturbance, including both container plant installation and related irrigation infrastructure. The oak exclosures would be 18 inches in diameter, within an 8-foot diameter disturbance area. Table 1-1, Summary of Disturbance Areas, identifies the estimated physical footprint, or ground area to be disturbed, for all Project components.

TABLE 1-1
SUMMARY OF DISTURBANCE AREAS

Activity	Estimated Disturbance Area
Berkshire Creek Restoration	0.42
Equestrian Picnic Area Improvements	0.36
Oak Woodland and California Sage Scrub Habitat Restoration	3.37
Total	**4.15**
sf: square feet; ac: acres	

Details of the construction scenario for the Berkshire Creek restoration, the equestrian picnic area improvements, and the CDD and oak woodland habitat restoration activities are provided below.

Berkshire Creek Restoration

Demolition of existing infrastructure beneath the park road and in the creek bed would generate approximately 215-cy of materials requiring approximately 21 truck trips (round trip), assuming the use of 10-cy trucks, for disposal or diversion over an estimated two working days. Installation of the proposed storm water infrastructure and bridge would involve approximately 175 cy of grading, that would be redistributed evenly at the surface within the Berkshire Creek area; 4 truckloads of concrete; 28 truckloads of materials (of which 10 truckloads would be delivered at the beginning of construction); 70 tons of asphalt requiring 6 truck trips; and importing of 870 cy of soil to infill Berkshire Creek. These construction activities would occur over approximately 8 weeks and represent the most intensive portion of the Project construction activities.

Equestrian Picnic Area Improvements

Demolition of the equestrian picnic area lot and asphalt removal on the trail would generate approximately 180 cy of asphalt and substrate requiring approximately 18 truck trips for disposal or diversion over an estimated 2 working days. The trail surface would be lightly graded to provide a safe walking or riding surface. Reconstruction of the parking lot with a permeable surface and native meadow garden would involve approximately 150 cy of additional earthmoving that would require off-site disposal. A total of approximately 300 cy of materials would be imported and installed to bring the new permeable surface to the same grade as the surrounding surface areas. This would involve a total of approximately 45 truck trips over an estimated 4 working days.

California Sage Scrub and Oak Woodland Habitat Restoration

All habitat restoration activities would be performed with hand tools (i.e., manual, non-powered, or powered), such as chain saws, weed cutters, and walk-behind/hand held trencher, except possibly the non-native cactus removals. These may be removed using a small tractor or similar equipment due to the large size of the cactus patch and difficulty in handling the removed material. Soils generated by shallow excavation, such as for the irrigation system installation, tree planting, and signage installation, would be redistributed evenly at the surface within the Project site. Habitat restoration would result in a limited volume of earthmoving. This would include approximately 0.03 ac of grading for irrigation system installation and 3 to 4 cy of grading to eliminate volunteer trails and reestablish the primary trail within Sunrise Overlook and install permanent trail and interpretive signs.

<u>Operations</u>

The proposed Project has been designed to provide improved physical facilities and open space resources to existing users of the Oak Grove area of the HWP and is not anticipated to increase use of the park. The same amount of parking and internal roads as well as the same type and extent of facilities would be provided. As such, operation of the Project would be essentially the same as the existing condition, with the exception that some areas may need less frequent maintenance.

<u>City Discretionary Actions</u>

The proposed Project would require the following discretionary approvals by the City of Pasadena:

- Approval of the Berkshire Creek Area Improvements Project;
- Adoption of the Berkshire Creek Area Improvements Project Initial Study/ Mitigated Negative Declaration; and
- Award of contract for construction of the Berkshire Creek Area Improvements Project.

In addition, the Urban Forestry Advisory Committee would review the Project's proposed public tree removals.

9. Surrounding Land Uses and Setting:

Exhibits 1 and 2 illustrate the Project site location and surrounding uses. Oak Grove Drive and educational land uses – Hillside School & Learning Center and the La Cañada United Methodist Church – are located immediately to the west across Oak Grove Drive. La Cañada High School and St. Francis High School are located to the northwest of the site. The Oak Grove Maintenance Office (OGMO) is situated at the northern boundary of the site, with habitat restoration activities located adjacent to the east, south, and west of this facility. A portion of the larger Arroyo Seco trail system is situated through and around the Project site, providing passive recreation for pedestrian and equestrian users. The Devil's Gate basin and dam is located immediately to the east; and Flint Wash Bridge, Oak Grove Drive, and I-210 are located immediately to the south and southwest.

10. Other public agencies whose approval is required:

- California Department of Fish and Wildlife (California Fish and Game Code);
- California Department of Water Resources (grant funding);
- Los Angeles Regional Water Quality Control Board (Clean Water Act); and
- U.S. Army Corps of Engineers (Clean Water Act);

This IS/MND is intended to serve as the primary environmental document pursuant to CEQA for actions associated with the proposed Project, including all discretionary approvals required to implement the Project. In addition, this IS/MND is the primary reference document for the formulation and implementation of a mitigation monitoring and reporting program for the Project, in accordance with Section 15097 of the State CEQA Guidelines.

11. Have California Native American tribes traditionally and culturally affiliated with the project area requested consultation pursuant to Public Resource Code Section 21080.3.1? If so, has consultation begun?

Consultation pursuant to Section 21080.3.1 of the *Public Resources Code* and Assembly Bill (AB) 52 was initiated and has been completed with the California Native American tribe affiliated with the City of Pasadena, and who has requested consultation. Refer to Section 2.18, Tribal Cultural Resources, of this IS/MND for a complete discussion of the Native American consultation process for the Project.

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

	Aesthetics		Greenhouse Gas Emissions		Public Services
	Agricultural Resources		Hazards and Hazardous Materials		Recreation
	Air Quality		Hydrology and Water Quality		Transportation/Traffic
	Biological Resources		Land Use and Planning		Tribal Cultural Resources
	Cultural Resources		Mineral Resources		Utilities and Service Systems
	Energy		Noise		Wildfire
	Geology and Soils		Population and Housing		Mandatory Findings of Significance

DETERMINATION: (to be completed by the Lead Agency)

On the basis of this initial evaluation:

I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.	
I find that, although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because the mitigation measures described on an attached sheet have been added to the project. A MITIGATED NEGATIVE DECLARATION will be prepared.	X
I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.	
I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment., but at least effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards , and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.	
I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.	

Jillian K Neary 5/23/19
Prepared By Date
Jillian K Neary
Printed Name

Brent Maue 5/23/19
Reviewed By Date
Brent Maue
Printed Name

Negative Declaration/Mitigated Negative Declaration adopted on: ________________

Adoption attested to by: ________________________ ________________
Signature Date

____
Printed Name

EVALUATION OF ENVIRONMENTAL IMPACTS:

1) A brief explanation is required for all answers except “No Impact” answers that are adequately supported by the information sources a lead agency cites in the parentheses following each question. A “No Impact” answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g., the project falls outside a fault rupture zone). A “No Impact” answer should be explained where it is based on project-specific factors as well as general standards (e.g., the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).

2) All answers must take account of the whole action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.

3) Once the lead agency has determined that a particular physical impact may occur, then the checklist answers must indicate whether the impact is potentially significant, less than significant with mitigation, or less than significant. “ Potentially Significant Impact’ is appropriate if there is substantial evidence that an effect is significant. If there are one or more “Potentially Significant Impact” entries when the determination is made, an EIR is required.

4) “Negative Declaration: Less Than Significant With Mitigation Incorporated” applies where the incorporation of mitigation measures has reduced an effect from “Potentially Significant Unless Mitigation Incorporated” applies where the incorporation of mitigation measures has reduced an effect from “Potentially Significant Impact” to a “Less than Significant Impact.” The Lead Agency must describe the mitigation measures and briefly explain how they reduce the effect to a less than significant level (mitigation measures from Section 21, “Earlier Analysis,” may be cross-referenced).

5) Earlier analysis may be used where, pursuant to the tiering, program EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR or negative declaration. See CEQA Guidelines Section 15063(c)(3)(D). Earlier analyses are discussed in Section 21 at the end of the checklist.

   a) Earlier Analysis Used. Identify and state where they are available for review.

   b) Impacts Adequately Addressed. Identify which effects from the above checklist were within the scope of and adequately analyzed in an earlier document pursuant to applicable legal standards, and state whether such effects were addressed by mitigation measures based on the earlier analysis.

   c) Mitigation Measures. For effects that are “less than Significant with Mitigation Measures Incorporated,” describe the mitigation measures which were incorporated or refined from the earlier documents and the extent to which address site-specific conditions for the project.

6) Lead agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (e.g., general plans, zoning ordinances). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated.

7) Supporting Information Sources: A source list should be attached, and other sources used or individuals contacted should be cited in the discussion.

8) The explanation of each issue should identify:

   a) The significance criteria or threshold, if any, used to evaluate each question; and

   b) The mitigation measure identified, if any, to reduce the impact to less than significant

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SECTION 2.0 ENVIRONMENTAL CHECKLIST FORM

2.1 AESTHETICS

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
a) Have a substantial adverse effect on a scenic vista?	☐	☐	☒	☐

WHY? A scenic vista is defined as a viewpoint that provides panoramic or focused views of a highly valued landscape or scenic resource for the benefit of the general public. The EIR for the Pasadena General Plan provides the following description of the existing scenic features and visual resources in the City: "The City of Pasadena affords a variety of views of scenic landscapes and built environments. The San Gabriel Mountains, near the north City boundary, dominate the skyline from most of the City. The San Rafael Hills are along the western City boundary, and the Verdugo Mountains are further to the west. In addition, the Arroyo Seco corridor and Eaton Canyon traverse the western and eastern portions of the City, respectively. The City also offers scenic views of distinct architecture in the built environment, such as the Old Pasadena Historic District, Pasadena City Hall, Castle Green, St. Andrew Catholic Church bell tower, and Bungalow Heaven" (City of Pasadena 2015a). For purposes of this analysis, views by visitors within the Oak Grove area of the HMP are considered views of a valued landscape and thus a scenic vista.

Although the Project would not introduce large or otherwise view-obscuring structures into the landscape, it would construct a new bridge crossing and storm water infrastructure at Berkshire Creek; remove and replace paving at the equestrian picnic area; and restore habitat throughout the Project. The built structures at Berkshire Creek or the other Project components would not exceed the height of existing trees in the Oak Grove area. However, a total of 81 non-native trees/saplings and 4 native trees would be removed as part of Project implementation; approximately 90 new native tree planting locations would be part of habitat restoration activities. The native trees removals are within the Berkshire Creek impact footprint must occur to accommodate the new storm water infrastructure and bridge crossing. The Berkshire Creek engineering design was planned to avoid native trees to the maximum extent feasible. However, due to the dense existing vegetation in this area combined with the short drainage distance to manage high storm flows and steep banks along the creek, a limited number of native tree removals became unavoidable.

Tree removals could create visual breaks in the tree canopy while new native trees grow to an average size, which can require between approximately 10 to 20 years, depending on the tree species installed (e.g., willows grow much faster than oaks) and site-specific weather conditions in the future. In the interim, views in and of portions of the Oak Grove area would be altered by intermittent canopy openings, immature trees and/or shrubs/understory vegetation, and changes to existing built features. Such view alterations may be considered visually unattractive to some viewers. However, the intent of the proposed Project is to improve the long-term visual quality of the area, particularly along Berkshire Creek that presently exhibits a highly degraded condition. This would be accomplished by removing existing visible, damaged, man-made infrastructure, such as corrugated pipe ends, and installing new infrastructure that would either be largely underground (i.e., the high-flow box culvert) or disguised with a surface treatment of Arroyo Stone.

As discussed in Section 1.0, Project Information, grade control structures with an approximate two-foot step height would be installed at the surface approximately every 20 ft from the low flow outlet to the end of the Berkshire Creek drainage, within City jurisdiction, to help reduce surface water runoff velocity that could result in erosion of restored habitat. The grade control structures would be constructed of cast-in-place concrete and camouflaged with Arroyo Stone, drawn from an existing stockpile that has been collected over more than 20 years by the City and used for City projects only. Eventually, the grade control structures would be mostly covered in silt and sand conveyed in the low-flow (i.e., surface) runoff, further improving the stabilization and naturalization of the creek. The same stone would be used to armor (i.e., protect) the channel bottom and side slopes to a height just above the modeled peak flood stage. The high-flow culvert outlet would be located downstream of the proposed bridge crossing, and therefore not be visible from the bridge or proximate segments of trail. The Berkshire Creek restoration concept, including use of materials, is intended to present a naturalized visual and ecological condition at the surface while adequately managing the high runoff volumes and velocities that occur at the Berkshire Drain outlet. The proposed bridge would be a glulam[2]-supported timber structure, and the proposed design is based on a National Forest Service standard plan. An improved long-term visual condition at the equestrian picnic area would be accomplished by removing asphalt paving in the equestrian picnic area and trail connection and replacing it with gravel and a native meadow garden (both with greater natural visual features compared to the existing condition). Also, the size of the gravel replacement lot would be slightly smaller than the existing lot to allow for expansion of the surrounding oak woodland vegetation. Additionally, an estimated 3 to 4 interpretive signs and 6 to 7 trail signs would be installed in and around the newly restored habitat and improved trails to provide park user education and foster stewardship of the restored areas. The signage design and installation would be consistent with the HWP Master Plan.

Visual simulations have been prepared for the Berkshire Creek and equestrian picnic area components of the Project. Exhibit 8, Visual Simulation of Berkshire Creek Restoration Looking Northwest; and Exhibit 9, Visual Simulation of Berkshire Creek Restoration Looking East, provide a comparison of the existing view and a rendering of the proposed view of Berkshire Creek. Exhibit 10 Visual Simulation of Equestrian Picnic Area Improvements Looking Southwest, provides a comparison of the existing view and a rendering of the proposed view of the equestrian picnic area lot with implementation of the proposed Project. Although there would be short-term changes in visual quality that some may find unattractive and construction activity would be visible for approximately three months, the long-term change in visual quality is considered a beneficial impact of the Project. Moreover, existing views that capture the scenic nature of the western Hahamongna Basin from multiple public vantage points in the Project vicinity would be unaffected or only marginally affected by the Project, including views from the Flint Wash Bridge, Oak Grove Drive, Devil’s Gate Dam, segments of the Perimeter Trail, and portions of the Oak Grove Disc Golf Course. As such, implementation of the proposed Project would not result in a substantial adverse effect on a scenic vista. There would be a less than significant impact and no mitigation is required.

	Potentially Significant Impact	**Less than Significant with Mitigation**	**Less than Significant Impact**	**No Impact**
Would the project:				
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☐	☒

WHY? There are portions of two designated State scenic highways in the City: 1) The Angeles Crest Highway (State Route [SR] 2) is located north of Arroyo Seco Canyon and transects the extreme northernmost portion of the City and 2) a segment of SR 110 from approximately East California Boulevard to Pasadena’s southern City boundary is identified as a Historic Parkway (the Arroyo Seco Historic Parkway) (Caltrans 2018). Additionally, SR 110 from Colorado Boulevard in the City to U.S. Highway 101 in downtown Los Angeles is also identified as a National Scenic Byway by the Federal Highway Administration (USDOT

[2] Glued laminated timber, also called glulam, is a type of structural engineered wood product comprising several layers of dimensional lumber bonded together with durable, moisture-resistant structural adhesives.

Existing Conditions

Proposed Conditions

- Vegetation represents 2 to 3 years of growth
- Surface of trail would remain earthen or other natural surface

Source: Psomas 2019

Visual Simulation of Berkshire Creek Restoration Looking Northwest

Exhibit 8

Berkshire Creek Area Improvements Project

PSOMAS

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Existing Conditions

Proposed Conditions

- Vegetation represents 2 to 3 years of growth

Source: Psomas 2019

Visual Simulation of Berkshire Creek Restoration Looking East

Exhibit 9

Berkshire Creek Area Improvements Project

PSOMAS

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Existing Conditions

Proposed Conditions

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Source: Psomas 2019

Visual Simulation of Equestrian Picnic Area Improvements Looking Southwest

Exhibit 10

Berkshire Creek Area Improvements Project

PSOMAS

(5/24/19 SAK) R:\Projects\PAS_Pasaden\3PAS010801\Graphics\Berkshire_Creek\MND\

2018). The Project site is not within the viewshed of the Angeles Crest Highway or the Arroyo Seco Historic Parkway (SR 110). There would be no impact and no mitigation is required.

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
c) In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, conflict with applicable zoning and other regulations governing scenic quality?	☐	☐	☒	☐

WHY? As discussed under Threshold 2.1(a) above, although there would be short-term changes in visual quality that some may find unattractive and construction activity would be visible for approximately three months, the long-term change in visual quality is considered a beneficial impact of the Project. Moreover, the proposed Project would not conflict with applicable zoning and other regulations governing scenic quality. As such, implementation of the proposed Project would not substantially degrade the existing visual character or quality of public views of the Oak Grove area. There would be a less than significant impact and no mitigation is required.

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☐	☒

WHY? There would be no new sources of light or glare with proposed Project implementation. No new light fixtures would be installed, and all proposed building materials would be comprised of non-reflective materials. Additionally, the proposed Project would not increase the number of visitors to the site and would not change the Park's hours of operation (6:00 AM to sunset). Therefore, it would not change the number or timing of vehicles coming into and out of the site. As there would be no added vehicular traffic, there would be no additional sources of glare due to reflected sunlight from car windshields and headlights. There would be no impact and no mitigation is required.

MITIGATION MEASURES

There would be no significant impacts and no mitigation is required.

2.2 AGRICULTURE AND FORESTRY RESOURCES

In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board.	**Potentially Significant Impact**	**Less than Significant with Mitigation**	**Less than Significant Impact**	**No Impact**
Would the project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒

WHY? The City is a developed urban area surrounded by hillsides to the north and northwest. The western portion of the City contains the Arroyo Seco, which runs from north to south though the City. It has commercial recreation, park, natural, and open space uses. The City contains no Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the most recent maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency (FMMP 2017). There would be no impact and no mitigation is required.

	Potentially Significant Impact	**Less than Significant with Mitigation**	**Less than Significant Impact**	**No Impact**
Would the project:				
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒

WHY? The City has no land zoned for agricultural use other than commercial growing areas and land within certain specific plan areas. The Project site is within the Open Space (OS) e, which is not one of the zones that permits commercial growing areas (Pasadena 2018a). Accordingly, there are no agricultural zoning and Williamson Act contracts are not applicable to the Project site. There would be no impact and no mitigation is required.

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220[g]), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104[g])?	☐	☐	☐	☒

WHY? There is no forest land, timberland, or any Timberland Production Zones, in the City; therefore, the proposed Project would not result in the loss of forest land, timberland, or Timberland Production areas. There would be no impact and no mitigation is required.

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒

WHY? There is no forest land in the City; therefore, the proposed Project would not result in the conversion or loss of forest land. While a total of 81 non-native trees/saplings and 4 native trees would be removed as part of Project implementation; approximately 90 new native tree planting locations would be part of habitat restoration activities. Further, while there is oak woodland, defined as a vegetation type for purposes of the biological resources analysis, no part of the Oak Grove area includes forest land as defined by the State, including forest land (Public Resources Code section 12220[g]), timberland (as defined by Public Resources Code section 4526), or Timberland Production (as defined by Government Code section 51104[g]). There would be no impact and no mitigation is required.

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☐	☒

WHY? As discussed in Threshold 2.2(a), there is no designated Farmland in the City. Additionally, there is no Farmland identified in the City of La Cañada Flintridge to the west (FMMP 2017). Therefore, the proposed Project would not indirectly result in the conversion of farmland to a non-agricultural use. Likewise, as discussed in Thresholds 2.2(c) and 2.2(e), there are no forestry resources that would be converted to non-forest use by the proposed Project. There would be no impact and no mitigation is required.

MITIGATION MEASURES

There would be no significant impacts and no mitigation is required.

2.3 AIR QUALITY

The Project site is located in the Los Angeles County portion of the South Coast Air Basin (SoCAB) and, for air quality regulation and permitting, is under the jurisdiction of the South Coast Air Quality Management District (SCAQMD). Both the State of California (State) and the U.S. Environmental Protection Agency (USEPA) have established health-based Ambient Air Quality Standards (AAQS) for air pollutants, which are known as “criteria pollutants”. The AAQS are designed to protect the health and welfare of the populace within a reasonable margin of safety. The AAQS for ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), inhalable particulate matter with a diameter of 10 microns or less (PM10), fine particulate matter with a diameter of 2.5 microns or less (PM2.5), and lead are shown in Table 2-2, California and National Ambient Air Quality Standards, on the following page.

Regional air quality is defined by whether the area has attained State and federal air quality standards, as determined by air quality data from various monitoring stations. Areas that are considered in “nonattainment” are required to prepare plans and implement measures that will bring the region into “attainment”. When an area has been reclassified from nonattainment to attainment for a federal standard, the status is identified as “maintenance”, and there must be a plan and measures established that will keep the region in attainment for the next ten years. For the California Air Resources Board (CARB), an “unclassified” designation indicates that the air quality data for the area are incomplete and there are no standards to support a designation of attainment or nonattainment. Table 2-1, Designations of Criteria Pollutants in the South Coast Air Basin (SoCAB), below, summarizes the attainment status of the SoCAB for the criteria pollutants.

TABLE 2-1
DESIGNATIONS OF CRITERIA POLLUTANTS
IN THE SOUTH COAST AIR BASIN

Pollutant	State	Federal
O_3 (1 hour)	Nonattainment	Nonattainment
O_3 (8 hour)	Nonattainment	Nonattainment
PM10	Nonattainment	Attainment/Maintenance
PM2.5	Nonattainment	Nonattainment
CO	Attainment	Attainment/Maintenance
NO_2	Attainment	Attainment/Maintenance
SO_2	Attainment	Attainment
Lead	Attainment	Attainment/Nonattainment*
All others	Attainment/Unclassified	No standards

O_3: ozone; PM10: respirable particulate matter 10 microns or less in diameter; PM2.5: fine particulate matter 2.5 microns or less in diameter; CO: carbon monoxide; NO_2: nitrogen dioxide; SO_2: sulfur dioxide; SoCAB: South Coast Air Basin.

* Los Angeles County is classified nonattainment for lead; the remainder of the SoCAB is in attainment of the State and federal standards.

Source: SCAQMD 2016

TABLE 2-2
CALIFORNIA AND NATIONAL AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Time	California Standards	Federal Standards	
			Primary[a]	Secondary[b]
O_3	1 Hour	0.09 ppm (180 μg/m^3)	–	–
	8 Hour	0.070 ppm (137 μg/m^3)	0.070 ppm (137 μg/m^3)	Same as Primary
PM10	24 Hour	50 μg/m^3	150 μg/m^3	Same as Primary
	AAM	20 μg/m^3	–	Same as Primary
PM2.5	24 Hour	–	35 μg/m^3	Same as Primary
	AAM	12 μg/m^3	12.0 μg/m^3	15.0 μg/m^3
CO	1 Hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	–
	8 Hour	9.0 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)	–
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m^3)	–	–
NO_2	AAM	0.030 ppm (57 μg/m^3)	0.053 ppm (100 μg/m^3)	Same as Primary
	1 Hour	0.18 ppm (339 μg/m^3)	0.100 ppm (188 μg/m^3)	–
SO_2	24 Hour	0.04 ppm (105 μg/m^3)	0.14 ppm (for certain areas)[c]	–
	3 Hour	–	–	0.5 ppm (1,300 μg/m^3)
	1 Hour	0.25 ppm (655 μg/m^3)	0.075 ppm (196 μg/m^3)	–
Lead	30-day Avg.	1.5 μg/m^3	–	–
	Calendar Quarter	–	1.5 μg/m^3	Same as Primary
	Rolling 3-month Avg.	–	0.15 μg/m^3	
Visibility Reducing Particles	8 hour	Extinction coefficient of 0.23 per km – visibility ≥ 10 miles (0.07 per km – ≥30 miles for Lake Tahoe)	**No Federal Standards**	
Sulfates	24 Hour	25 μg/m^3		
Hydrogen Sulfide	1 Hour	0.03 ppm (42 μg/m^3)		
Vinyl Chloride	24 Hour	0.01 ppm (26 μg/m^3)		

O_3: ozone; μg/m^3: micrograms per cubic meter; PM10: large particulate matter; AAM: Annual Arithmetic Mean; PM2.5: fine particulate matter; CO: carbon monoxide; mg/m^3: milligrams per cubic meter; NO_2: nitrogen dioxide; SO_2: sulfur dioxide; ppm: parts per million; km: kilometer; –: No Standard.

[a] *National Primary Standards:* The levels of air quality necessary, within an adequate margin of safety, to protect the public health.

[b] *National Secondary Standards:* The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

[c] On June 2, 2010, a new 1-hour SO2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO2 national standards (24-hour and annual) remain in effect until one year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.

Note: More detailed information in the data presented in this table can be found at the CARB website (www.arb.ca.gov).

Source: CARB 2016.

The SCAQMD develops rules and regulations; establishes permitting requirements for stationary sources; inspects emissions sources; and enforces such measures through educational programs or fines, when necessary. It is directly responsible for reducing emissions from stationary (area and point), mobile, and indirect sources and has prepared an Air Quality Management Plan (AQMP) that establishes a program of rules and regulations directed at attaining the National Ambient Air Quality Standards (NAAQS) and California Ambient Air Quality Standards (CAAQS).

The SCAQMD has adopted significance thresholds to assess the regional impact of air pollutant emissions in the SoCAB. Table 2-3, SCAQMD Regional Emissions Significance Thresholds, summarizes the SCAQMD's mass emissions thresholds, which are presented for both short-term construction and long-term operational emissions. A project with emissions rates below these thresholds is considered to have a less than significant effect on air quality.

TABLE 2-3
SCAQMD REGIONAL POLLUTANT SIGNIFICANCE THRESHOLDS (LBS/DAY)

Criteria Pollutant	Construction	Operation
VOC	75	55
NOx	100	55
CO	550	550
SOx	150	150
PM10	150	150
PM2.5	55	55

SCAQMD: South Coast Air Quality Management District; lbs/day: pounds per day; VOC: volatile organic compounds; NOx: oxides of nitrogen; CO: carbon monoxide; SOx: oxides of sulfur; PM10: respirable particulate matter with a diameter of 10 microns or less; PM2.5: fine particulate matter with a diameter of 2.5 microns or less.
Source: SCAQMD 2015.

The nearest air quality sensitive receptors to the Project site include the private school (Hillside School and Learning Center) located west of Oak Grove Drive, and trail users and park users adjacent to the Project site The nearest residential uses are located 700 ft to the south of the Project site beyond I-210 along Normandy Court in the City of La Cañada Flintridge.

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Where available, the significance criteria established by the applicable air quality management district or air pollution control district may be relied upon to make the following determinations. Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☐	☒

WHY? On March 3, 2017, the SCAQMD adopted the 2016 AQMP, which is a regional and multi-agency effort (SCAQMD, CARB, Southern California Association of Governments [SCAG], and USEPA). The 2016 AQMP incorporates the latest scientific and technical information and planning assumptions, including the 2016–2040 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS); updated emission inventory methodologies for various source categories; and SCAG's latest growth forecasts.

The main purpose of an AQMP is to bring an area into compliance with the requirements of federal and State air quality standards. For a project to be consistent with the AQMP, the pollutants emitted from the project should not (1) exceed the SCAQMD CEQA air quality significance thresholds or (2) conflict with or exceed the assumptions in the AQMP. As shown in Tables 2-4 and 2-5 below, pollutant emissions from the proposed Project would be less than the SCAQMD thresholds and would not result in a significant impact.

Construction (Short-Term) Impacts

Regional Emissions

The SCAQMD has established methodologies to quantify air pollutant emissions associated with construction activities, such as air pollutant emissions generated by operation of on-site construction equipment; fugitive dust emissions related to trenching and earthwork activities; and mobile (tailpipe) emissions from construction worker vehicles and haul/delivery truck trips. Emissions would vary from day to day, depending on the level of activity; the specific type of construction activity occurring; and, for fugitive dust, prevailing weather conditions.

A construction-period mass emissions inventory was compiled based on an estimate of construction equipment as well as scheduling and Project phasing assumptions. More specifically, the mass emissions analysis considers the following:

- Combustion emissions from operating on-site stationary and mobile construction equipment.
- Fugitive dust emissions from demolition, site preparation, and grading phases.
- Mobile-source combustion emissions and fugitive dust from worker commute and truck travel.

All construction activities would be conducted consistent with applicable SCAQMD requirements, including Rules 402 and 403. SCAQMD Rule 402, Nuisance, states that a Project shall not "discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property".

Emissions were calculated using the California Emissions Estimator Model Version 2016.3.2 (CalEEMod) emissions inventory model (CAPCOA 2017). CalEEMod is a computer program accepted by the SCAQMD that can be used to estimate anticipated emissions associated with land development projects in California. CalEEMod has separate databases for specific counties and air districts, and the Los Angeles County database was used for the proposed Project. Consistent with the requirements of SCAQMD Rule 403, watering for dust control is assumed in the emissions calculations. As stated in Section 1.0, Project Information, the construction activities for the Project would begin in fall of 2019 for a period of three months and would be completed in one phase. Because the Project includes discrete activities across a moderately-sized geographic area, it is expected that some or all these components would be completed separately and/or sequentially. However, to provide both flexibility for the City during Project implementation and a worst-case scenario for environmental analysis, this air quality analysis assumes that completion of the three Project components (i.e., Berkshire Creek restoration, equestrian picnic area improvements, and California sage scrub and oak woodland habitat restoration) would all start together and overlap. The air quality analysis therefore conservatively assumed overlap of the construction phases. More information regarding the construction activities can be found in Section 1.0 of the IS/MND. The regional emissions thresholds (see Table 2-3 above) are based on the rate of emissions (i.e., pounds of pollutants emitted per day). Therefore, the quantity, duration, and the intensity of construction activities are important in ensuring analysis of worst-case (i.e., maximum daily emissions) scenarios. Project activities (e.g., demolition, grading, bridge/infrastructure construction, and paving) are identified by start date and duration, as described in Section 1.0, Project Information. Each activity has associated off-road equipment (e.g., excavators, drill rigs, pavers) and on-road vehicles (e.g., haul trucks, concrete trucks, worker commute vehicles). The worker trips used in the air quality modeling analysis was derived from the *Berkshire Creek Area Improvements Project*

Traffic Evaluation Memorandum, provided in Appendix E (Psomas 2019). Detailed construction assumptions and CalEEMod inputs and outputs can be found in Appendix A of this IS/MND.

Maximum daily construction emissions during the peak work day are shown in Table 2-4, Estimated Maximum Daily Construction Emissions (lbs/day). If construction is delayed or occurs over a longer time period, daily emissions could be reduced because of (1) a more modern and cleaner-burning construction equipment fleet mix and/or (2) a less intensive buildout schedule (i.e., fewer daily emissions occurring over a longer time interval). As shown, all criteria pollutant emissions from Project construction would be less than their respective thresholds. Thus, impacts would be less than significant and no mitigation is required.

TABLE 2-4
ESTIMATED MAXIMUM DAILY CONSTRUCTION EMISSIONS (LBS/DAY)

Construction Year	VOC	NOx	CO	SOx	PM10	PM2.5
2019	5	41	34	<1	4	2
SCAQMD Daily Thresholds	***75***	***100***	***550***	***150***	***150***	***55***
Exceeds SCAQMD Thresholds?	**No**	**No**	**No**	**No**	**No**	**No**

lbs/day: pounds per day; VOC: volatile organic compound(s); NOx: nitrogen oxides; CO: carbon monoxide; SOx: sulfur oxides; PM10: respirable particulate matter with a diameter of 10 microns or less; PM2.5: fine particulate matter with a diameter of 2.5 microns or less; SCAQMD: South Coast Air Quality Management District.

Source: SCAQMD 2015 (thresholds). Emissions calculated by Psomas using CalEEMod 2016.3.2.

Localized Emissions

The localized effects from the on-site portion of daily emissions were evaluated at sensitive receptor locations that would be potentially impacted by the Project; these were evaluated according to the SCAQMD's localized significance threshold (LST) methodology, which utilizes on-site mass emissions rate look up tables and Project-specific modeling, where appropriate. LSTs are applicable to the following criteria pollutants: NO_2, CO, PM10, and PM2.5.[3] LSTs represent the maximum emissions from a project that are not expected to cause or contribute substantially to an exceedance of the most stringent applicable federal or State ambient air quality standard. These are developed based on the ambient concentrations of that pollutant for each source receptor area and distance to the nearest sensitive receptor. For the purposes of an LST analysis, the SCAQMD considers receptors where it is possible that an individual could remain for 1 hour for NO_2 and CO exposure and 24 hours for PM10 and PM2.5 exposure. For PM10 and PM2.5, LSTs were derived based on requirements in SCAQMD's Rule 403 regarding Fugitive Dust. The mass rate look-up tables were developed for each source receptor area and can be used to determine whether a project may generate significant adverse localized air quality impacts. The SCAQMD provides LST mass rate look-up tables (i.e., screening thresholds) for projects that are less than or equal to five acres. This approach is conservative as it assumes that all on-site emissions would occur within a five-acre area and over-predicts potential localized impacts (i.e., more pollutant emissions occurring within a smaller area and within closer proximity to potential sensitive receptors). The use of LST screening thresholds based on one-acre was used to assess the potential for localized air quality impacts associated with the Project. Although the Project site is almost five acres in size, SCAQMD guidance for LST analysis states that the disturbance acreage should be based not on the total size of a project but on the number and types of off-road construction equipment that would be involved in earthmoving activities. As such, because the Project would not involve a substantial quantity of earthmoving, the one-acre parameter was determined to be most applicable and represents the most conservative approach.

3 NO_2 impacts are conservatively addressed by evaluating nitrogen oxide (NOx) emissions.

When quantifying mass emissions for localized analysis, only emissions that occur on site are considered. Consistent with the SCAQMD's LST methodology guidelines, emissions related to off-site delivery/haul truck activity and employee trips are not considered in the evaluation of localized impacts.

As shown in Table 2-5, Maximum Localized Construction Emissions (lbs/day), localized construction emissions were evaluated for each Project component for all criteria pollutants. Although it is unlikely that all Project phases would occur at the same time, the total emissions from all phases are compared to the screening threshold. Emissions occurring at the Project site would be less than the SCAQMD LST screening thresholds. Thus, impacts related to air pollutant exposure of residents proximate to the Project site would be less than significant and no mitigation is required.

TABLE 2-5
MAXIMUM LOCALIZED CONSTRUCTION EMISSIONS (LBS/DAY)

	NOx	CO	PM10	PM2.5
Demolition	9	10	2	1
Grading	9	9	<1	<1
Irrigation Trenching	4	3	<1	<1
Infrastructure/Bridge Construction	3	3	<1	<1
Paving	5	5	<1	<1
Total	**30**	**30**	**3**	**2**
LST Screening Threshold	**69**	**535**	**56**	**17**
Exceeds SCAQMD Thresholds?	**No**	**No**	**No**	**No**

lbs/day: pounds per day; NOx: nitrogen oxides; CO: carbon monoxide; PM10: respirable particulate matter with a diameter of 10 microns or less; PM2.5: fine particulate matter with a diameter of 2.5 microns or less; SCAQMD: South Coast Air Quality Management District; LST: Local Significance Threshold; SRA: Source Receptor Area.

[a] Thresholds are for 1-acre site with receptors located within 25 meters for NOx and CO, and 195 meters for PM10 and PM2.5 in SRA 8.

Source: SCAQMD 2009 (LSTs). Emissions from Psomas calculated with CalEEMod 2016.3.2.

Toxic Air Contaminants

The greatest potential for toxic air contaminant (TAC) emissions during construction would be related to diesel particulate emissions associated with heavy equipment operations during site grading activities. The SCAQMD does not consider diesel-related cancer risks from construction equipment to be an issue due to the short-term nature of construction activities. Construction activities associated with the proposed Project would be short term (three months or less). The assessment of cancer risk is typically based on a 30- to 70-year exposure period. Because exposure to diesel exhaust would be well below the 30- and 70-year exposure period, construction of the proposed Project is not anticipated to result in an elevated cancer risk to exposed persons. As such, Project-related TAC impacts during construction would be less than significant and no mitigation is required.

Operational (Long-Term) Impacts

Operational emissions are comprised of area, energy, and mobile (i.e., vehicle) source emissions. The proposed Project has been designed to provide improved physical facilities and open space resources to existing users of the Oak Grove area of the HWP and would not result in increased use of the park. The same amount of parking and internal roads and the same type and extent of facilities would be provided. As such, operation of the Project would be comparable to the existing conditions of the Project site, with the exception that some areas may need less frequent maintenance. There would be no new trips added as a result of the proposed Project. Therefore, emissions from the long-term operations of the proposed Project would be the same with existing emissions and impacts from long-term operational impacts would be less than significant and no mitigation is required.

Air Quality Management Plan Assumptions Consistency

The Project is consistent with the Zoning and General Plan Land Use designations for the site and is therefore consistent with the growth expectations for the region. Further, the proposed Project would not result in development of new land uses that have not been anticipated in the AQMP. No conflict with the 2016 AQMP would occur with the proposed Project. There would be no impact and no mitigation is required.

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
b) Result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is in non-attainment under an applicable federal or state ambient air quality standard?	☐	☐	☒	☐

WHY? The SCAQMD in their White Paper on *Regulatory Options for Addressing Cumulative Impacts from Air Pollution Emissions*, identifies that impacts that are less than significant on a project level are also considered to be less than significant on a cumulative basis. The AQMD uses the same significance thresholds for project-specific and cumulative impacts for all environmental topics, except for the Hazard Index for toxic air contaminant (TAC) emissions (SCAQMD 2003). Any projects that are found to result in less than significant impacts on a project level are not considered by the SCAQMD to be cumulatively considerable and consequently would not result in a considerable contribution to cumulative impacts.

Since the Project-related emissions impacts were identified as less than significant, as shown in Threshold 2.3(a), construction of the Project would not result in a cumulatively considerable contribution to air quality impacts. Cumulative impacts are also less than significant and no mitigation is required.

Notwithstanding, acknowledging the County's ongoing Devil's Gate project, the City of Pasadena, as the Lead Agency, desires to limit additional air pollutant generation in the Hahamongna area as a result of the Project's construction. As such, the City will implement the following condition of approval that specifies how the City and the contractor will comply with SCAQMD Rule 403 requirements to minimize construction-phase air quality emissions to the maximum extent practicable:

- Watering exposed surfaces at least three times per day, or more during windy conditions. High wind conditions are defined under Rule 403 as instantaneous wind speeds that exceed 25 miles per hour.
- Non-toxic soil stabilizers/dust suppressants that create a crust on the surface to be resistant to wind erosion would be selected and applied consistent with Rule 403.
- Traffic speeds on unpaved roads would be restricted to no more than 15 miles per hour.
- One or more devices would be installed at ingress/egress points to remove dirt from vehicle tires and undercarriage prior to leaving the site.
- All materials to be loaded for export would be pre-watered.
- All haul trucks would either be covered (with on board tarp) or maintain at least two feet of freeboard between the top of the soil and the edge of the truck bed.
- City staff would inspect Rule 403 compliance daily.

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
c) Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☒	☐

WHY? As described in Threshold 2.3(b) above, the proposed Project would not result in any substantial TAC air pollution impacts, and construction criteria pollutant emissions would be less than the conservative LST screening thresholds. Therefore, Project construction would not expose any nearby sensitive receptors to substantial pollutant concentrations.

A CO hotspot is an area of elevated CO concentrations that is caused by severe vehicle congestion on major roadways, typically near intersections. If a project substantially increases average delay at signalized intersections that are operating at Level of Service (LOS) E or F or causes an intersection, operating at LOS D or better without the project, to operate at LOS E or F with the project, there is a potential for a CO hotspot.

The proposed Project would generate the same quantity of vehicle trips as existing conditions. Therefore, Project-related vehicle trips would not have the potential to substantially change the average LOS at nearby intersections and consequently would not contribute to the potential for the formation of a CO hotspot. As discussed further in Section 2.17, Transportation, There would be a less than significant impact and no mitigation is required.

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?	☐	☐	☒	☐

WHY? According to the SCAQMD's *CEQA Air Quality Handbook,* land uses associated with odor complaints typically include agricultural uses, wastewater treatment plants, food processing plants, chemical plants, composting, refineries, landfills, dairies, and fiberglass molding (SCAQMD 1993). The Project does not propose any of these land uses and would not otherwise produce objectionable, long-term operational odors. The Project involves improvements to open space and recreational areas and consequently does not involve any sources of odors-causing air pollutant emissions that would adversely affect a substantial number of people.

Short-term construction equipment and activities would generate odors, such as diesel exhaust emissions from construction equipment and paving activities. There may be situations where construction activity odors would have an olfactory presence, but these odors would not be of sufficient magnitude to constitute a public nuisance. The odors would be temporary and would dissipate rapidly from the source with an increase in distance. Therefore, the impacts would be short-term and would not be objectionable to a substantial number of people. There would be a less than significant impact and no mitigation is required.

MITIGATION MEASURES

There would be no significant impacts and no mitigation is required.

2.4 BIOLOGICAL RESOURCES

Information in this section is derived from the *Biological Technical Report for the Berkshire Creek Area Improvements Project* (Biological Technical Report) and *Jurisdictional Delineation Report for the Berkshire Creek Area Improvements Project* (Jurisdictional Delineation Report), both dated May 2019 and prepared by (Psomas 2019a, 2019b). The Biological Technical Report is are provided in its entirety in Appendix B-1; the Jurisdictional Delineation Report is provided as Attachment B of Appendix B-1.

The data provided below are based on literature searches, database reviews, and Project biologists' field observations, as well as Psomas' biological resource studies for other projects in the same vicinity as the proposed Project site and site-specific surveys performed for the Project. Site visits in support of the Biological Technical Report were conducted on the Project site by Psomas Biologist Sarah Thomas on November 2 and 3, 2018; and February 26, 2019. Tree surveys were conducted by Psomas Arborist Trevor Bristle within the Berkshire Creek Project Component on March 1, 2019. During the tree survey, all trees within the Project component subject to regulation by the Pasadena Tree Ordinance and/or the *California Fish and Game Code* were identified and mapped in the field. Other non-native trees throughout the Project site were also identified as part of proposed removals for habitat enhancement. A Jurisdictional Delineation was performed on the Project site by Psomas Regulatory Specialist David Hughes on May 25 and July 24, 2018. In addition, a focused survey to determine the presence or absence of one special status plant species, Nevins barberry (*Berberis nevinii*), was conducted by Psomas biologist Sarah Thomas on May 17, 2019.

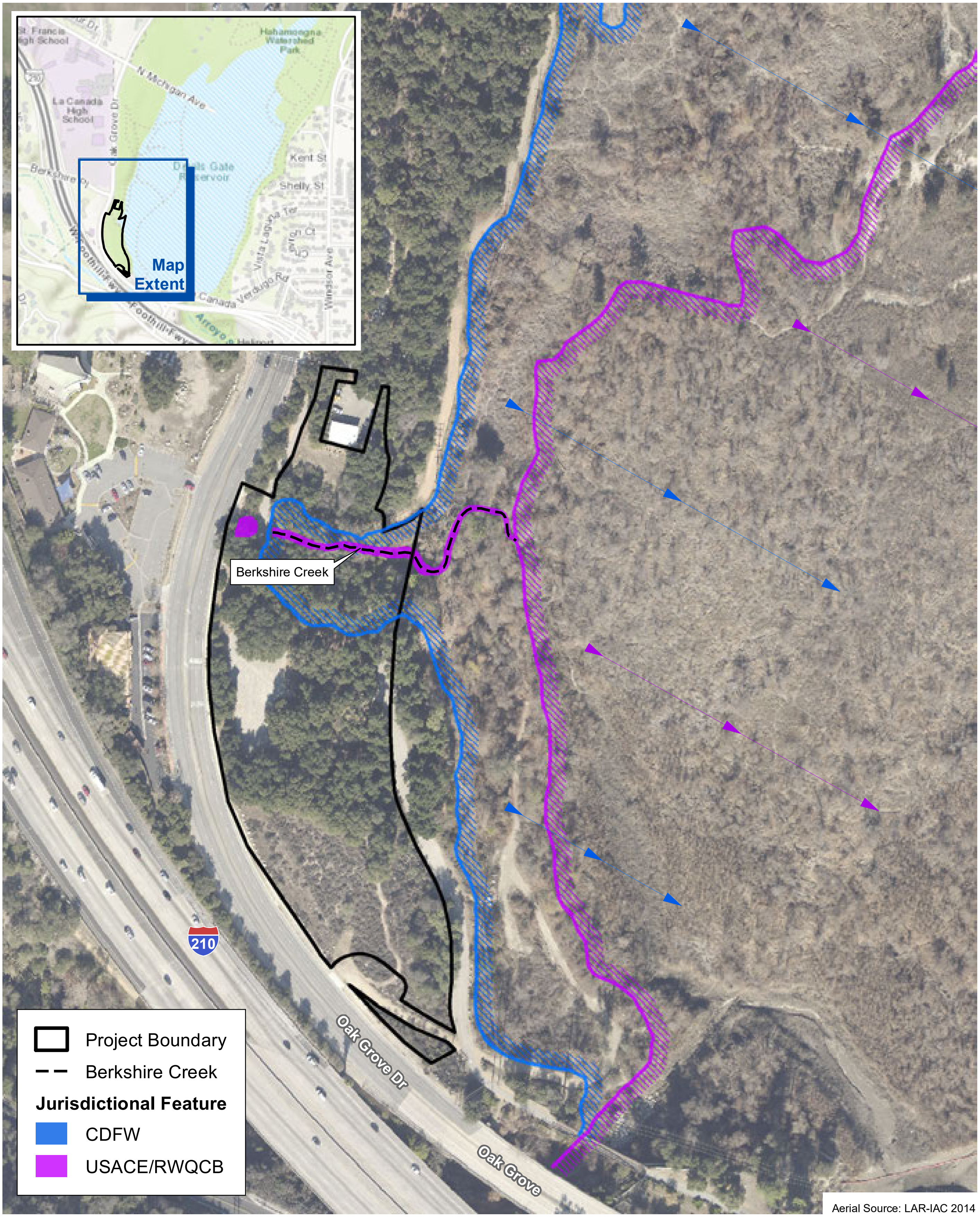
Existing Setting

The Project site is located on the U.S. Geological Survey's (USGS') Pasadena 7.5-minute quadrangle. Topography is generally mixed with flat and sloped areas with on-site elevations ranging from approximately 1,060 to 1,100 ft above mean sea level (msl). The Upper Arroyo Seco, a tributary of the Los Angeles River, is located directly east of the Project site. The Arroyo Seco to the northeast and east of the site consists of series of shallow basins, which are used to facilitate storm water runoff percolation and a wide reservoir where flood waters and sediment are retained behind Devil's Gate Dam.

Soil types on the site include, urban land-Soboba complex, urban land-Montebello-Xerorthents, and Soboba and Tujunga soils as shown in Exhibit 4, Soil Types, in Section 1.1.1, of the Biological Technical Report (Appendix B-1) (USDA NRCS 2012).

Jurisdictional Features

One jurisdictional feature, Berkshire Creek, is present on the Project site, as shown on Exhibit 11, Jurisdictional Features – Berkshire Creek. Berkshire Creek flows into the southern portion of Devil's Gate Reservoir and is therefore under the jurisdictional authority of the U.S. Army Corps of Engineers (USACE). The limits of non-wetland Waters of the United States in Berkshire Creek were defined by the presence of an Ordinary High-Water Mark (OHWM), exhibited by the break in bank slope. There are no wetland Waters of the United States within the Project site. In all, a total of 0.11 acre of Waters of the United States occur in Berkshire Creek. There are no "isolated waters" present in the Project area. Therefore, the Regional Water Quality Control Board's (RWQCB's) jurisdictional limits are equal to those of the USACE. The limits of California Department of Fish and Wildlife's (CDFW's) jurisdiction in the survey area were mapped to the outer canopy of native tree species that overhang Berkshire Creek, as shown on Exhibit 12, Jurisdictional Tree Locations. CDFW limits were mapped to the top of the Berkshire Creek banks in areas that contain only non-native species. In all, the survey area contains 0.76 acre of CDFW jurisdictional areas. A complete description of jurisdictional waters on the site is provided in the Jurisdictional Delineation Report in Attachment B of Appendix B-1 of this IS/MND.



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Jurisdictional Features - Berkshire Creek

Exhibit 11

Berkshire Creek Area Improvements Project

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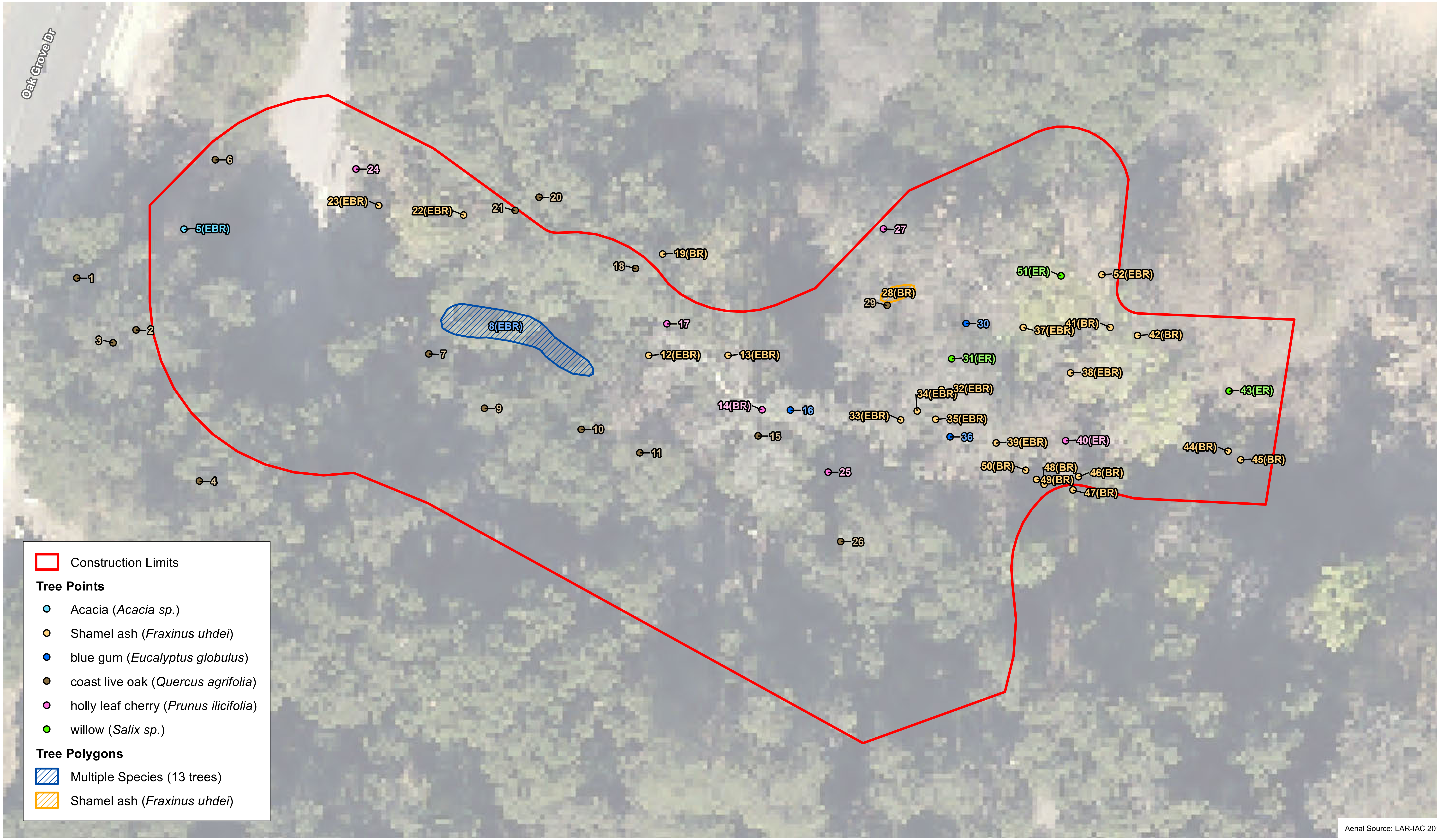

Aerial Source: LAR-IAC 2014

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Jurisdictional Tree Locations

Berkshire Creek Area Improvements Project

Exhibit 12

N W E S

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Vegetation

The Project site consists of coast live oak woodland, black willow–California sycamore woodland, black willow thickets/mulefat thickets, California sagebrush scrub, non-native ornamental woodland, developed, and disturbed vegetation types as shown in Exhibit 13, Vegetation Types and Other Areas.

Coast live oak woodland occurs throughout the central portion of the Project site. This vegetation type is dominated by coast live oak trees and has an understory comprised mostly of leaf litter. Non-native species such as wild oat (*Aveena* sp.), horehound (*Marrubium vulgare*), smilo grass (*Stipa miliacea* var. *miliacea*), and short-podded mustard (*Hirschfeldia incana*) also occur in the understory. Native species such as wild cucumber and phacelia (*Phacelia* sp.) were also observed in the understory. The oak woodland area contains various paved roadways, a parking lot, and pedestrian/equestrian (i.e., unpaved) trails.

California sagebrush scrub occurs in the southern portion of the Project site. This appears to be a remnant patch of sagebrush scrub associated with revegetation following adjacent construction associated with Oak Grove Drive. This area is dominated by California sagebrush (*Artemesia californica*) with California buckwheat (*Eriogonum fasciculatum*), black sage (*Salvia mellifera*), black elderberry (*Sambucus nigra*), and laurel sumac (*Malosma laurina*) also occurring.

Black willow–California sycamore woodland occurs in the central-eastern portion of the Project site. This vegetation type is dominated by Goodding's black willow trees (*Salix gooddingii*) and California sycamore (*Platanus racemosa*) trees and has an understory of non-native species including brome grasses (*Bromus* sp.), and common fig (*Ficus carica*) as well as some native species such as poison oak (*Toxicodendron diversilobum*) and wild cucumber (*Marah macrocarpa*).

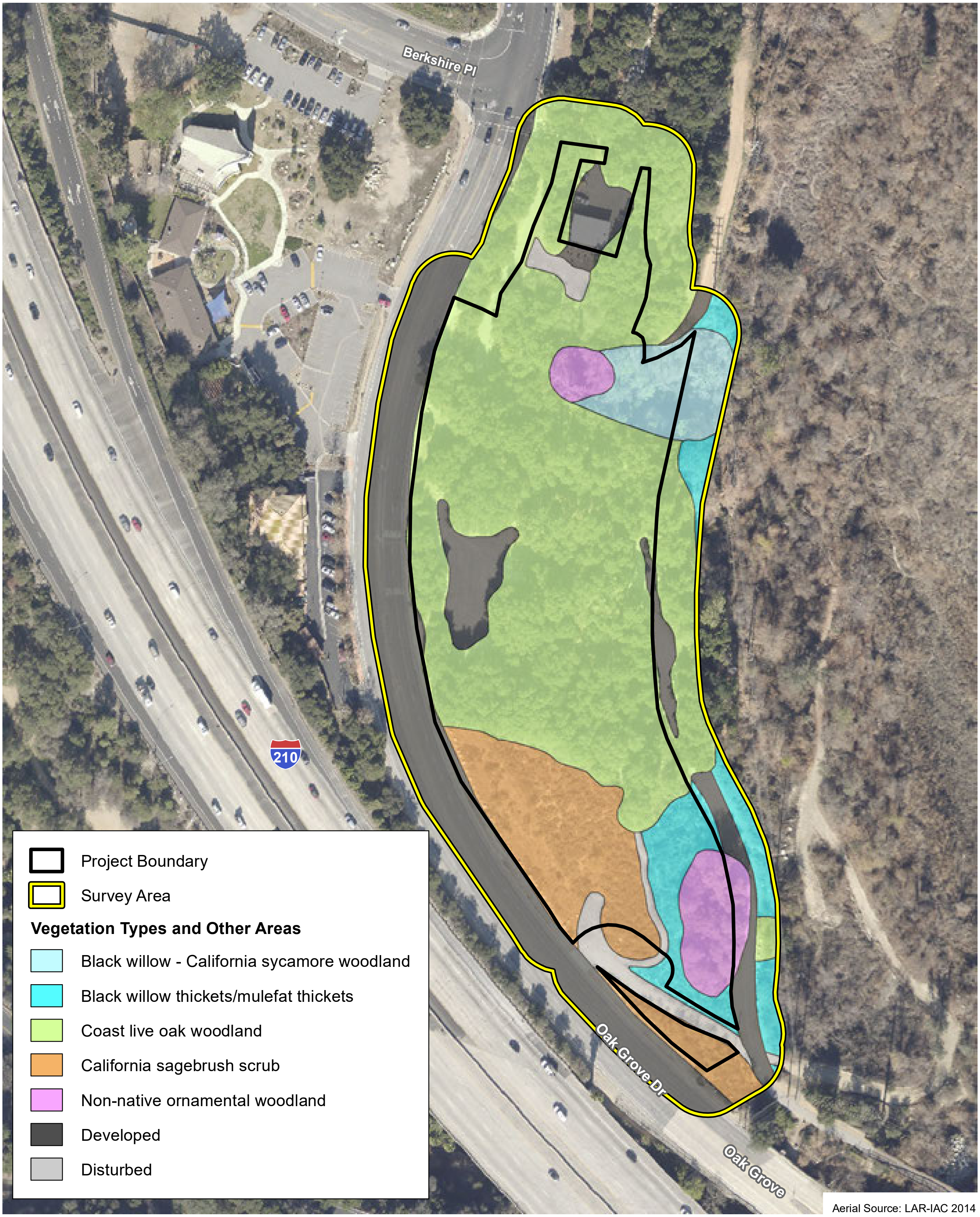
The black willow thickets/mulefat thickets occurs in the southeastern and central-eastern portions of the study area. It consists of Goodding's black willow and mulefat (*Baccharis salicifolia*) thickets interspersed. Other species observed include poison oak and poison hemlock (*Conium maculatum*).

Non-native ornamental woodland areas occur in the southeastern and central portions of the Project site. These areas consist of non-native trees such as Shamel ash (*Fraxinus uhdei*), Eucalyptus (*Eucalyptus* sp.), Acacia (*Acacia* sp.), and edible fig (*Ficus carica*). Ripgut brome can be found in the understory. This vegetation type is not described in the *California Manual of Vegetation*.

Developed areas are considered "other" areas and occur in the Project site as roadways in the western portion and the Oak Grove Maintenance Office in the northern portion. Disturbed areas are also considered "other" areas and consist of dirt roads or other maintained areas that are either devoid of vegetation or support a sparse cover of ruderal species.

Special Status Vegetation

Three of the seven vegetation types in the study area are considered special status: black willow–California sycamore woodland, black willow thickets/mulefat thickets, and California sagebrush scrub. Special status habitats are vegetation types, associations, or subassociations that support concentrations of special status plant or wildlife species; these habitats are of relatively limited distribution or of particular value to wildlife. Although special status habitats are not afforded legal protection unless they support protected species, potential impacts on them may increase concerns and mitigation suggestions by resources agencies.



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Vegetation Types and Other Areas

Exhibit 13

Berkshire Creek Area Improvements Project

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Regulated Trees

Within the Berkshire Creek disturbance footprint, a total of 54 trees (including 4 native trees and 50 non-native trees/saplings), regulated under the City's Ordinance No. 6896 "City Trees and Tree Protection Ordinance" (codified in Chapter 8.52 of the Pasadena Municipal Code) and/or California Fish and Game Code as riparian trees, mapped during the tree survey for the Project are proposed for removal as shown on Exhibit 14 and listed in Appendix B-2, Impacted Trees Table. Some of root systems and/or canopies of the listed trees, above, may fall within the impact area for the Berkshire Creek component of the Project.

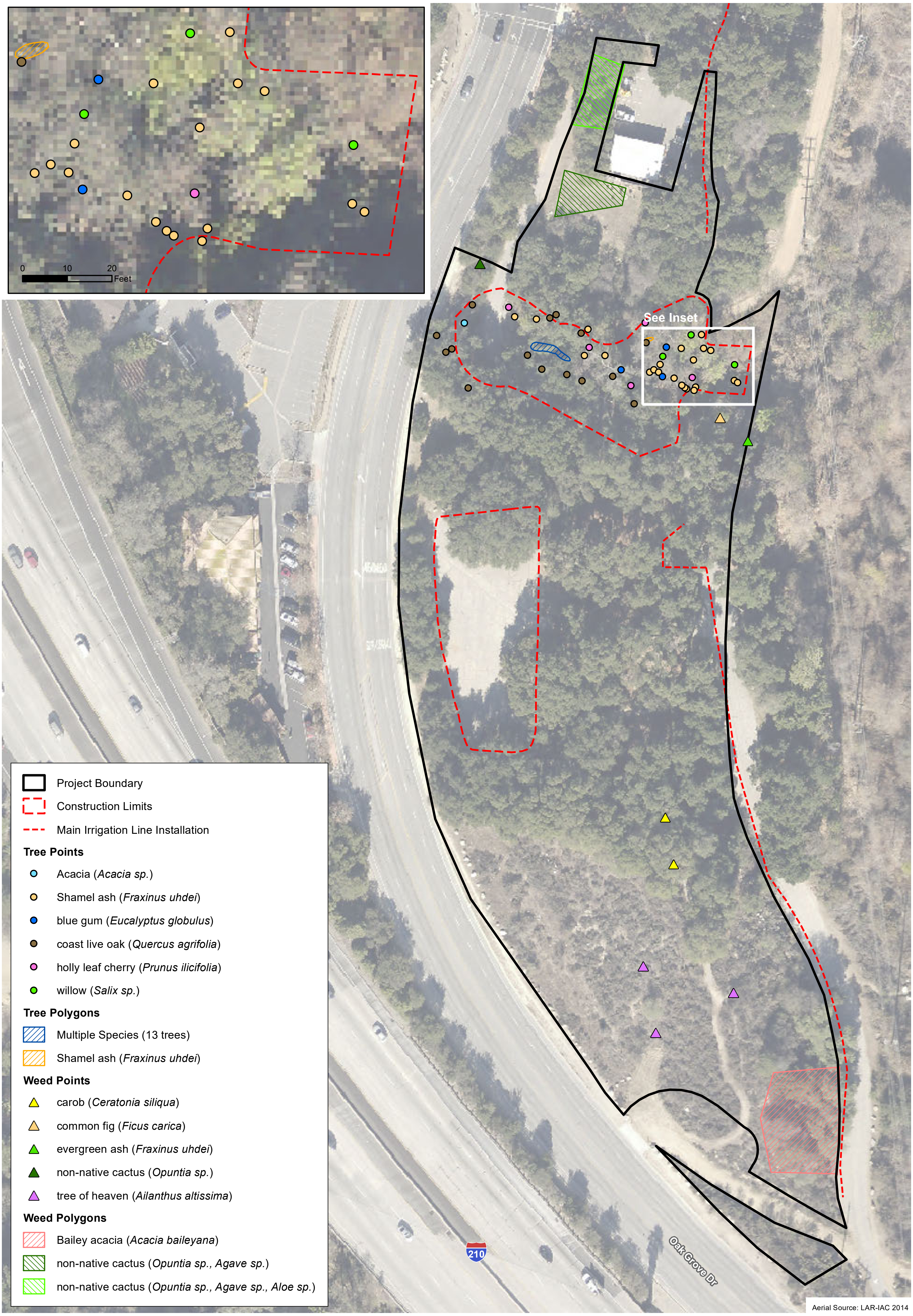
Within the remainder of the Project site, an additional 31 non-native trees/saplings mapped during the tree survey for the Project are proposed for removal as part of habitat restoration activity. As part of habitat restoration activities outside the Berkshire Creek component, there are also selected non-native plants identified in the Exhibit 14 for removal due to the size or number of those species. A total of 80 non-native plant removals are proposed. All proposed tree and plant removals are shown in Exhibit 14, Proposed Tree and Plant Removals, and all proposed tree removals are listed in Appendix B-2. Table 2-6, Tree Impact Summary, provides a simplified list of the tree species and number of each that are proposed for removal. Therefore, there are a total of 85 proposed tree removals (including 4 native trees and 81 non-native trees/saplings) and 80 non-native plant removals proposed as part of the Project.

TABLE 2-6
TREE IMPACT SUMMARY

Tree Species		Number of Tree Removals
Common Name	**Scientific Name**	
acacia	*Acacia* sp.	1
arroyo willow	***Salix lasiolepis***	1
Bailey acacia	*Acacia baileyana*	11
blue gum	*Eucalyptus globulus*	3
carob	*Ceratonia siliqua*	3
common fig	*Ficus carica*	1
evergreen ash	*Fraxinus uhdei*	1
holly leaf cherry	***Prunus ilicifolia***	1
Mexican fan palm	*Washingtonia Robusta*	5
Shamel ash	*Fraxinus uhdei*	41
tree of heaven	*Ailanthus altissima*	15
willow	***Salix* sp.**	2
	Total	**85**
* **Bold** indicates native species		

Special Status Plants

Many special status plant species have potential to occur in the Project region (i.e., Pasadena, Mt. Wilson, Burbank, and Condor Peak USGS 7.5-minute quadrangles). These species, along with their potential to occur, are summarized in Table 2-7, Special Status Plant Species Potentially Occurring in the Project Region, beginning on the following page. In addition, a focused survey to determine the presence or absence of one special status plant species, Nevins barberry (*Berberis nevinii*), was conducted by Psomas biologist Sarah Thomas on May 17, 2019. Results of the survey are included within Table 2-6, Special Status Plant Species Potentially Occurring in the Project Region, beginning on the following page.



Trees Regulated Under the City Tree Protection Ordinance

Exhibit 14

Berkshire Creek Area Improvements Project

N W E S

75 37.5 0 75 Feet

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TABLE 2-7
SPECIAL STATUS PLANT SPECIES POTENTIALLY OCCURRING IN THE PROJECT REGION

Scientific Name	Common Name	USFWS	CDFW	CRPR	Species Background	Potential
Arctostaphylos glandulosa ssp. *gabrielensis*	San Gabriel manzanita			1B.2	Evergreen shrub. Rocky soil in chaparral; 1,952–4,920 ft Southern California County Distribution: Los Angeles, San Bernardino. Blooming period: March	Not expected to occur; outside current known elevational range.
Astragalus brauntonii	Braunton's milk-vetch	FE		1B.1	Perennial herb. Recently burned and disturbed areas, in sandstone and carbonite soils, in chaparral, coastal scrub, and grasslands; 13–2,099 ft Southern California County Distribution: Los Angeles, Orange, Riverside, Ventura. Blooming period: January–August	Not expected to occur; no suitable habitat.
Atriplex parishii	Parish's brittlescale			1B.1	Annual herb. Alkaline soils in chenopod scrub, playas, and vernal pools; 82–6,232 ft Southern California County Distribution: Los Angeles (Presumed extirpated), Orange (Presumed extirpated), Riverside, San Bernardino (Presumed extirpated), San Diego. Blooming period: June–October	Not expected to occur; no suitable habitat.
Berberis nevinii	Nevin's barberry	FE	SE	1B.1	Evergreen shrub. Sandy or gravelly soils in chaparral, cismontane woodland, coastal scrub, and riparian scrub; 898–2,707 ft Southern California County Distribution: Los Angeles, Riverside, San Bernardino, San Diego. Blooming period: March–June	Absent from Project site per negative results of focused survey.
Calochortus clavatus var. gracilis	slender mariposa lily			1B.2	Perennial bulbiferous herb. Chaparral, coastal scrub, grassland; 1,050–3,280 ft Southern California County Distribution: Los Angeles, Ventura. Blooming period: March–June	Not expected to occur; limited marginally suitable habitat.
Calochortus palmeri var. *palmeri*	Palmer's mariposa lily			1B.2	Perennial bulbiferous herb. Mesic soils in chaparral, lower montane coniferous forests, meadows and seeps; 3,280–7,839 ft Southern California County Distribution: Kern, Los Angeles, Riverside, San Bernardino, Ventura. Blooming period: April–July	Not expected to occur; outside current known elevational range.
Calochortus plummerae	Plummer's mariposa lily			4.2	Perennial bulbiferous herb. Granitic and rocky areas in chaparral, cismontane woodland, coastal scrub, lower montane coniferous forest, and grassland; 328–5,576 ft Southern California County Distribution: Los Angeles, Orange, Riverside, San Bernardino, Ventura. Blooming period: May–July	Not expected to occur; limited marginally suitable habitat.
Castilleja gleasoni	Mt. Gleason paintbrush		SR	1B.2	Hemiparasitic perennial herb. Granitic soils in chaparral, lower montane coniferous forests, and Pinyon and juniper woodland; 3,805–7,118 ft Southern California County Distribution: Los Angeles. Blooming period: May–September	Not expected to occur; outside current known elevational range.

TABLE 2-7
SPECIAL STATUS PLANT SPECIES POTENTIALLY OCCURRING IN THE PROJECT REGION

Scientific Name	Common Name	USFWS	CDFW	CRPR	Species Background	Potential
Centromadia parryi ssp. *australis*	southern tarplant			1B.1	Annual herb. Found within the margin of marshes and swamps, vernally mesic soils in grassland, and vernal pools; 0–1,574 ft Southern California County Distribution: Los Angeles, Orange, San Diego, Ventura. Blooming period: May–November	Not expected to occur; no suitable habitat.
Centromadia pungens ssp. *laevis*	smooth tarplant			1B.1	Annual herb. Alkaline soils in chenopod scrub, meadows and seeps, playas, riparian woodland, and grassland; 0–2,100 ft Southern California County Distribution: Los Angeles, Riverside, San Bernardino, San Diego. Blooming period: April–September	Not expected to occur; records in the region are historic.
Chorizanthe parryi var. *fernandina*	San Fernando Valley spineflower	FC	SE	1B.1	Annual herb. Sandy soil in coastal scrub and grassland; 492–4,002 ft Southern California County Distribution: Los Angeles, Orange (Presumed extirpated), Ventura. Blooming period: April–July	Not expected to occur; records in the region are historic.
Chorizanthe parryi var. *parryi*	Parry's spineflower			1B.1	Annual herb. Sandy or rocky openings in chaparral, coastal scrub, cismontane woodland, and grassland; 902–4,001 ft Southern California County Distribution: Los Angeles, Riverside, San Bernardino. Blooming period: April–June	Not expected to occur; records in the region are historic.
Cladium californicum	California sawgrass			2B.2	Perennial rhizomatous herb. Meadows, seeps, marshes, and swamps either alkaline or freshwater; 197–2,837 ft Southern California County Distribution: Los Angeles (Presumed extirpated), Riverside, San Bernardino. Blooming period: June–September	Not expected to occur; records in the region are historic.
Dodecahema leptoceras	slender-horned spineflower	FE	SE	1B.1	Annual herb. Sandy soils in chaparral, cismontane woodland, and alluvial fan coastal scrub; 656–2,493 ft Southern California County Distribution: Los Angeles, Riverside, San Bernardino. Blooming period: April–June	Not expected to occur; records in the region are historic.
Dudleya multicaulis	many-stemmed dudleya			1B.2	Perennial herb. Often in clay soils in chaparral, coastal scrub, and grassland; 49–2,591 ft Southern California County Distribution: Los Angeles, Orange, Riverside, San Bernardino, San Diego. Blooming period: April–July	Not expected to occur; limited, marginally suitable habitat; few records in the region.
Galium grande	San Gabriel bedstraw			1B.2	Deciduous shrub. Chaparral, cismontane woodland, broadleafed upland and lower montane coniferous forest; 1,394–4,920 ft Southern California County Distribution: Los Angeles. Blooming period: January–July	Not expected to occur; no suitable habitat.

TABLE 2-7
SPECIAL STATUS PLANT SPECIES POTENTIALLY OCCURRING IN THE PROJECT REGION

Scientific Name	Common Name	USFWS	CDFW	CRPR	Species Background	Potential
Helianthus nuttallii ssp. *parishii*	Los Angeles sunflower			1A	Perennial rhizomatous herb. Coastal salt and freshwater marshes and swamps; 33–5,494 ft Southern California County Distribution: Los Angeles (Presumed extirpated), Orange (Presumed extirpated), San Bernardino (Presumed extirpated). Blooming period: August–October	Not expected to occur; records in the region are historic.
Horkelia cuneata var. *puberula*	mesa horkelia			1B.1	Perennial herb. Sandy and gravelly soils in maritime chaparral, cismontane woodland, and coastal scrub; 229–2,657 ft Southern California County Distribution: Los Angeles, Orange, Riverside (Presumed extirpated), San Bernardino, San Diego (Presumed extirpated), Ventura. Blooming period: February–July (September)	Not expected to occur; records in the region are historic.
Imperata brevifolia	California satintail			2B.1	Perennial rhizomatous herb. Mesic soils in chaparral, coastal scrub, Mojavean desert scrub, riparian scrub, meadows and seeps (often alkali); 0–3,985 ft Southern California County Distribution: Imperial, Kern, Los Angeles, Orange, Riverside, San Bernardino, Ventura. Blooming period: September–May	Not expected to occur; limited, marginally suitable habitat; few records in the region.
Lasthenia glabrata ssp. *coulteri*	Coulter's goldfields			1B.1	Annual herb. Coastal salt marsh, coastal salt swamps, playas, vernal pools; 3–4,001 ft Southern California County Distribution: Kern (Presumed extirpated), Los Angeles (Presumed extirpated), Orange, Riverside, San Bernardino (Presumed extirpated), San Diego, Ventura. Blooming period: February–June	Not expected to occur; no suitable habitat.
Lepidium virginicum var. *robinsonii*	Robinson's pepper-grass			4.3	Annual herb. Openings in chaparral and sage scrub; below 2,900 ft Southern California County Distribution: Los Angeles, Orange, Riverside, San Bernardino, San Diego, Ventura. Blooming Period: January–July	Not expected to occur; limited marginally suitable habitat.
Linanthus concinnus	San Gabriel linanthus			1B.2	Annual herb. Rocky openings in chaparral, lower and upper montane coniferous forest; 4,986–9,184 ft Southern California County Distribution: Los Angeles, San Bernardino. Blooming period: April–July	Not expected to occur; outside current known elevational range.
Malacothamnus davidsonii	Davidson's bush-mallow			1B.2	Deciduous shrub. Chaparral, coastal scrub, cismontane and riparian woodland; 607–2,804 ft Southern California County Distribution: Kern, Los Angeles, Ventura. Blooming period: June–January	Not expected to occur; limited marginally suitable habitat.
Pseudognaphalium leucocephalum	white rabbit-tobacco			2B.2	Perennial herb. Sandy or gravelly soils in chaparral, cismontane woodland, coastal scrub, and riparian woodland; 0–6,888 ft Southern California County Distribution: Los Angeles, Orange, Riverside, San Diego. Blooming period: July–December	Not expected to occur; records in the region are historic.

TABLE 2-7
SPECIAL STATUS PLANT SPECIES POTENTIALLY OCCURRING IN THE PROJECT REGION

Scientific Name	Common Name	USFWS	CDFW	CRPR	Species Background	Potential
Ribes divaricatum var. *parishii*	Parish's gooseberry			1A	Deciduous shrub. Riparian woodland; 213–984 ft Southern California County Distribution: Los Angeles (Presumed extirpated), San Bernardino (Presumed extirpated). Blooming period: February–April	Not expected to occur; records in the region are historic.
Sidalcea neomexicana	salt spring checkerbloom			2B.2	Perennial herb. Alkaline and mesic soils in chaparral, coastal scrub, lower montane coniferous forest, Mojavean desert scrub, and playas; 49–5,020 ft Southern California County Distribution: Kern, Los Angeles (Presumed extirpated), Orange, Riverside, San Bernardino, San Diego, Ventura. Blooming period: March–June	Not expected to occur; limited marginally suitable habitat.
Symphyotrichum greatae	Greata's aster			1B.3	Perennial rhizomatous herb. Mesic soils in chaparral, cismontane and riparian woodland, broadleaved upland and lower montane coniferous forest; 984–6,593 ft Southern California County Distribution: Los Angeles, San Bernardino, Ventura. Blooming period: June–October	Not expected to occur; no suitable habitat.

Species Background: California Native Plant Society (CNPS). 2018 (January 25). Inventory of Rare and Endangered Plants (online edition, v8-03). Sacramento, CA: CNPS. http://www.rareplants.cnps.org/.

Listing Status: California Department of Fish and Wildlife (CDFW). 2018 (January). Special Vascular Plants, Bryophytes, and Lichens List. Sacramento, CA: CDFW, Natural Heritage Division.

USFWS: U.S. Fish and Wildlife Service; CDFW: California Department of Fish and Wildlife; CRPR: California Rare Plant Rank; ft: feet

Species Status:

Federal (USFWS)	**State (CDFW)**
FE Endangered	SE Endangered
FT Threatened	ST Threatened
	SR Rare

CRPR

1A Plants presumed extirpated in California and either rare or extinct elsewhere
1B Plants Rare, Threatened, or Endangered in California and elsewhere
2B Plants Rare, Threatened, or Endangered in California, but more common elsewhere
4 Plants of limited distribution - watch list

CRPR Threat Code Extension

None: Plants lacking any threat information
.1 Seriously threatened in California (over 80% of occurrences threatened; high degree and immediacy of threat)
.2 Moderately threatened in California (20–80% of occurrences threatened; moderate degree and immediacy of threat)
.3 Not very threatened in California (<20% of occurrences threatened; low degree and immediacy of threat or no current threats known)

Common Wildlife and Wildlife Movement

The Project area currently consists mostly of native woodland and scrub habitats with meandering existing trail systems, access roads, and passive or active recreational features surrounded by substantial transportation corridors and low-density residential properties. The majority of the land immediately west of the Project site is developed, primarily with residential, educational, and transportation uses, while the land immediately to the east is open space flood control that is connected to unimproved open space. Wildlife movement in the region is expected to be of high value as wildlife traverse large open space areas of the Angeles National Forest (ANF), and travel between the ANF and large tracts of native vegetation within the upper and central Arroyo Seco to the northeast, east, and southeast of the Project site. The Project site itself, however, does not occur within a critical linkage or corridor for wildlife movement. Movement occurring through the Project area is expected to be local movement only. The wildlife expected to move through the Project site would be residents of the area and are expected to be common species habituated to human settlement such as the Virginia opossum, common raccoon, and coyote. These local wildlife species can readily move through many areas in the immediate vicinity of HWP and do not specifically require the Project site to accommodate the daily or seasonal activities. The Project area does not occur within a regional wildlife corridor or any feature that would be used by wildlife to travel from one large open space area to another.

No fish or amphibians were observed during the survey due to lack of suitable habitat. During a storm event, when water is flowing or ponded, common fish and amphibian species that may occur include the western mosquitofish (*Gambusia affinis*), American bullfrog (*Lithobates catesbeianus*), California toad (*Anaxyrus boreas halophilus*), Baja California treefrog (*Pseudacris hypochondriaca*), and black-bellied slender salamander (*Batrachoseps nigriventris*). Potentially suitable habitat for reptile species occurs throughout the Project site. Two reptile species, the western fence lizard (*Sceloporus occidentalis*) and side-blotched lizard (*Uta stansburiana*), were detected during the surveys. Other common reptile species that may occur in the survey area include San Diego alligator lizard (*Elgaria multicarinata webbii*), California gopher snake (*Pituophis catenifer annectens*), California striped racer (*Coluber literalis literalis*), and Southern Pacific rattlesnake (*Crotalus oreganus helleri*). A variety of bird species are expected to be residents on the Project site, using the habitats throughout the year. Other species are present only during certain seasons. For example, the white-crowned sparrow (*Zonotrichia leucophrys*) is expected to occur on the Project site during the winter season and then migrate north in the spring to breed during the summer.

A variety of bird species are expected to occur on or adjacent to the Project site. Species observed during the survey include: Canada goose (*Branta canadensis*), mallard (*Anas platyrhynchos*), ring-necked duck (*Aythya collaris*), hooded merganser (*Lophodytes cucullatus*), rock pigeon (*Columba livia*), Eurasian collared-dove (*Streptopelia decaocto*), mourning dove (*Zenaida macroura*), Anna's hummingbird (*Calypte anna*), western gull (*Larus occidentalis*), California gull (*Larus californicus*), sharp-shinned hawk (*Accipiter striatus*), red-shouldered hawk (*Buteo lineatus*), red-tailed hawk (*Buteo jamaicensis*), Lewis' woodpecker (*Melanerpes lewis*), acorn woodpecker (*Melanerpes formicivorus*), Nuttall's woodpecker (*Picoides nuttallii*), downey woodpecker (*Picoides pubescens*), northern flicker (*Colaptes auratus*), American kestrel (*Falco sparverius*), black phoebe (*Sayornis nigricans*), California scrub-jay (*Aphelocoma californica*), American crow (*Corvus brachyrhynchos*), common raven (*Corvus corax*), oak titmouse (*Baeolophus inornatus*), bushtit (*Psaltriparus minimus*), white-breasted nuthatch (*Sitta carolinensis*), Bewick's wren (*Thryomanes bewickii*), ruby-crowned kinglet (*Regulus calendula*), western bluebird (*Sialia mexicana*), hermit thrush (*Catharus guttatus*), American robin (*Turdus migratorius*), California thrasher (*Toxostoma redivivum*), European starling (*Sturnus vulgaris*), house finch (*Haemorhous mexicanus*), purple finch (*Haemorhous purpureus*), lesser goldfinch (*Spinus psaltria*), spotted towhee (*Pipilo maculatus*), California towhee (*Pipilo crissalis*), song sparrow (*Melospiza melodia*), white-crowned sparrow (*Zonotrichia leucophrys*), dark-eyed junco (*Junco hyemalis*), and yellow-rumped warbler (*Setophaga coronata*).

Other common bird species expected to occur on the Project site include, but are not limited to: Allen's hummingbird (*Selasphorus sasin*), Say's phoebe (*Sayornis saya*), blue gray gnatcatcher (*Polioptila* *caerulea*), yellow warbler (*Setophaga petechia*), California quail (*Callipepla californica*), acorn woodpecker (*Melanerpes formicivorus*), and lesser goldfinch (*Spinus psaltria*), Cassin's kingbird (*Tyrannus vociferans*), house wren (*Troglodytes aedon*), wrentit (*Chamaea fasciata*), northern mockingbird (*Mimus polyglottos*), cedar waxwing (*Bombycilla cedrorum*), phainopepla (*Phainopepla nitens*), brown-headed cowbird (*Molothrus ater*), orange-crowned warbler (*Oreothlypis celata*), and black-headed grosbeak (*Pheucticus melanocephalus*).

Two small-sized mammals, California ground squirrel (*Spermophilus beecheyi*) and Botta's pocket gopher (*Thomomys bottae*) were observed in the survey area. Other small-sized mammal species expected to occur include eastern fox squirrel (*Sciurus niger*). Medium-sized mammals expected to occur include desert cottontail (*Sylvilagus audubonii*), Virginia opossum (*Didelphis virginiana*), common raccoon (*Procyon lotor*), and striped skunk (*Mephitis mephitis*). Large-sized mammals expected to occur include coyote (*Canis latrans*), bobcat (*Lynx rufus*), and mule deer (*Odocoileus hemionus*).

Bats occur throughout most of Southern California and may use any portion of the study area as foraging habitat. Most of the bats that could potentially occur in the study area are inactive during the winter and either hibernate or migrate, depending on the species. The following common bat species are expected to occur on or adjacent to the Project site: big brown bat (*Eptesicus fuscus*), Brazilian free-tailed bat (*Tadarida brasiliensis*), canyon bat (*Parastrellus hesperus*), hoary bat (*Lasiurus cinereus*), yuma myotis (*Myotis yumanensis*), little brown bat (*Myotis lucifigus*), and California myotis (*Myotis californicus*). Bats may roost in crevices of structures, in culverts, under bridges, or in large oak or sycamore trees in the survey area.

Special Status Wildlife

Many special status wildlife species have potential to occur in the Project region, summarized in Table 2-8, Special Status Wildlife Species Reported in the Project Area, beginning on the following page. The table includes a brief description of the habitat for the species and the potential for occurrence on the Project site. Note that these species are grouped by taxon and listed alphabetically according to their scientific name.

Additionally, several CDFW Watch List species are reported from the Project region but are not included in the table, below, such as: orange-throated whiptail (*Aspidoscelis hyperythra*), California mountain kingsnake (San Bernardino population) (*Lampropeltis zonata parvirubra*), sharp-shinned hawk (*Accipiter striatus*), Cooper's hawk (*Accipiter cooperii*), merlin (*Falco columbarius*), California horned lark (*Eremophila alpestris actia*), southern California rufous-crowned sparrow (*Aimophila ruficeps canescens*), and Bell's sage sparrow (*Artemisiospiza belli belli*). The orange-throated whiptail (Aspidoscelis hyperythra), Cooper's hawk, sharp-shinned hawk, merlin, and southern California rufous-crowned sparrow may occur on the Project site. Cooper's hawk and southern California rufous-crowed sparrow may occur for nesting.

TABLE 2-8
SPECIAL STATUS WILDLIFE SPECIES REPORTED FROM THE PROJECT AREA

Species	General Habitat/Range Description	USFWS	CDFW	Critical Habitat Present in the Study Area[a]	Potential for Occurrence
Fish					
Gila orcuttii arroyo chub	Occurs in coastal freshwater streams and rivers with sustained flows and emergent vegetation with substrates consisting primarily of sand or mud.	–	SSC	–	Not expected to occur; no suitable habitat.
Rhinichthys osculus ssp. 3 Santa Ana speckled dace	Occurs in perennial streams with riffle habitats in clean, rocky-bottomed streams and rivers.	–	SSC	–	Not expected to occur; no suitable habitat.
Catostomus santaanae Santa Ana sucker	Occurs in shallow streams with flows that run from slow to swift. Stream substrates consist of boulders, gravel, and cobble where there are growths of filamentous algae. This species is occasionally found on sandy or muddy substrates.	FT	SSC	No	Not expected to occur; no suitable habitat.
Amphibians					
Taricha torosa Coast Range newt	Found in wet forests, oak forests, chaparral, and rolling grasslands. In Southern California, drier chaparral, oak woodland, and grasslands are used.	–	SSC	–	Not expected to occur; no suitable habitat.
Anaxyrus [*Bufo*] *californicus* arroyo toad	Occurs in semi-arid regions near washes or intermittent streams. Streams must be of low velocity with sand or gravel substrate.	FE	SSC	No	Not expected to occur; no suitable habitat.
Rana draytonii California red-legged frog	Occurs in deep ponds and slow-moving streams with emergent vegetation in forests, woodlands, grasslands, streams, wetlands, ponds, and lakes from sea level to 8,000 ft above msl.	FT	SSC	No	Not expected to occur; no suitable habitat.
Rana muscosa Southern Mountain yellow-legged frog	Occurs in small, isolated populations in the San Gabriel, San Bernardino, and San Jacinto Mountains in narrow, rock-walled rivers, perennial creeks, and permanent plunge pools with intermittent creeks and pools in montane riparian and/or chaparral between 1,200 and 7,500 ft above msl.	FE	SSC	No	Not expected to occur; no suitable habitat.

TABLE 2-8
SPECIAL STATUS WILDLIFE SPECIES REPORTED FROM THE PROJECT AREA

Species	General Habitat/Range Description	USFWS	CDFW	Critical Habitat Present in the Study Area[a]	Potential for Occurrence
Spea hammondii Western Spadefoot	Occurs in a wide range of habitats; lowlands to foothills, grasslands, open chaparral, pine-oak woodlands. It prefers shortgrass plains, sandy or gravelly soil (e.g., alkali flats, washes, alluvial fans). It is fossorial and breeds in temporary rain pools and slow-moving streams (e.g., areas flooded by intermittent streams).	–	SSC	–	Not expected to occur; no suitable habitat.
Reptiles					
Emys marmorata western pond turtle	Occurs in ponds, lakes, marshes, rivers, streams, and irrigation ditches with a rocky or muddy bottom and aquatic vegetation at elevations from sea level to approximately 6,696 ft above msl.	–	SSC	–	Not expected to occur; no suitable habitat.
Phrynosoma blainvillii coast horned lizard	Occurs in scrubland, grassland, coniferous forests, and broadleaf woodland vegetation types.	–	SSC	–	Not expected to occur; limited marginally suitable habitat.
Aspidoscelis tigris stejnegeri San Diegan tiger whiptail	Occurs in hot and dry areas with sparse foliage and open areas. Found in forests, woodland, chaparral, and riparian areas.	–	–	–	May occur; potentially suitable habitat.
Anniella sp. California legless lizard	Requires areas with loose sandy soil, moisture, warmth, and plant cover, including leaf litter. Occurs in coastal dune, valley-foothill, chaparral, and coastal scrub types at elevations between sea level and approximately 1,800 m (6,000 ft).	–	SSC	–	May occur; potentially suitable habitat.
Arizona elegans occidentalis California glossy snake	Occurs most commonly in desert habitats but also occur in chaparral, sagebrush, valley-foothill hardwood, pine-juniper, and annual grass, elevation from below sea level to 7,000 ft. Prefer open sandy areas with scattered brush, but also found in rocky areas.	–	SSC	–	Not expected to occur; limited marginally suitable habitat.
Thamnophis hammondii two-striped garter snake	Occurs in wetlands, freshwater marsh, and riparian habitats with perennial water.	–	SSC	–	May occur; limited potentially suitable habitat.

TABLE 2-8
SPECIAL STATUS WILDLIFE SPECIES REPORTED FROM THE PROJECT AREA

Species	General Habitat/Range Description	USFWS	CDFW	Critical Habitat Present in the Study Area[a]	Potential for Occurrence
Birds					
Gymnogyps californianus California condor	Occurs in mountainous country at low to moderate elevations, especially rocky and brushy areas with cliffs available for nest sites. Foraging habitat includes grasslands, oak savannas, mountain plateaus, ridges, and canyons. In lower elevation mountains, they require areas where wind conditions are suitable for take-offs.	FE	SE	No	Not expected to occur; no suitable habitat.
Coccyzus americanus occidentalis western yellow-billed *cuckoo (nesting)*	Uncommon to rare summer resident of valley foothill and desert riparian habitats in scattered locations in California. Requires broad areas of old-growth riparian habitats dominated by willows and cottonwoods with dense understory vegetation.	FT	SE	No	Not expected to occur; no suitable habitat.
Asio otus long-eared owl (nesting)	Occurs in dense woodlands adjacent to open grassland or shrubland, and open forests.	–	SSC	–	May occur for foraging; limited potentially suitable habitat.
Cypseloides niger black swift	Nesting typically occurs in a moist crevice or cave on a sea cliff above the surf or on cliffs behind or adjacent to waterfalls in deep canyons.	–	SSC	–	Not expected to occur; no suitable habitat.
Empidonax traillii extimus southwestern willow flycatcher	Occurs in extensive (greater than 20 acres) riparian habitats along rivers, streams, or other wetlands where dense growth of willows, mule fat, arrow-weed (*Pluchea sericea*), tamarisk (*Tamarix* sp.), or other plants are present, often with a scattered overstory of cottonwood.	FE	SE	No	Not expected to occur; lack of suitable habitat of sufficient quantity for breeding. It is noted, the species has not been observed breeding in Los Angeles County in several decades.
Buteo swainsoni Swainson's hawk	Forages in savanna, open pine-oak woodland, and agricultural lands with scattered trees.	–	ST	–	Not expected to occur for breeding; breeding in the county is restricted to the Antelope Valley, no breeding records in the Project region since 1919 (one breeding record between 1880-1919) (Allen et al. 2016); may occur as a migrant fly-over.

TABLE 2-8
SPECIAL STATUS WILDLIFE SPECIES REPORTED FROM THE PROJECT AREA

Species	General Habitat/Range Description	USFWS	CDFW	Critical Habitat Present in the Study Area[a]	Potential for Occurrence
Aquila chrysaetos golden eagle	Uncommon permanent resident and migrant throughout California, except center of Central Valley. More common in southern California than in north. Ranges from sea level up to 3833 m (0-11,500 ft). Generally, occurs in rolling foothills, mountain areas, sage-juniper flats, and desert habitats. Breeding in Southern California breeding birds are primarily restricted to rugged, mountainous country (Garrett and Dunn 1981).	–	FP	–	Not expected to occur for breeding; marginally suitable breeding and foraging habitat due to proximity to developed areas; may occur as a fly-over.
Athene cunicularia burrowing owl (burrow and wintering sites)	Breeds and forages in grasslands and prefers flat to low, rolling hills in treeless terrain. Nests in burrows, typically in open habitats, most often along banks and roadsides.	–	SSC	–	Not expected to occur; no suitable habitat.
Vireo bellii pusillus least Bell's vireo (nesting)	Riparian habitats dominated by willows with dense understory vegetation between sea level and 1,500 ft above msl.	FE	SE	No	Limited potential to occur; marginal potentially suitable habitat
Riparia riparia bank swallow	Breeds in riparian areas with vertical cliffs and banks with fine-textured sandy soil in which it digs nesting holes.	–	ST	–	Not expected to occur; no suitable habitat.
Polioptila californica californica coastal California gnatcatcher	In California, this species is an obligate resident of several distinct sub-associations of the coastal sage scrub vegetation type. The gnatcatcher has been recorded from sea level to approximately 3,000 ft above msl (USFWS 2003); however, greater than 90 percent of gnatcatcher records are from between sea level and 820 ft above msl along the coast and between sea level and 1,800 ft above msl inland (Atwood and Bolsinger 1992).	FT	SSC	No	Not expected to occur; sagescrub habitat on site too isolated and limited in size to support the gnatcatcher.
Icteria virens yellow-breasted chat	For nesting, this species requires dense, brushy tangles near water and riparian woodlands that support a thick understory.	–	SSC	–	Not expected to occur; no suitable habitat.

TABLE 2-8
SPECIAL STATUS WILDLIFE SPECIES REPORTED FROM THE PROJECT AREA

Species	General Habitat/Range Description	USFWS	CDFW	Critical Habitat Present in the Study Area[a]	Potential for Occurrence
Agelaius tricolor tricolored blackbird (nesting)	This colonial nesting species prefers to breed in freshwater marshes dominated by cattails (*Typha* spp.) and bulrushes (*Scirpus* or *Schoenoplectus* spp.), with willows (*Salix* spp.) and nettles (*Urtica* spp.) also common. The introduced mustards (*Brassica* spp.), blackberries (*Rubus* spp.), thistles (*Circium* spp.), and mallows (*Malva* spp.) have been commonly used for several decades.	–	SCE, SSC	–	Not expected to occur; no suitable habitat.
Setophaga petechia yellow warbler	Riparian habitats dominated by willows with dense understory vegetation between sea level and 9,000 ft above msl.	–	SSC	–	May occur; potentially suitable habitat.
Mammals					
Bassariscus astutus Ring-tailed cat	Dry, rocky, or mountainous areas with scattered oaks and conifers. Dens among rock crevices or in burrows, hollow trees, or attics by day. Strictly nocturnal, seldom emerges before dark. Fairly common throughout range.	–	FP	–	Limited potential to occur; potentially suitable habitat.
Neotoma lepida intermedia San Diego desert woodrat	Common to abundant in Joshua tree, Pinyon-juniper, mixed and chamise-redshank chaparral, sagebrush, and most desert habitats. Also found in a variety of other habitats. Most abundant in rocky areas with Joshua trees. Elevational range from sea level to 2600 m (8500 ft). Northern and elevational distribution may be limited by temperature.	–	SSC	–	May occur; potentially suitable habitat.
Onychomys torridus southern grasshopper mouse	Common in arid desert habitats of the Mojave Desert and southern Central Valley of California. Alkali desert scrub and desert scrub habitats are preferred, with somewhat lower densities expected in other desert habitats, including succulent shrub, wash, and riparian areas. Also occurs in coastal scrub, mixed chaparral, sagebrush, low sage, and bitterbrush habitats.	–	SSC	–	May occur; potentially suitable habitat.

TABLE 2-8
SPECIAL STATUS WILDLIFE SPECIES REPORTED FROM THE PROJECT AREA

Species	General Habitat/Range Description	USFWS	CDFW	Critical Habitat Present in the Study Area[a]	Potential for Occurrence
Choeronycteris mexicana Mexican long-tongued bat	Occurs in arid habitats and roosts in caves, buildings, crevices, and mines. Species typically found in dimly lit areas near preferred food source of ornamental trees or large native plants with sufficient nectar, including agaves, cacti, avocado, banana plants, etc.	–	SSC	–	Not expected to occur for foraging or roosting; site or vicinity contains no vegetation with suitable nectar sources.
Macrotus californicus California leaf-nosed bat	Occurs in desert lowlands. The species roosts in caves and cave-like structures, and forages in desert washes and floodplains, and dry, sandy washes with riparian tree vegetation. Extirpated from all known non-desert sites north of San Diego.	–	SSC	–	Not expected to occur; outside known range.
Antrozous pallidus pallid bat	Occurs in grasslands, shrublands, and woodlands and in open habitats with rocky areas or man-made structures for roosting. Species can also roost in caves and trees. Species typically forages in rural or undeveloped, natural areas and is mostly absent in urban and suburban areas.	–	SSC	–	May occur for roosting and foraging; potentially suitable habitat.
Corynorhinus townsendii Townsend's big-eared bat	Occurs in oak woodlands, arid deserts, grasslands, along the coast, and high-elevation forests and meadows. Population centers occur near large, minimally-disturbed cavities, including both natural caves and man-made structures.	–	SSC	–	May occur for foraging, not expected to occur for roosting.
Lasiurus blossevillii western red bat	Roosts in trees typically associated with riparian habitats where cottonwoods, oaks, sycamores, and walnuts are present. Also known to roost in orchards trees.	–	SSC	–	May occur for roosting and foraging, potentially suitable habitat.
Lasiurus xamtjomis western yellow bat	This is a tree-roosting species most commonly found roosting in groves of palm trees with skirts of dead fronds. Also documented roosting in large cottonwood trees. Found in the arid environment of the southwestern U.S., the Mexican Plateau, and coastal western Mexico.	–	SSC	–	Low potential to occur for foraging and not expected for roosting, marginal potentially suitable foraging habitat, no potentially suitable roosting habitat.

TABLE 2-8
SPECIAL STATUS WILDLIFE SPECIES REPORTED FROM THE PROJECT AREA

Species	General Habitat/Range Description	USFWS	CDFW	Critical Habitat Present in the Study Area[a]	Potential for Occurrence
Eumops perotis californicus western mastiff bat	Found in many open semi-arid to arid habitats, including conifer and deciduous woodlands, coastal scrub, grasslands, palm oases, chaparral, desert scrub, and urban areas. Typically forages in open areas with high cliffs and roosts in crevices on cliff faces and occasionally in man-made structures with at least 15 ft of unobstructed space below roost.	–	SSC	–	May occur for foraging; not expected to occur for roosting; potentially suitable foraging habitat, no suitable roosting habitat.
Nyctinomops macrotis big free-tailed bat	Feeds primarily on moths caught while flying over water sources in suitable habitat in the southwestern U.S. This migratory species prefers rugged, rocky terrain and roosts in crevices in high cliffs or rocky outcrops. Uncommon in Southern California.	–	SSC	–	Not expected to occur for roosting or foraging; no suitable roosting habitat onsite and no records in the Project region.
Lepus californicus bennettii San Diego black-tailed jackrabbit	Occurs in herbaceous and desert-shrub areas and open, early stages of forest and chaparral habitats.	–	SSC	–	May occur; potentially suitable habitat.
Taxidea taxus American badger	Most abundant in the drier open stages of most shrub, forest, and herbaceous habitats, with friable soils. When inactive, occupies underground burrow.	–	SSC	–	Not expected to occur; no suitable habitat.

USFWS: U.S. Fish and Wildlife Service; CDFW: California Department of Fish and Wildlife; USFS: U.S. Forest Service; msl: mean sea level

Status Definitions

Federal (USFWS) Status
FE Endangered
FT Threatened
FC Candidate

State (CDFW) Status
SE Endangered
ST Threatened
SCE Candidate Endangered
SSC Species of Special Concern
FP California Fully Protected

Notes: Scientific and common names for wildlife species follow the most current list of Special Animals (October 2017) available from the CDFW (https://www.wildlife.ca.gov/Data/CNDDB/Plants-and-Animals).

[a] Critical Habitat only applies to USFWS-listed species. As such, any species without a USFWS listing, will have a "–".

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modification, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☒	☐	☐

WHY? The analysis below is divided into discussions about direct and/or indirect impacts to special status plant species and special status wildlife species that occur or potentially occur on the Project site. For a discussion of cumulative impacts, refer to Section 2.22, Mandatory Findings of Significance, Threshold (c), of this IS/MND. Exhibit 15, Biological Resources Impacts, illustrates the impact footprint defined for Berkshire Creek and the equestrian picnic area lot, where earthmoving activities would occur and the location of the irrigation main line, where shallow trenching would occur.

<u>Special Status Plant Species</u>

No special status species are expected to occur within the Project site. Although one special status species, Nevin's barberry, was initially determined to have limited potential to occur as a result of literature review, a focused survey determined the species to be absent from the Project site. The Project would have no adverse impact on special status plant species, and no mitigation would be required.

<u>Special Status Wildlife Species</u>

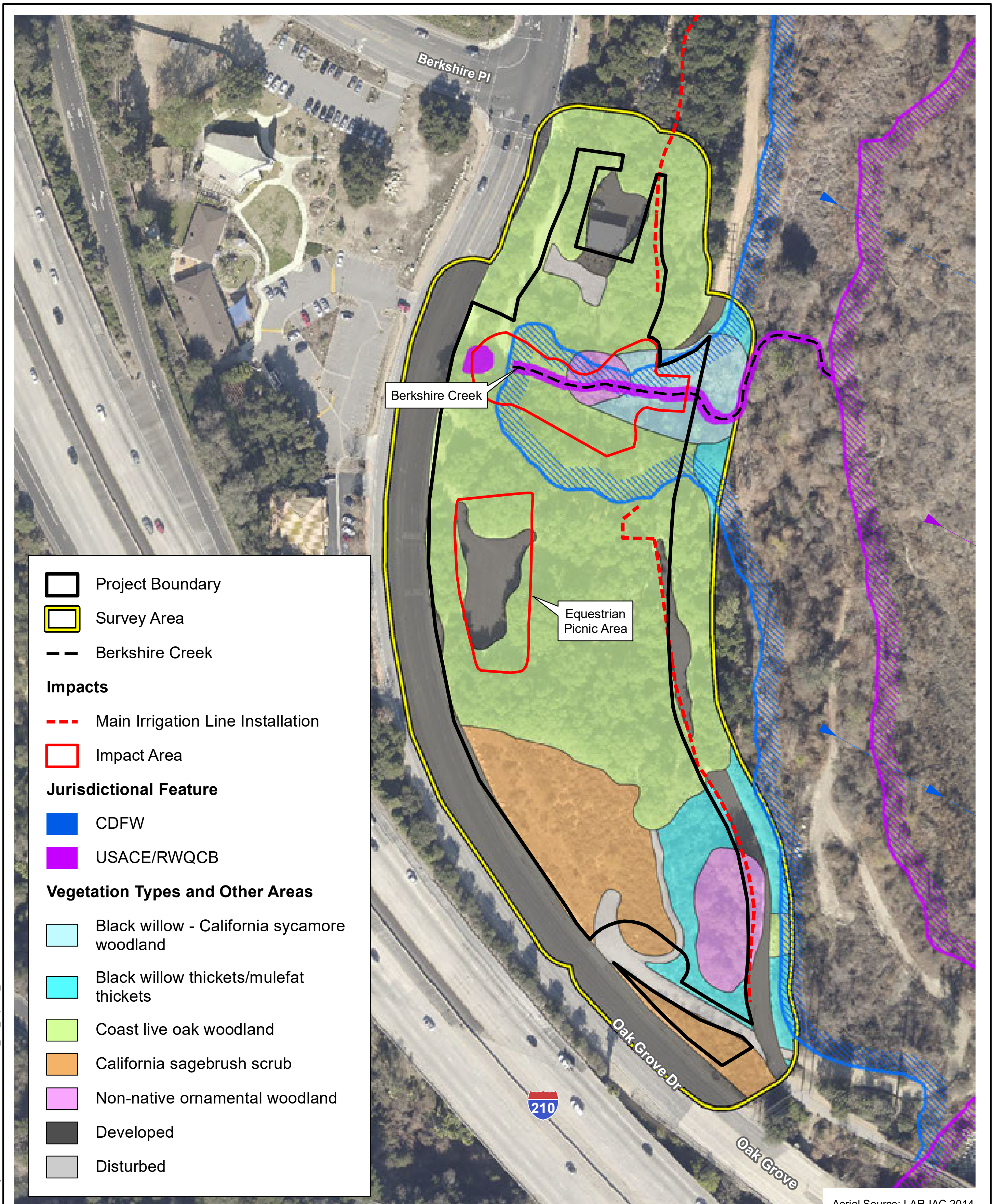
The proposed Project would result in the loss of potential habitat for 14 special status wildlife species. The discussions below evaluate impacts on those wildlife species observed and those that may occur on the Project site. For those species with potential to occur, potential impacts were evaluated for the habitat which the species is expected to occupy.

Reptiles

Three special status reptile species potentially occur on the site: the coastal whiptail, two-striped garter snake, and silvery legless lizard. Although the proposed Project would impact potential habitat for these species, they are not listed as Threatened or Endangered by State or federal resource agencies. The temporary loss of a small amount of native habitat may be considered an adverse impact on these species, but only a very small number of individuals would be affected relative to the much greater number of individuals that constitute the regional populations. As a result, the relatively minor temporary loss of habitat would not be expected to substantially reduce regional populations of these species. There would be no permanent adverse impacts on these species or their habitat. Additionally, implementation of the Project would benefit these native habitats in the long term. Therefore, potential Project impacts on these special status reptile species would be considered adverse but less than significant, and no mitigation is required.

Birds

Eight federally and/or State-listed Threatened or Endangered (or Candidate State-listed Endangered) bird species occur in the Project region: California condor, western yellow-billed cuckoo, Swainson's hawk, southwestern willow flycatcher, least Bell's vireo, bank swallow, coastal California gnatcatcher, and tricolored blackbird.



Biological Resources Impacts

Exhibit 15

Berkshire Creek Area Improvements Project

N W E S

150 75 0 150 Feet

PSOMAS

(Rev: 05/21/2019 MMD) R:\Projects\PAS_Pasaden\3PAS010801\Graphics\Berkshire_Creek\MND\ex_Bio_Impacts.pdf

The western yellow-billed cuckoo and southwestern willow flycatcher are not expected to occur because the riparian habitat on the Project site is not expansive enough for the breeding needs of these species. Therefore, Project implementation would not result in any impacts on these species and no mitigation is required.

The California sagebrush scrub on the Project site is too limited in size and isolated to support the coastal California gnatcatcher. There would be no impact to this species and no mitigation is required.

The California condor, Swainson's hawk, bank swallow, and tricolored blackbird are not expected to occur due to a lack of suitable habitat. There would be no impact to this species and no mitigation is required.

The riparian vegetation on the Project site is potentially suitable for least Bell's vireo. Although the extent of such habitat on the site is extremely limited, impacts to this species may be potentially significant. The Project schedule of Fall 2019 has been designed in part to avoid any potential impact on least Bell's vireo by entirely avoiding the period when this species is potentially present in the region. The balance of the year, this species returns to non-breeding grounds in central and south America. Furthermore, implementation of MM BIO-1, requiring that work activities avoid impacts to nesting birds, would ensure avoidance and reduce this impact to a less than significant level.

One additional passerine bird species, yellow warbler, a California Species of Special Concern but not listed as Threatened or Endangered by State or federal resources agencies, potentially occurs on the Project site. If present, the proposed Project would temporarily impact potential foraging and nesting habitat for this species. The temporary loss of foraging and nesting habitat would be considered an adverse impact but only a very small number of individuals would be affected relative to the much greater number of individuals comprising the regional population. As a result, the relatively minor temporary loss of habitat would not be expected to substantially reduce regional populations of this species. There would be no permanent adverse impacts on this species or its habitat. Therefore, Project impacts on this special status bird species would be considered adverse but less than significant, and no mitigation is required.

One common raptor species, the red-tailed hawk, has the potential to nest on the Project site. Should an active raptor nest be found on the Project site, the loss of the nest would be considered a violation of *California's Fish and Game Code* (Sections 3503, 3503.5, and 3513). The loss of any active raptor nest occurring on the Project site would be considered potentially significant. However, the Project schedule of Fall 2019 has been designed in part to avoid the nesting season of local breeding raptors such as red-tailed hawk. Additionally, there would be no permanent adverse impacts on this species or its habitat. Implementation of MM BIO-1, requiring that work activities avoid impacts to nesting birds, would ensure avoidance and reduce this impact to a less than significant level.

Mammals

Special status mammal species potentially present on the Project site include the ringtail cat, San Diego desert woodrat, southern grasshopper mouse, pallid bat, Townsend's big-eared bat, western red bat, western yellow bat, western mastiff bat, and San Diego black-tailed jackrabbit. Potential roosting habitat is present for the western red bat and pallid bat.

Temporary loss of habitat for the San Diego desert woodrat, southern grasshopper mouse, and San Diego black-tailed jackrabbit would be considered an adverse impact. However, only a very small number of individuals would be affected relative to the much greater numbers of individuals that constitute these regional populations. As a result, the relatively minor temporary loss of habitat would not be expected to substantially reduce regional populations of these species. In addition, there would be no permanent adverse impacts on these species or their habitat. Therefore, Project impacts on these special status mammal species would be considered adverse but less than significant, and no mitigation is required.

The western red bat and pallid bat may also have potential to roost in or adjacent to the Project area. Project implementation would result in the loss of some potential roosting habitat for these species. Direct impacts to roosting bats would be considered potentially significant. However, the Project schedule of Fall 2019 has been designed in part to avoid potential impacts on bats by avoiding the period when these species may potentially breed or hibernate in colonies in the region. Implementation of MM BIO-2 would ensure avoidance and would reduce adverse impacts to a less than significant level by minimizing disturbance to roosting bats during construction through seasonal avoidance and a two-step habitat removal process. In conclusion, there would be no impacts to special status plant species and less than significant impacts on special status wildlife species with implementation of MMs BIO-1 through BIO-2.

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☐	☒	☐

WHY? A total of 0.40 acres of coast live oak woodland would be impacted within the Berkshire Creek disturbance footprint of the Project. An additional approximately 2.24 acres (including 54 existing trees) of coast live oak woodland would be temporarily impacted with the installation of coast live oak trees for restoration purposes. The 0.04 acres of black willow–California sycamore woodland would be temporarily impacted by the Project. Other special status vegetation types on the Project site (i.e. black willow thickets/mulefat thickets and California sagebrush scrub) are outside of the area of disturbance would not be impacted by Project activities. Implementation of the Project would not result in a measurable negative effect on the regional distribution and abundance of these vegetation types. Also, the Project would be expected to substantially benefit these vegetation types in the long term as a result of increased habitat health and resulting functions and values compared to the existing condition. There would be less than significant impacts to coast live oak woodland and black willow–California sycamore woodland, and no mitigation is required.

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
c) Have a substantial adverse effect on State or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☒	☐	☐

WHY? As mentioned above, the Project survey area contains a jurisdictional ephemeral drainage feature (Berkshire Creek). The CDFW regulates all work (including initial construction and ongoing operation and maintenance) that may substantially divert or obstruct the natural flow of or substantially change or use any material from the bed, channel, or bank of any river, stream, or lake through its Streambed Alteration Program. An Applicant must enter into an agreement with the CDFW to ensure no net loss of wetland values and acreages.

The extent of potential impacts to CDFW jurisdiction in the Project survey area has been identified as 0.36 acre.

As previously indicated, approximately 0.09 acre of Waters of the United States, under the regulatory authority of the USACE, are subject to impact on the Project site. All USACE jurisdictional areas are non-wetland waters. Because no isolated waters are present on the site, the quantity of "waters of the State" under the regulatory authority of the RWQCB is equal to that of USACE "waters of the U.S.".

Impacts to jurisdictional features would be considered significant before mitigation. Compliance with Clean Water Act and *California Fish and Game Code* regulations would require the City to obtain permits from the USACE, RWQCB, and CDFW. Additionally, MM BIO-3 requires a minimum level of equal, or greater, replacement of permanently lost jurisdictional resources. Through compliance with regulatory requirements and implementation of MM BIO-3, impacts to jurisdictional resources would be reduced to a less than significant level.

	Potentially Significant Impact	**Less than Significant with Mitigation**	**Less than Significant Impact**	**No Impact**
Would the project:				
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☒	☐	☐

WHY? Wildlife movement typically consists of (1) dispersal (e.g., juvenile animals from natal areas or individuals extending range distributions); (2) seasonal migration; and (3) movements related to home range activities (e.g., foraging for food or water, defending territories, or searching for mates, breeding areas, or cover). This movement is necessary in order to maintain healthy wildlife populations, especially where open space is limited in size or otherwise isolated from other open space areas. A number of terms such as "wildlife corridor", "travel route", "habitat linkage", and "wildlife crossing" have been used in various wildlife movement studies to refer to areas where wildlife moves from one area to another.

Although regional wildlife movement does occur within the general area through open-spaces and native vegetation of the Arroyo Seco and adjacent lands, as previously described, the ability of the Project site specifically to support regional wildlife movement has been compromised by surrounding development. As a result, the Project site supports the movement of almost exclusively local wildlife, that also readily use surrounding areas. As such, the Project site has very little potential to support critical regional wildlife movement. Moreover, given the limited geographic footprint of the Project (approximately 4.7 acres) within the larger Hahamongna Watershed Park (approximately 1,300 acres), any regional wildlife movement occurring on the Project site would continue to occur in the land surrounding the Project footprint with limited, if any, disruption during Project construction. Upon completion of Project construction, the Project would have no adverse impact on regional wildlife movement.

Construction activities would create very minimal dust and noise within and adjacent to the work areas. During active construction, wildlife movement may be deterred by noise and human activity; however, most wildlife movement would occur at night while construction activities would occur during the day. In addition, construction activities would be temporary and brief, and as such would not be expected to impact wildlife movement patterns in the area to a measurable degree. Direct and indirect impacts, such as noise pollution and human activity, are considered adverse but less than significant since the temporary loss (i.e., inability to be used) of local movement areas during construction activities would affect a small number of individuals representing an extremely small percentage of the overall regional populations. As a result, there would not be a substantial effect on regional wildlife populations. In addition, greater opportunities for regional movement would continue to be available in the wider region and the post-Project condition would promote greater movement potential in the project area through a greater abundance and diversity of native vegetation.

Bird species have potential to nest in native and non-native vegetation on the Project site. Active nests of birds and raptors are protected by the Migratory Bird Treaty Act (MBTA) and *California Fish and Game Code.* Suitable habitat for ground-nesting birds is present throughout the Project site, and suitable habitat for tree and shrub-nesting species is present on-site and within a 500-ft radius. MM BIO-1 is included to ensure migratory birds and their nests are protected pursuant to the MBTA and CDFW Code. With implementation of MM BIO-1, there would be less than significant impacts related to wildlife movement, particularly nesting birds and raptors.

	Potentially Significant Impact	**Less than Significant with Mitigation**	**Less than Significant Impact**	**No Impact**
Would the project:				
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☒	☐

WHY? The only local ordinance protecting biological resources in the City of Pasadena is Ordinance No. 6896 “City Trees and Tree Protection Ordinance” (codified in Chapter 8.52 of the Pasadena Municipal Code). This ordinance was set forth with the goal of protecting landmark, native, and specimen trees so that the tree canopy cover in the City is preserved and expanded. The proposed Project would result in the displacement of Public Trees, including the removal of 4 native and 81 non-native trees as part of habitat restoration efforts and vegetation removal to accommodate the proposed improvements (see Appendix B-2). Refer to Table 2-6 for a summary of proposed tree removals. The Project is required to comply with the City Trees and Tree Protection Ordinance. Moreover, the Project is intended to increase the number of native trees throughout the project area and includes approximately 90 new tree planting locations. Therefore, the Project would not conflict with the applicable local ordinance. There would be a less than significant impact and no mitigation is required.

	Potentially Significant Impact	**Less than Significant with Mitigation**	**Less than Significant Impact**	**No Impact**
Would the project:				
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒

WHY? The proposed Project does not conflict with any Significant Ecological Areas (SEAs), Wildflower Reserve Areas, or Sensitive Environmental Resource Areas (SERAs), as none exists within the Project site. There are no adopted Habitat Conservation Plan or Natural Community Conservation Plan (HCP/NCCP) within the City. Therefore, the Project would not conflict with any regional or State plans protecting biological resources.

The Project site is located within the southwestern portion of the HWP Master Plan boundaries. The proposed Project includes improvements within approximately the southern third portion of the Oak Grove area that are consistent with the HWP Master Plan. The Project would not conflict with the adopted HWP Master Plan. There would be no impact and no mitigation is required.

MITIGATION MEASURES

MM BIO-1 Project construction activities (including, but not limited to, staging and disturbances to native and non-native vegetation, structures, and substrates) shall occur outside of the avian breeding season, which generally runs from February 1–August 31 (as early as January 1 for some raptors) to avoid take of birds or their eggs. “Take” means to hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture or kill (*California Fish and Game Code*, Section 86), and includes take of eggs or young resulting from disturbances that cause abandonment of active nests.

A Biological Monitor shall be present on site during all grubbing and clearing of vegetation to ensure that these activities remain within the Project footprint (i.e., the demarcated buffer); to ensure that the flagging/stakes/fencing that shall be installed by the Biologist prior to initiation of construction activity is being maintained; and to minimize the likelihood that active nests are abandoned or fail due to Project activities.

MM BIO-2 Prior to the initiation of any grading and/or construction-related activity involving the disturbance and/or removal of potentially suitable bat roosting habitat—namely rocky outcrops or trees—a qualified Biologist shall conduct a pre-construction bat habitat assessment of the potential habitat marked for removal. Potential for roosting will be categorized by (1) potential for solitary roost sites and (2) potential for colonial roost sites (i.e., ten bats or more). If the potential for colonial roosting is determined, those rocky outcrops or trees shall not be removed during the bat maternity roost season (March 1 to July 31). Trees potentially supporting colonial roosts outside the maternity roost season and trees potentially supporting solitary roosts may be removed via a two-step removal process whereby, at the direction of the Biologist, some level of disturbance (such as trimming of lower branches of trees) is applied to the habitat on the day prior to removal to allow bats to escape during the darker hours. In the case of a tree, it shall be removed the following day (i.e., there shall be no less or more than one night between initial disturbance and the grading or tree removal). Rock outcrops potentially supporting colonial roosts outside the maternity roost season and rock outcrops potentially supporting solitary roosts shall be fitted with a bat exclusionary device at the entry location, whereby bats are allowed to leave the structure but unable to return. The structure can be demolished the following day.

MM BIO-3 Mitigation for the loss of jurisdictional resources shall be negotiated with the resource agencies during the regulatory permitting process and shall ensure that mitigation to compensate for permanent impacts on jurisdictional resources is equivalent or superior to biological functions and values impacted by the Project. Potential mitigation options may include: (1) removal of exotic species from within the Project site or Hahamongna Watershed Park or elsewhere within the Arroyo Seco or adjacent watersheds (e.g., invasive plant or wildlife species removal); (2) payment to a mitigation bank or regional riparian enhancement program; and/or (3) restoration of riparian habitat including qualifying vegetation and trees, either on site or off site at a ratio of no less than 1:1, determined through consultation with the USACE, the RWQCB, and the CDFW. The restoration plan shall detail the methodology and performance standards, which shall be prepared in accordance with requirements specified in permits/agreements issued by the USACE, the RWQCB, and the CDFW.

In addition, prior to initiation of any Project activities affecting identified jurisdictional features, areas all work areas will be clearly demarcated with construction stakes and flagging. These areas will be verified by a qualified biologist familiar with the project to ensure no only permitted and approved impacts areas are disturbed.

2.5 CULTURAL RESOURCES

Information in this section is derived from the *Historical Resources Technical Memorandum, Oak Grove Area Improvement Project Habitat Restoration Area* (Historical Resources Memorandum), dated November 2018 and prepared by Architectural Resources Group (ARG 2018a). This report is provided in its entirety in Appendix C-1 of this IS/MND. The Historical Resources Memorandum incorporates by reference the *Historical Resources Assessment Report, Oak Grove Area, Hahamongna Watershed Park* (Historical Resources Assessment), prepared by ARG, that addressed the Oak Grove area as a whole (ARG 2018b). Additionally, Psomas conducted a Phase I Cultural Resources Assessment for the Project, which included review of the Historical Resources Memorandum and Historical Resources Assessment. The results of the cultural resources assessment is presented below, and supporting documentation is provided in Appendix C-2 of this IS/MND.

Methodology

Cultural Resources Records and Archival Search

A cultural resources records search was conducted for the Project at the South-Central Coastal Information Center (SCCIC) at California State University, Fullerton on December 3, 2018. The SCCIC is the designated branch of the California Historical Resources Information System (CHRIS) for the Project site and houses records concerning archaeological and historic resources in Los Angeles, Ventura, San Bernardino, and Orange Counties. The review consisted of an examination of the USGS Pasadena, California 7.5-minute quadrangle to determine if any cultural resources studies have been conducted on or within a one-mile radius of the Project site. The records search provided data on recorded archaeological and built environment resources on or within one mile of the Project site. Sources consulted at the SCCIC included archaeological records, Archaeological Determinations of Eligibility, historic maps, and the Historic Property Data File (HPDF) maintained by the California Office of Historic Preservation. The HPDF contains listings for the California Register of Historical Resources (CRHR) and/or the National Register of Historic Places (NRHP), California Historical Landmarks, and California Points of Historical Interest.

Sacred Lands File Search

An inquiry was made of the Native American Heritage Council (NAHC) on December 4, 2018 to request a review of the Sacred Lands File (SLF) database regarding the possibility of Native American cultural resources and/or sacred places in the Project vicinity that are not documented on other databases. The NAHC completed its SLF search on December 19, 2018.

Cultural Resources Field Survey

Psomas Archaeologist, Kassie Sugimoto, conducted a pedestrian survey of the Project site on December 13, 2018. The survey consisted of walking along open areas, walking trails, and bike paths in linear transects. The ground visibility varied within the Project site with some areas concealed by vegetation. The bike paths and a walking trails were typically visible, but some areas were paved.

Existing Conditions

Archaeological and Historical Studies

A total of 44 archaeological and/or historical studies have been conducted within one mile of the Project site, as shown in Table 2-9, Cultural Resources Studies Near the Project Site.

TABLE 2-9
CULTURAL RESOURCES STUDIES NEAR THE PROJECT SITE

Report No.	Year	Title	Author	Proximity to Project Site
LA-11625	2012	A Phase I (CEQA) and Class III (NEPA) Cultural Resources Investigation for the Hahamongna Multi-Benefit/Multi-Use Project in the Hahamongna Watershed Park, City of Pasadena, Los Angeles County, California	McKenna et. al.	Within*
LA-06950	2003	La Canada-Flintridge Sewer Improvement Project Summary	McKenna et. al.	Within
LA-11194	2002	Hahamongna Watershed Park Master Plan, A Component of the Arroyo Seco Master Plan	Takata Associates	Within
LA-05233	2000	Phase I Cultural Resources Investigations for the Proposed Sanitary Sewer Improvements Project in the City of La Canada-Flintridge, Los Angeles County, Ca	McKenna et. al.	Within
LA-05249	2000	Negative Archaeological Survey Report: Route 210:kp30.3/40.2-170-129971	Caltrans District 7	Within
LA-01903	1987	Preliminary Assessment of the Prehistoric Cultural Resources of the Devil's Gate Reservoir, Pasadena, California.	Blodgett, Leslie M.	Within
LA-12346	2013	Finding of No Adverse Effect for Interstate Route 210 Phase 1 Sound Wall Project City of La Canada Flintridge, Los Angeles County, California	Parsons	Outside
LA-12427	2013	Cultural Resources Records Search and Site Visit Results for T-Mobile West, LLC Candidate IE04517A (Caltrans) 2122 North Windsor Avenue, Altadena, Los Angeles County, California	EAS	Outside
LA-12779	2013	Historical/Archaeological Resources Survey Report Foothill Municipal Water District Recycled Water Project, City of La Canada Flintridge and Unincorporated La Crescenta-Montrose and Altadena Areas Los Angeles County, California	CRM Tech	Outside
LA-11387	2011	JPL - LA0267 740 West Woodbury Road, Pasadena, CA 91103	C. A. R. E	Outside
LA-09899	2009	Results of the Cultural Resources Assessment for the Ravine New Circuit and Reconductoring Distribution Substation Plan Project, Los Angeles County, California	LSA Associates, Inc.	Outside
LA-11231	2009	Historic American Engineering Record Arroyo Seco Flood Control Channel, Los Angeles County, California	EDAW, Inc.	Outside
LA-09561	2008	Records Search and Field Reconnaissance Phase for the Proposed Bechtel Wireless Telecommunications Site LA0267 (JPL), Located at 740 West Woodbury Road, Pasadena, California 91103	C. A. R. E	Outside
LA-08927	2007	A Phase I (CEQA) and Class Iii (NEPA) Cultural Resources Investigation for the Sunset Overlook Trailhead Area of the Hahamongna Watershed Park in the City of Pasadena, Los Angeles County, California	McKenna et. al.	Outside
LA-10834	2007	Phase I archaeological study for the Flint Canyon Trail Improvements Project, City of La Canada Flintridge, Los Angeles County, California	ASM Affiliates	Outside
LA-11193	2007	Sunset Overlook Trailhead Area in Hahamongna Watershed Park, Master EIR Initial Study Environmental Checklist	Bellas, John	Outside
LA-07455	2005	Historic Property Survey Report for the Oak Grove Drive Bridges 53c-1829 and 53c-1851 Seismic Retrofit Project Los Angeles County, California District 7, Expense Authorization Ep04-013	EDAW, Inc.	Outside
LA-07430	2004	Caltrans Historic Bridges Inventory Update: Concrete Box Girder Bridges	Myra L. Frank & Associates, Inc.	Outside
LA-06848	2003	Bear Canyon Water Tank Replacement, San Gabriel River Ranger District, Angeles National Forest, Los Angeles County, California	Angeles National Forest	Outside
LA-06851	2003	Cultural Resource Assessment Cingular Wireless Facility No. VY 310-01 Altadena, Los Angeles County, California	LSA Associates, Inc.	Outside
LA-06948	2002	Archaeological Survey Report Southern California Edison Seco 16 KV Circuit Deteriorated Pole Replacement Project	Compass Rose Archaeological, Inc.	Outside
LA-07451	2002	Cultural Resource Assessment for Cingular Wireless Facility Vy256-01 City of Pasadena Los Angeles County, California	Kyle Consulting	Outside
LA-05639	2001	A Phase I Cultural Resources Investigation of the Parker and Johnson Property in La Canada Flintridge Area Los Angeles County, California	McKenna et. al.	Outside

TABLE 2-9
CULTURAL RESOURCES STUDIES NEAR THE PROJECT SITE

Report No.	Year	Title	Author	Proximity to Project Site
LA-05640	2001	Negative Archaeological Survey Report	Caltrans District 7	Outside
LA-05160	2000	Cultural Resource Assessment for Pacific Bell Wireless Facility La 979-01, County of Los Angeles, Ca	LSA Associates, Inc.	Outside
LA-05162	2000	Cultural Resource Assessment for Pacific Bell Wireless Facility La 940-01, County of Los Angeles, Ca	LSA Associates, Inc.	Outside
LA-05860	2000	Review of Pacific Bell Wireless Facilities La977-01 and La978-01, County of Los Angeles, California	LSA Associates, Inc.	Outside
LA-05154	1999	Phase I Cultural Resources Investigations of Area 2-proposed Sanitary Sewer Improvements Project in the City of La Canada-Flintridge, Los Angeles County, Ca 2006 La Canada-Flintridge Update	McKenna et. al.	Outside
LA-03886	1998	Archaeological Assessment for Pacific Bell Mobile Services, Telecommunications Facility La-147-03, 8953 South Western Avenue, City of Los Angeles, California	LSA Associates, Inc.	Outside
LA-03927	1998	Archaeological Assessment for Pacific Bell Mobile Services Telecommunications Facility LA 096-09, 4815 Oak Glen Drive, City of La Canada Flintridge, County of Los Angeles, California	LSA Associates, Inc.	Outside
LA-13048	1998	Cultural Resources Investigation, Los Angeles County Tax Parcel 5704-1-44, Pasadena, California	W. H. Bonner Associates	Outside
LA-03169	1994	Archaeological Test Excavations at CA-LAN-849, CA-LAN-850, and CA-LAN-2191, Friendship County Park, Located Within the City Limits of Los Angeles and Rancho Palos Verdes, Los Angeles County, California	C.A. Singer & Associates, Inc.	Outside
LA-02975	1993	A Phase I Cultural Resources Survey of Alternative Locations for the Proposed Jet Propulsion Laboratory Parking Structure, Jet Propulsion Laboratory, Pasadena, Los Angeles County, California	McKenna et. al.	Outside
LA-02638	1992	Cultural Resources Survey and Impact Assessment for the La Canada Water Reclamation Plant Outfall and Football Boulevard Main Projects, Los Angeles County, California.	C.A. Singer & Associates, Inc.	Outside
LA-02665	1985	Cultural Resource Overview and Survey for the Los Angeles County Drainage Area Review Study	ARMC	Outside
LA-03508	1985	Historical Resource Overview and Survey for the Los Angeles County Drainage Area Review Study	Archaeological Resource Management Corp.	Outside
LA-00880	1980	Cultural Resources Overview for the Jet Propulsion Laboratory Environmental Resources Document, Pasadena, California	Chavez, David	Outside
LA-00396	1978	Cultural Resource Survey and Impact Assessment for Lots 6 and 7 of Tract #14279, City of La Canada Flintridge, Los Angeles County, California.	C.A. Singer & Associates, Inc.	Outside
LA-01041	1977	Assessment of the Archaeological Impact by the Proposed Development of Portion B, 9450 Topanga Canyon Blvd., Chatsworth	Northridge Archaeological Research Center, CSUN	Outside
LA-04469	1977	Assessment of the Archaeological Impact by the Installation of a Sewer Pipeline in La Crescenta and Glendale	California State University, Northridge	Outside
LA-00108	1973	Clewlow, William C. Jr. Cultural Resources Report on Pasadena Heliport Site Los Angeles County, California	University of California, Los Angeles Archaeological Survey	Outside
LA-02513	1965	Highway Construction Survey Foothill Freeway Ucas-082-d	University of California, Los Angeles Archaeological Survey	Outside
LA-05235	2000	Cultural Resource Evaluation of the Oak Grove Ranger Station, Angeles National Forest ARP #05-01-00-607	Angeles National Forest	Outside

*Contains resources located within the Project boundaries
Source: SCCIC 2018

Of the 44 studies listed in Table 2-9, 6 reports have included all or a portion of the Project site. The earliest report [LA 1903 (1987)] was a preliminary assessment for the Devils Gate Reservoir. A literature review and field survey yielded negative results within Devils Gate Reservoir, which included the entire Project site. However, the traditional transect method was not used due to ground cover, topographic features, and multiple land uses. The entire Oak Grove Park area was thoroughly surveyed for cultural resources. No cultural resources, specifically, prehistoric and historic archaeological sites, were observed within or around the Oak Grove area in 1987.

In 2000, Caltrans conducted a linear archaeological study (LA-05249) of a proposed route. Although no cultural resources were observed, the area flanking the Project site was deemed culturally sensitive by Caltrans. The area west of the Project site was also studied in 2000 for a sewage improvement Project (LA-5233), but no cultural resources were observed within or around the Project site.

The Hahamongna Watershed Park Master Plan (LA-11194) was completed in 2002. One cultural resource was identified within one-mile of the Project site, but no cultural resources were identified within the Project boundaries. A block investigation was conducted in 2003 (LA-06950), which included the Project site. A literature review and construction monitoring were completed for a sewage improvement project. No cultural resources were identified within or near the Project site.

One resource residing within the Project boundaries was identified in a CEQA Phase I/National Environmental Policy Act (NEPA) Class III investigation for the Hahamongna Watershed Park in 2012 (LA-11625). The investigation, conducted by McKenna et. al. (2012), identified 22 resources, including one resource (189942) within the Project boundaries.

Archaeological and Historical Resources

Fourteen cultural resources were identified within one mile of the Project site, as shown in Table 2-10, Archaeological and Historical Resources Near the Project Site.

TABLE 2-10
ARCHAEOLOGICAL AND HISTORIC RESOURCES NEAR THE PROJECT SITE

Primary No.	Age	Type	Resource Name	Attributes	Record Date (Author)	Proximity To Project Site
P-19-189942	Historic	Site	Hahamongna Watershed Park	Amusement Park; Urban open space	2012 (Jeanette A. McKenna, McKenna et. al.)	Within
P-19-000026	Prehistoric	Site	Walker's Sheldon Reservoir Site	Burials	1951 (WALKER); 1962 (RHC)	Outside
P-19-002189	Historic	Site	Jet Propulsion Lab	Standing structures	1993 (Jeanette A. McKenna, McKenna et. al.)	Outside
P-19-186859	Historic	Site	Arroyo Secco Flood Control Channel; OHP property numbers 173825 and 147051	Engineering Structure	2003 (M. Strauss, EDAW)	Outside
P-19-186878	Historic	Object	Oak Grove Administration Site	New Deal Public Works Project	2000 (D. W. Vance, USDA-Forest Service)	Outside
P-19-187571	Historic	Building	Oak Grove Dr over Arroyo Seco Bridge; OHP Property Number - 162113	Bridge	2003 (J. Feldman, D. Greenwood, Myra L Franck)	Outside
P-19-188157	Historic	Building	Buffum House; OHP Property Number - 166000	Single Family Property	2007 (A. Merchell)	Outside
P-19-188404	Historic	Structure	Devils Gate Dam	Water conveyance system - Dam	2009 (Ewers, Daniel, LSA); 2009 (Antonina, Delu, LSA)	Outside
P-19-190576	Historic	Building	E.P. Barker Residence	Single Family Property	2012 (Carrie Chasteen, Parsons)	Outside
P-19-190577	Historic	Building	Dwight Hamlin Residence	Single Family Property	2012 (Carrie Chasteen, Parsons)	Outside
P-19-190578	Historic	Building	Flintridge Country Club	Educational building; Religious building	2012 (Carrie Chasteen, Parsons)	Outside
P-19-190590	Historic	District	Pasadena Arroyo Parks and Recreation District; OHP Property Number - 152894	Community center/social hall; Landscape architecture; Urban open space; Highway/trail	2007 (Teresa Grimes, Pasadena Heritage)	Outside
P-19-190633	Historic	Building	California Department of Transportation; Other - T-Mobile West LLC IE04517A/Caltrans	Government building	2013 (K.A. Crawford, Crawford Historic Services)	Outside
P-19-192442	Historic	Building; District	Flintridge Preparatory School	Educational building	2017 (Justin Castells, Applied Earthworks, Inc)	Outside
Source: SCCIC 2018						

One known resource (P-19-189942) is located within the Oak Grove area but outside of the Project site. The remaining 13 resources are located within 1 mile of the Project site and consist primarily of built structures dating to the historic era.

Cultural resource P-19-189942 is documented as Oak Grove Park, now the Oak Grove area of Hahamongna Watershed Park, located in the Devil's Gate Dam area of the Arroyo Seco watershed. The Oak Grove area is an irregularly shaped park located on either side of the Arroyo Seco and north of the I-210, consisting of picnic areas, hiking trails, ball fields, golf course, disc golf course, equestrian trails, parking lots, and support facilities. The main access to the area is from the west side, via Oak Grove Drive and Foothill Boulevard. The area can also be accessed from the Altadena community to the east; from portions of the Arroyo Seco park system south of the I-210; and to the north, via the San Gabriel Mountain foothills. This resource is classified as a historic park containing historic building, structures, and objects. The park was used as open space as early as the 1880s, but was developed into an official park in the 1930s. In 1988, the park area formally became known as Hahamongna Watershed Park. The Oak Grove area of the HWP has become directly associated with the establishment of the world's first disc "Frisbee" golf course.

As noted above, a Historical Resources Assessment was prepared that evaluated the Oak Grove area (ARG 2018b). As a whole, the Oak Grove area does not appear to be eligible for listing in the NRHP, CRHR, or as a City of Pasadena Landmark/Historic Monument as a district or a site because the resource is not 50 years of age and the park lacks the integrity of its original design, feeling, and association. However, the Oak Grove Disc Golf Course, a component of the Oak Grove area, is considered eligible for listing in the CRHR and as a City of Pasadena Landmark. The Oak Grove Disc Golf Course is not eligible to be listed on the NRHP because it is less than 50 years of age and does not meet the standards of exceptional significance, as defined in Criterion Consideration G.

Sacred Lands File Search

A review of the NAHC SLF did not indicate the presence of Native American traditional sites/places within the Project site or the immediate vicinity surrounding the site. However, the absence of known archaeological features and Native American cultural resources on the SLF does not preclude their existence at the subsurface level. The NAHC provided a list of contacts (provided in Appendix C-2 of this IS/MND) for tribes with ancestral ties to the Project site to assist with scoping and consultation. The City of Pasadena also coordinated and executed Tribal Consultation consistent with AB 52. For additional information on this process, please reference Section 2.18, Tribal Cultural Resources, of this IS/MND.

Archaeological Field Survey

On December 19, 2018, a pedestrian field survey of the Project site was conducted by Psomas Archaeologist, Kassie Sugimoto. The Project site was of mixed surfaces, containing both paved and unpaved areas with portions of the ground concealed by vegetation. No cultural resources were observed during the pedestrian survey.

	Potentially Significant Impact	**Less than Significant with Mitigation**	**Less than Significant Impact**	**No Impact**
Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource pursuant to Section 15064.5?	☐	☐	☐	☒

WHY? As discussed above, cultural resource P-19-189942 is known as Oak Grove (Hahamongna Watershed) Park, located in the Devil's Gate Dam area of the Arroyo Seco watershed. Based on the Historical Resources Assessment of the Oak Grove area prepared in 2018, the Oak Grove area is not eligible as an historical resource. However, the Oak Grove Disc Golf Course, is considered eligible to be listed on the CRHR and as a City of Pasadena Landmark/Historic Monument.

The Project site is located along the western flank of the Oak Grove area, and the Oak Grove Disc Golf Course is located approximately 750 ft north of the Project site boundary. The Project does not intend to develop or alter any part of the Oak Grove Disc Golf Course. As such, there would be no impacts to an historical resource (ARG 2018a; Appendix C-1) and no mitigation is required.

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?	☐	☒	☐	☐

WHY? As discussed under Threshold 2.5(a) above, the Project site does not contain any known archaeological resources. Thus, the Project is not expected to impact any known resources. However, there are several resources located within one mile of the Project site; most of these resources are built structures, which date to the historic era, with the exception of resource P-19-000026.

The Walker Sheldon Reservoir Site (P-19-000026) was originally recorded in 1951 as a prehistoric burial site. Although no known resources have been recorded within the Project boundaries, the presence of the Walker Sheldon Reservoir Site demonstrates prehistoric occupation by the Gabrielino Tribe. Moreover, as part of the AB 52 consultation process, the Gabrielino Band of Mission Indians, Kizh Nation, has indicated that waterways, such as the Arroyo Seco, were used for burial processes and regular daily use, and that there were settlements along the stretch of Arroyo Seco in the Project area. The Project site is also next to an historic trade route. It is understood by the Kizh Nation that the Project area was a heavily used by the Gabrieleno. The Oak Grove area is therefore considered sensitive for unknown archaeological resources. As such, any earthmoving activities within alluvial sediment has the potential to adversely impact unknown buried archaeological resources. With implementation of MM CUL-1, which requires earthmoving activity in native soils (i.e., soils that have not been previously disturbed) to be monitored by a qualified Archaeologist and to sample, identify, and evaluate any artifacts encountered, there would be a less than significant impact.

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
c) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☐	☒	☐

WHY? There are no known human remains on the site. The Project site is not part of a formal cemetery and is not known to have been used for burial of historic or prehistoric human remains. Thus, the Project is not expected to impact known human remains or cemeteries. However, a prehistoric burial site [the Walker Sheldon Reservoir Site (P-19-000026)] is located outside of, but within one mile, of the Project site. Furthermore, the Gabrielino Band of Mission Indians, Kizh Nation, has indicated that human remains have been discovered near the Project site in the past (McKenna et. al. 2012). Project-related earth disturbance always has the potential to unearth previously undiscovered remains, resulting in a potentially significant impact.

If human remains are encountered during Project construction, those remains would require proper treatment, in accordance with applicable laws. Sections 7050.5 through 7055 of the *California Health and Safety Code* describe the general provisions for human remains. Specifically, Section 7050.5 of the *California Health and Safety Code* describes the protocols to be followed if human remains are accidentally discovered during excavation of a site. In addition, the requirements and procedures set forth in Section

5097.98 of the *California Public Resources Code* would be implemented. If human remains are found during excavation, construction activities must stop in the vicinity of the find and in any area that is reasonably suspected to overlie adjacent remains until the County Coroner has been notified; the remains have been investigated; and appropriate recommendations have been made for the treatment and disposition of the remains. Following compliance with State regulations, which detail the appropriate actions necessary in the event human remains are encountered, potential impacts would be less than significant and no mitigation is required.

MITIGATION MEASURES

MM CUL-1 Prior to the initiation of any earthmoving activity in which native soil is disturbed, the City shall be responsible for retaining a qualified Archaeologist to observe grading activities and to salvage and catalogue archaeological resources, as necessary. The Archaeologist shall be present at the pre-grade conference, shall establish procedures for archaeological resource surveillance, and shall establish, in cooperation with the City or its designee, procedures for temporarily halting or redirecting work to permit the sampling, identification, and evaluation of any discovered artifacts as appropriate. If archaeological resources are found to be significant pursuant to Section 15064.5 of the State CEQA Guidelines, the Archaeologist shall determine appropriate actions, in cooperation with the City or its designee, for exploration and/or recovery. The Archaeologist shall also prepare a report of findings. The report shall include the period of inspection, an analysis of any artifacts found, and the present repository of the artifacts. The Archaeologist shall prepare excavated material to the point of identification and curation. The City or its designee shall pay curatorial fees associated with the cost of curation.

2.6 ENERGY

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?	☐	☐	☒	☐

WHY?

Construction

The Project would result in energy consumption from the construction phase related to construction equipment use and vehicle trips, including worker trips, equipment delivery, and soil import/export. Off-road construction equipment use was calculated from the equipment data (mix, hours per day, horsepower, load factor, and days per phase) described in Section 1.0, Project Information, and provided in the CalEEMod construction output files included in Appendix A of this IS/MND. The total horsepower hours for the Project based on the construction equipment data was then multiplied by fuel usage estimates per hours of construction activities included in CARB's OFFROAD2007 model. OFFROAD2007 inputs and outputs for the energy analysis are provided in Appendix D of this IS/MND.

Fuel consumption from construction worker, vendor, and delivery/haul trucks was calculated using the trip rates and distances provided in the CalEEMod model assumptions, which in turn are based on the *Berkshire Creek Area Improvements Project Traffic Evaluation Memorandum* (Traffic Evaluation), provided in Appendix G of this IS/MND. Total vehicle miles traveled (VMT) was then calculated for each type of construction-related trip and divided by the corresponding miles per gallon factor using CARB's EMFAC2014 model (EMFAC). EMFAC provides the total annual VMT and fuel consumed for each vehicle type. Construction equipment delivery and haul trucks were assumed to be heavy-duty diesel trucks. As shown in Table 2-11, Fuel Energy Use During Construction, an estimated 1,425 gallons of diesel fuel and 961 gallons of gasoline is estimated to be consumed during Project construction.

TABLE 2-11
FUEL ENERGY USE DURING CONSTRUCTION

Source	Gasoline (gallons)	Diesel Fuel (gallons)
Off-road Construction Equipment	0	949
Worker commute	956	0
On-road haul	5	474
Totals	961	1,425
Sources: Psomas 2019 based on data from CalEEMod, OFFROAD2007, and EMFAC2014.		

Fuel energy consumed during construction would be temporary, finite, and this amount of fuel consumption would not represent a significant demand on energy resources. Furthermore, there are no unusual Project characteristics that would necessitate the use of construction equipment that would be less energy efficient than at comparable construction sites in other parts of the State. The proposed Project would not create a high enough demand for energy to require development of new energy sources. Therefore, the proposed construction activities would not result in inefficient, wasteful, or unnecessary fuel consumption. There would be a less than significant impact and no mitigation is required.

Operation

The proposed Project has been designed to provide improved physical facilities and open space resources to existing users of Oak Grove Park and would not result in increased use of the park. The same amount of parking and internal roads as well as the same type and extent of facilities would be provided. As such, operation of the Project would be essentially the same as the existing condition, with the exception that some areas may need less frequent maintenance. Therefore, fuel consumption related to visitor and other vehicular trips would remain the same. There would be no impact and no mitigation is required.

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
b) Conflict with or obstruct a State or local plan for renewable energy or energy efficiency?	☐	☐	☐	☒

WHY? The Project would be required to comply with the applicable standards in the California Energy Code, Part 6 of the California Building Standards Code (Title 24). Measures to meet the energy standards that are applicable to the Project are limited to water-efficient irrigation systems. The proposed irrigation systems to be installed as part of habitat restoration activities would comply with the applicable provisions of Title 24.

To promote energy conservation, the City has adopted an amended California Green Building Standards Code (Section 14.04.500 et seq. of the PMC)(CALGreen). However, there are no structures being built at part of the Project that would be subject to CALGreen.

The City has also adopted policies related to renewable energy and/or energy efficiency in the *Green City Action Plan* (Pasadena 2006):

Green City Action Plan

- Action 1 – Increase the use of renewable energy to meet 10% of the City's peak electric load within seven years.
- Action 2 – Reduce the City's peak electric load by 10% within seven years through energy efficiency, shifting the timing of energy demands, and conservation measures.
- Action 3 – Reduce greenhouse gas emissions by 25% by 2030 and include a system for accounting and auditing these emissions.

The proposed Project would not include structures or infrastructure to which these policies would be applicable. The Project would involve negligible long-term energy use, primarily related to the irrigation system and would generate a nominal amount greenhouse gas (GHG) emissions (refer to Section 2.8, Greenhouse Gas Emissions, of this IS/MND).

As discussed above, the Project would involve energy use during construction only, with no additional energy use related to long-term operation of the Project. As such, the Project would neither obstruct nor contribute to the City's policies related to energy use. There would be no impact and no mitigation is required.

MITIGATION MEASURES

There would be no significant impacts and no mitigation is required.

2.7 GEOLOGY AND SOILS

Information in this section is derived from the *Geotechnical Investigation, Berkshire Creek Restoration Project, Proposed Pedestrian Bridge, Pasadena, California* (Geotechnical Investigation), dated April 2019 and prepared by Geocon West Inc. (Geocon 2019); the *Safety Element* of the City's General Plan (Safety Element; Pasadena 2002a); and the *Technical Background Report for the Safety Element* (Safety Element Technical Background Report; Pasadena 2002b). The Geotechnical Report is provided in its entirety in Appendix E of this IS/MND.

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☐	☒

WHY? The numerous faults in Southern California include active, potentially active, and inactive faults. The criteria for these major groups are based on criteria developed by the California Geological Survey (CGS) for the Alquist-Priolo Earthquake Fault Zone Program. By definition, an active fault is one that has had surface displacement within Holocene time (about the last 11,700 years). A potentially active fault has demonstrated surface displacement during Quaternary time (approximately the last 1.6 million years) but has had no known Holocene movement. Faults that have not moved in the last 1.6 million years are considered inactive (Geocon 2019).

The County of Los Angeles and the City of Pasadena are both affected by Alquist-Priolo Earthquake Fault Zones (Alquist-Priolo Zones). The City is shown on a total of four USGS 7.5-minute quadrangle maps. The Los Angeles and the Mt. Wilson quadrangles were mapped for earthquake fault zones under the Alquist-Priolo Act in 1977. The Pasadena and Condor Peak quadrangles have not yet been mapped per the Alquist-Priolo Act. The Project site is in the Pasadena 7.5-minute quadrangle.

Therefore, the Project site is within an area not-yet evaluated by the State for the presence of surface fault rupture hazard. However, the Safety Element Technical Background Report shows that the site is not located within an Alquist-Priolo Zone for active faulting and that no active or potentially active faults with the potential for surface fault rupture are known to pass directly beneath the site. Therefore, the potential for surface rupture due to faulting occurring beneath the site during the design life of the proposed development is considered low (Geocon 2019). The surface rupture of a known fault within the Project site that would result in substantial adverse effects is not considered reasonably foreseeable. Further, no new or more intense land uses would be developed as part of the Project. There would be no impact and no mitigation is required.

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving: ii) Strong seismic ground shaking?	☐	☐	☐	☒

WHY? The Project site is located in the seismically active southern California region and could be subjected to moderate to strong ground shaking in the event of an earthquake on one of the many active faults. The closest surface trace of an active fault to the site is the Verdugo Fault located approximately 3.7 miles to the southwest. Other nearby active faults are the Raymond Fault, Sierra Madre Fault Zone, the Hollywood Fault, and the East Montebello Fault located approximately 4.6 miles to the south, 5.8 miles to the northwest, 7.2 miles to the southwest, and 10.2 miles to the southeast, respectively. The active San Andreas Fault Zone is located approximately 24 miles northeast of the site (Geocon 2019).

Several buried thrust faults, commonly referred to as blind thrusts, underlie the Los Angeles Basin. These faults are not exposed at the ground surface and are typically identified at depths greater than 3.0 kilometers. Thrust faults are not exposed at the surface and do not present a potential surface fault rupture hazard at the site; however, these deep thrust faults are considered active features capable of generating future earthquakes that could result in moderate to significant ground shaking at the site. The subject site is underlain at depth by the Los Angeles segment of the Puente Hills Blind Thrust (Geocon 2019).

Consistent with its location in a seismically active region, the site may be subject to strong ground shaking resulting from a major earthquake on one or more faults in the area within the lifetime of the Project. Seismic ground shaking from major earthquakes in the region is not anticipated to be greater than at any other sites in Southern California. The potential for strong ground shaking is an existing seismic hazard that affects the site, and the Project would not exacerbate this condition. Also, the Project would not involve construction of habitable structures or structures whose height, mass, or materials would pose a hazard in the event of an earthquake. The proposed Project would not directly or indirectly cause substantial adverse effects due to strong seismic ground shaking. There would be no impact and no mitigation is required.

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving: iii) Seismic-related ground failure, including liquefaction?	☐	☐	☒	☐

WHY? Liquefaction is a phenomenon in which loose, saturated, relatively cohesionless soil deposits lose shear strength during strong ground motions. Primary factors controlling liquefaction include intensity and duration of ground motion, gradation characteristics of the subsurface soils, in-situ stress conditions, and the depth to groundwater. Liquefaction typically occurs in areas where the soils below the water table are composed of poorly consolidated, fine to medium-grained, primarily sandy soil. In addition to the requisite soil conditions, the ground acceleration and duration of the earthquake must also be of a sufficient level to induce liquefaction (Geocon 2019). The most likely places for liquefaction in Pasadena are the streambed areas of the Arroyo Seco and Eaton Canyon Wash (Pasadena 2002b). The Seismic Hazard Zone Map for the Pasadena Quadrangle indicates that the site is on the margin of, but outside, the area designated as having a potential for liquefaction (Geocon 2019). As discussed under Threshold 2.7(a)(ii), the Project would not involve construction of habitable structures. The Geotechnical Investigation incorporated the liquefaction risk into the grading and building recommendations for the proposed bridge, consistent with California Building Code. Earthquake-resistant design and materials used in new construction must meet the current seismic engineering standards of the California Building Code Seismic Zone 4 requirements (incorporated by reference in the PMC), in effect at the time of design and construction of the bridge. Compliance with these standards would reduce the risk to people and structures (i.e., the bridge and stormwater infrastructure) to the maximum extent practicable. Furthermore, the Project would not exacerbate any liquefaction hazards or risks. There would be a less than significant impact and no mitigation is required.

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving: iv) Landslides?	☐	☐	☐	☒

WHY? The Project site is not within a Landslide Hazard Zone, as shown in the Safety Element Technical Background Report (Pasadena 2002b). There are no known landslides near the site, nor is Berkshire Creek in the path of any known or potential landslides. Therefore, the potential for slope stability hazards to adversely affect the proposed bridge structure is considered low (Geocon 2019). There would be no other built structure, and no habitable structures, constructed as part of the Project. There would be no impact and no mitigation is required.

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☒	☐

WHY? The largest source of erosion and topsoil loss, particularly in a developed environment, is uncontrolled drainage during construction activities. Grading and other earthwork associated with Project construction may temporarily expose soils on the Project site to wind and/or water erosion. Since the Project area of earth disturbance is greater than one acre, compliance with the State Water Resources Control Board's (SWRCB's) National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with the Construction and Land Disturbance Activities[4] (Construction General Permit) would be required. Pursuant to the Construction General Permit, the City would be required to prepare, or have prepared by the Construction Contractor, a Storm Water Pollution Prevention Plan (SWPPP) that would include erosion-control Best Management Practices (BMPs). It is noted that the Berkshire Creek component of the Project would repair the existing severely eroded channel and also prevent future erosion after reconstruction of the slopes and restoration of the habitat. Operation of the

4 Order No. 2009-0009-DWQ, NPDES No. CAS000002, adopted by the SWRCB on September 2, 2009 (effective for all project sites on July 1, 2010) and most recently amended by Order No. 2012-0006-DWQ on July 17, 2012.

Project is intended to reduce the soil erosion potential of Berkshire Creek. There would be a less than significant impact and no mitigation is required.

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the Project, and potentially result in onsite or offsite landslide, lateral spreading, subsidence, liquefaction, or collapse?	☐	☐	☒	☐

WHY? Secondary seismic hazards related to the underlying geologic unit include several types of ground failure that can occur as a result of severe ground shaking. These hazards include landslides, collapse, ground lurching, shallow ground rupture, and liquefaction. The probability for each type of ground failure depends on the severity of the earthquake, the site's distance from the fault, the local topography, and subsoil and groundwater conditions, among other factors. In addition, there can be soil engineering characteristics inherent in the underlying sediments on a site that can adversely affect structures if not appropriately managed during construction, including subsidence, hydroconsolidation, and other forms of collapse.

As shown on Plate 2-4 of the Safety Element Technical Background Report, most of the City, including the Project site, lies on the flat portion of the alluvial fan, which is expected to be stable (Pasadena 2002b). Subsidence occurs when a large portion of land is displaced vertically, usually due to the withdrawal of groundwater, oil, or natural gas. Soils that are particularly subject to subsidence include those with high silt or clay content. The Project site is not located within an area of known ground subsidence. No large-scale extraction of groundwater, gas, oil, or geothermal energy is occurring or planned at the site or in the general site vicinity. There appears to be little or no potential for ground subsidence due to withdrawal of fluids or gases at the site (Geocon 2019). As discussed under Thresholds 2.7(a)(iii) and 2.7(a)(iv) above, the Project has potential for liquefaction but not for landslides. As noted previously, the Project would not involve construction of any habitable structures. Modern engineering practices and compliance with California Building Code, incorporated by reference into the PMC, for construction of all built structures (i.e., the bridge and stormwater infrastructure) would minimize adverse safety effects associated with unstable geologic units or soils to the maximum extent practicable. Moreover, the Project would not exacerbate the risk or potential hazards of landslides, lateral spreading, subsidence, liquefaction, or collapse. There would a less than significant impact and no mitigation is required.

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?	☐	☐	☒	☐

WHY? According to the Safety Element Technical Background Report, the Project site is underlain by sediments consisting of unconsolidated coarse sand and pebble, cobble, and boulder gravel, which are in the low to moderately low range for expansion potential (Pasadena 2002b). As part of the Geotechnical

Investigation, a prior geotechnical report that encompassed the Oak Grove area was reviewed. That geotechnical report, prepared in 2016 provided as Appendix C to the Geotechnical Investigation (Appendix E of this IS/MND) concluded that the upper five ft of soils are considered non-expansive. Also, compliance with established building standards, including the California Building Code would reduce the likelihood that substantial risks to life or property related to soil expansion would occur as a result of the proposed Project. There would be less than significant impacts and no mitigation is required.

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of wastewater?	☐	☐	☐	☒

WHY? The Project would not involve restroom facilities or otherwise generate wastewater. There would be no impact and no mitigation is required.

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☐	☐	☒

WHY? Installation of the replacement stormwater infrastructure would involve excavation to depths ranging between approximately 2 and 15 ft below the existing ground surface. The Geotechnical Investigation included a total of 6 borings in the Berkshire Creek vicinity and encountered existing artificial fill at depths ranging from none to a maximum depth of 6.5 ft. Because of the shallow depth of excavation and the nature of some of the sediment on the site as artificial fill, there is no potential to encounter paleontological resources. There would be no impact and no mitigation is required.

MITIGATION MEASURES

There would be no significant impacts and no mitigation is required.

2.8 GREENHOUSE GAS EMISSIONS

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☒	☐

WHY? Climate change refers to any significant change in temperature, precipitation, or wind patterns over a period of time. Climate change may result from natural factors, natural processes, and human activities that change the composition of the atmosphere and alter the surface and features of the land. Significant changes in global climate patterns have recently been associated with global warming, which is an average increase in the temperature of the atmosphere near the Earth's surface; this is attributed to an accumulation of greenhouse gas (GHG) emissions in the atmosphere. GHGs trap heat in the atmosphere which, in turn, increases the Earth's surface temperature. Some GHGs occur naturally and are emitted to the atmosphere through natural processes, while others are created and emitted solely through human activities. The emission of GHGs through fossil fuel combustion in conjunction with other human activities are closely associated with global warming.

GHGs, as defined under California's Assembly Bill (AB) 32, include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). General discussions on climate change often include water vapor, ozone, and aerosols in the GHG category. Water vapor and atmospheric ozone are not gases that are formed directly in the construction or operation of development projects, nor can they be controlled in these projects. Aerosols are not gases. While these elements have a role in climate change, they are not considered by either regulatory bodies, such as CARB, or climate change groups, such as the Climate Registry, as gases to be reported or analyzed for control. Therefore, no further discussion of water vapor, ozone, or aerosols is provided.

In developing methods for GHG impact analysis, there have been suggestions of quantitative thresholds, often referred to as screening levels, which define an emissions level below which it may be presumed that climate change impacts would be less than significant. The City has prepared and adopted a *Climate Action Plan* (CAP) (Pasadena 2018b). This document builds upon the City's existing sustainability efforts, such as the *Green City Action Plan* (Pasadena 2006), which provides a framework to further reduce GHG emissions throughout the City. As part of the City's CAP, a Consistency Checklist was adopted to assess climate change impacts from new development projects to demonstrate consistency with the CAP. Projects that meet the requirements of the Consistency Checklist are deemed to be consistent with the City's CAP and would have less than significant impacts regarding cumulative GHG emissions. Step 1 of the Consistency Checklist requires the completion of a Master Land Use Application Form. Step 2 of the Checklist requires demonstrating consistency with the Land Use Element of the General Plan. The Project is consistent with the existing land use designation of the Land Use Element. Step 3 of the Checklist requires that the Project demonstrate consistency with one of three options.

Option A requires that the new development project apply sustainable development actions, as deemed appropriate by the CAP, which would become conditions of the entitlement for approval of the project. Option B requires that the project demonstrate consistency with Pasadena's per person GHG efficiency threshold. Option C requires that the project achieve Net Zero GHG Emissions, which requires quantifying the project's GHG emission levels and demonstrate that the project would not result in a net increase in GHG emissions.

Option C was selected for this analysis, in large part because the proposed Project is not a land use development project and Options A and B are not well suited.

Construction GHG Emissions

Construction GHG emissions are generated by vehicle engine exhaust from construction equipment, on-road hauling trucks, vendor trips, and worker commuting trips. Construction GHG emissions were calculated by using CalEEMod. The model and construction assumptions are described in Section 2.3, Air Quality and are included in Appendix A of this IS/MND. The results are output in $MTCO_2e$ for each year of construction.

GHG emissions generated from construction activities are finite and will occur for a short-term period of time (approximately three months). Unlike the numerous opportunities available to reduce a project's long-term GHG emissions through design features, operational restrictions, use of green-building materials, or other methods, GHG-reduction measures for construction equipment are relatively limited. Therefore, SCAQMD staff recommends that construction emissions be amortized over a 30-year project lifetime so that GHG-reduction measures will address construction GHG emissions as part of the operational GHG-reduction strategies (SCAQMD 2008). Additionally, per the City's CAP, the City also recommends amortization of construction emissions over 30 years. As shown in Table 2-12, GHG Emissions from Construction, Project construction would generate a total of 37 $MTCO_2e$, or approximately 1 $MTCO_2e$/yr when amortized over 30 years.

TABLE 2-12
GHG EMISSIONS FROM CONSTRUCTION

Year	Emissions ($MTCO_2e$)
2019	37
Amortized Emissions[1]	1

$MTCO_2e$: metric tons of carbon dioxide equivalent
1 Combined total amortized over 30 years.

Operational GHG Emissions

Operational uses for the proposed Project would be comparable to existing uses since the types and sizes and recreational facilities would remain the same and no new vehicle trips would be added as a result of the Project. Therefore, operational GHG emissions can be assumed to be comparable to, or less than, existing emissions, and therefore, operational GHG emissions are not quantified for this analysis.

The proposed Project would contribute approximately one $MTCO_2e$ per year from the amortization of construction emissions. Operational emissions would be comparable to existing emissions, as described above. In addition, the proposed Project would stabilize Berkshire Creek and create sustainable long-term hydrologic conditions consistent with the hydrologic regime present in the Berkshire Creek watershed prior to land development (i.e., impervious surfaces). These improvements, in turn, would enhance water quality compared to the current condition, allowing for riparian habitat restoration by reducing surface flows that scour the creek, and eliminating flooding on the service road and the Berkshire Creek trail crossing. Finally, the paved equestrian picnic area lot would be converted to a pervious surface, further reducing surface flows and enhancing storm water runoff infiltration in the area. As described in the City's CAP, it is anticipated that the City will experience more droughts and intense rains as a result of climate change. The CAP details that "while average conditions may be drier, the expectation is that more intense rainstorms will occur during a shorter rainy season resulting in increased flooding and associated landslides" (City of Pasadena 2018). This Project would eliminate flooding issues at Berkshire Creek that could be exacerbated by climate change and enhance management of storm water runoff through pavement removal. Also, while a total of 81 non-native trees/saplings and 4 native trees would be removed as part of Project implementation; approximately

90 new native tree planting locations would be part of habitat restoration activities. These trees, and new understory vegetation, would provide long-term CO2 sequestration that is expected to offset the finite GHG emissions resulting from the Project's construction. Therefore, with implementation of the proposed Project, it can be reasonably assumed that there would be net zero GHG emissions. There would be a less than significant impact and no mitigation is required.

		Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:					
b)	Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☐	☒

WHY? The principal State plan and policy adopted for the purpose of reducing GHG emissions is AB 32, the California Global Warming Solutions Act of 2006. AB 32 requires CARB to adopt rules and regulations that would achieve GHG emissions equivalent to statewide levels in 1990 by 2020 through an enforceable statewide emission cap which was phased starting in 2012. In December 2007, CARB approved a GHG emissions target for 2020 equivalent to the State's calculated GHG emissions level in 1990. This 2020 target of 427 $MMTCO_2e$ required the reduction of 169 $MMTCO_2e$, or approximately 30 percent, from the State's projected 2020 business as usual emissions of 596 $MMTCO_2e$. CARB approved a *Climate Change Scoping Plan* as required by AB 32 in 2008; this plan is required to be updated every five years. The *Climate Change Scoping Plan* proposes a "comprehensive set of actions designed to reduce overall carbon GHG emissions in California, improve our environment, reduce our dependence on oil, diversify our energy sources, save energy, create new jobs, and enhance public health" (CARB 2008). The *Climate Change Scoping Plan* has a range of GHG-reduction actions which include direct regulations, alternative compliance mechanisms, monetary and non-monetary incentives, voluntary actions, market-based mechanisms such as a cap-and-trade system, and an AB 32 implementation regulation to fund the program. On May 22, 2014, CARB approved the final *First Update to the Climate Change Scoping Plan*. The first update describes California's progress towards AB 32 goals, stating that "California is on track to meet the near-term 2020 greenhouse gas limit and is well positioned to maintain and continue reductions beyond 2020 as required by AB 32" (CARB 2014). The latest update, *Second Update to the Climate Change Scoping Plan*, was adopted in December 2017 and incorporates the 40 percent reduction to 1990 emissions levels by 2030 of Senate Bill (SB) 32, as discussed below.

On April 29, 2015, the California Governor issued Executive Order B-30-15 that aims to reduce California's GHG emissions 40 percent below 1990 levels by 2030. This executive order aligns California's GHG reduction targets with those of other international governments, such as the European Union that set the same target for 2030 in October 2014. This target will make it possible to reach the ultimate goal of reducing GHG emissions 80 percent under 1990 levels by 2050 (per Executive Order S3-05) that is based on scientifically-established levels needed in the United States to limit global warming below two degrees Celsius – the warming threshold at which scientists say there will likely be major climate disruptions. AB 197 (September 8, 2016) and SB 32 (September 8, 2016) codified into statute the GHG emissions reduction targets of at least 40 percent below 1990 levels by 2030 as detailed in EO B-30-15. AB 197 also requires additional GHG emissions reporting that is broken down to sub-county levels and requires CARB to consider the social costs of emissions impacting disadvantaged communities. The *Second Update to the Climate Change Scoping Plan*, as discussed above, includes the statutory GHG reduction requirements that were not included in the past iterations of Scoping Plan, including SB 32, SB 350, and SB 650 (which establishes priority GHG reduction targets for designated types of greenhouse gases such as methane) (CARB 2017).

The quantitative goal of AB 32 is to reduce GHG emissions to 1990 levels by 2020, and the goal of SB 32 is the 40 percent reduction in 1990 levels by 2030. Plans and regulations (e.g., GHG emissions standards for vehicles and the Low Carbon Fuel Standard) are being implemented at the statewide level, and compliance at the project level is not applicable. The proposed Project would not conflict with or obstruct implementation of AB 32 or SB 32.

The City's CAP outlines several measures relevant to the Project. Specifically, Water Conservation Measure 3 (WC-3) Stormwater, is particularly relevant to the Project and a consistency analysis between the Project and WC-3 is shown with in Table 2-13, Consistency Analysis with Climate Action Plan Measures.

TABLE 2-13
CONSISTENCY ANALYSIS WITH CLIMATE ACTION PLAN MEASURES

Measure	Consistency Analysis
WC-3: Storm Water	
Measure WC-3.1: Improve storm water to slow, sink, and treat water run-off, recharge groundwater, and improve water quality.	**Consistent**. The Project would stabilize Berkshire Creek and create sustainable long-term hydrologic conditions consistent with the hydrologic regime present in the Berkshire Creek watershed prior to land development (i.e., impervious surfaces). These improvements would enhance water quality compared to the current condition, allowing for riparian habitat restoration by reducing surface flows that scour the creek and would eliminate flooding on the service road and the Berkshire Creek trail crossing. The proposed Project would remove the entirety of the paving at the equestrian picnic area lot and a portion of the paving along the adjacent trail and replace with permeable surfaces. These surfaces would remain permeable, either as a trail surface, gravel lot, or native meadow garden. This removal and replacement of impervious surfaces would facilitate on-site storm water runoff infiltration.
Implementation Action A. Replace Impervious Surfaces: Identify and map potential public locations to replace impervious surfaces with landscaped green spaces, permeable pavement, rain gardens, and/or bioswales.	**Consistent.** The proposed Project would remove the entirety of the paving at the equestrian picnic area lot and a portion of the paving along the adjacent trail and replace with permeable surfaces. These surfaces would remain permeable, either as a trail surface, gravel lot, or native meadow garden. This removal and replacement of impervious surfaces facilitates on-site storm water runoff infiltration.
Implementation Action B. Increase Storm Water Capacity: Continue to increase storm water capacity and reduce flooding by identifying locations to divert or redirect water run-off and improve culverts and other storm water infrastructure.	**Consistent.** The Berkshire Creek restoration concept, including use of materials, is intended to present a naturalized visual and ecological condition at the surface while adequately managing the high runoff volumes and velocities that occur at the Berkshire Drain outlet. These improvements would reduce surface flows that scour the creek and would eliminate flooding on the service road and the Berkshire Creek trail crossing.
Implementation Action C. Project Funding and Prioritization: Develop a prioritized list of projects and identify funding for implementation.	**Consistent.** The proposed Project is one of the City's prioritized projects and has received grant funding for implementation.
Implementation Action D. Restore Arroyo Seco: Work with community organizations and volunteers to continue efforts to restore the Arroyo Seco region and other identified priority areas.	**Consistent.** The proposed Project includes a partnership with the Arroyo Seco Foundation and Hahamongna Native Plant Nursery to provide a portion of the plants to be used for habitat restoration activities in Berkshire Creek.
Source: Pasadena 2018b.	

As shown in Table 2-13, the Project would comply with relevant portions of the CAP. As described under Threshold 2.8(a), the Project would have net zero GHG emissions. Implementation of the proposed Project would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions. There would be no impact and no mitigation is required.

MITIGATION MEASURES

There would be no significant impacts and no mitigation is required.

2.9 HAZARDS AND HAZARDOUS MATERIALS

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☒	☐

WHY? With Project implementation, the Oak Grove area would continue existing operations as a recreational facility, which does not use or store hazardous substances other than occasional, localized use of herbicides. The City would be required to continue adherence to applicable zoning and fire regulations for the use and storage of any hazardous substances. As such, upon compliance with applicable regulations, the routine use, disposal, and transport of small amounts of commonly used hazardous materials associated with Project operation would not result in a significant hazard to the public or to the environment. There would be a less than significant impact and no mitigation is required.

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☐	☒	☐

WHY? Construction of the Project would involve the use of common hazardous substances such as petroleum-based fuels and hydraulic fluid. However, the level of risk associated with the accidental release of hazardous substances during construction is considered low due to the small volume of hazardous materials that would be used during construction. The construction contractor would be required to use standard construction controls and safety procedures during any transport, use, or disposal of hazardous materials. Standard construction practices would be observed such that any materials released are appropriately contained and remediated as required by local, State, and federal law. As such, the transport, use, and disposal of hazardous substances required for construction and the risk of release of these substances into the environment would not represent a significant hazard. There would be a less than significant impact and no mitigation is required.

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter-mile of an existing or proposed school?	☐	☐	☐	☒

WHY? The Project site is within approximately one-quarter mile of the following schools, all located to the west across Oak Grove Drive:

- La Cañada High School (4463 Oak Grove Drive);
- Hillside School and Learning Center (4331 Oak Grove Drive);
- Crestview Preparatory School (140 Foothill Boulevard);
- St. Francis High School (200 Foothill Boulevard).

As discussed under Threshold 2.9(b) above, construction of the Project would involve the use of common hazardous substances such as petroleum-based fuels or hydraulic fluid used for construction equipment. However, this would not be considered a significant hazard for potential environmental release. The remote risk of release of a small volume of fuel or other materials commonly used in construction activity, which are not acutely hazardous, would not pose a potential health hazard to the occupants (e.g., students, staff) of the schools to the west of the site. Operation of the Project would be the same as the existing conditions with no potential for emitting hazards emissions or handling hazardous materials such that would result in impacts on existing schools in proximity to the Project site. There would be no impact and no mitigation is required.

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	☒

WHY? Based on review of the Cortese List data resources, the Project site is not located on the State of California Hazardous Waste and Substances Sites List of sites published by California Environmental Protection Agency (CalEPA) and compiled pursuant to Section 65962.5 of the *California Government Code* (referred to as the Cortese List) (CalEPA 2018). The Project site is an existing recreational facility. The site is not known or anticipated to have been contaminated with hazardous materials, and no hazardous material storage facilities are known to exist on-site. For these reasons, the Project is not be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5. There would be no impact and no mitigation is required.

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
e) For a Project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the Project result in a safety hazard or excessive noise for people residing or working in the Project area?	☐	☐	☐	☒

WHY? The Project site is not within an airport land use plan or within two miles of a public airport or public use airport. The nearest public use airport is the Hollywood Burbank Airport (formerly Bob Hope Airport), located more than 10 miles west of the Project site. Therefore, the proposed Project would not result in a safety hazard for people residing or working in the Project area, nor for people visiting the Oak Grove area of the HWP. There would be no impact and no mitigation is required.

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☒	☐

WHY? The City of Pasadena Emergency Operations Plan (EOP) addresses the City's planned response to emergencies associated with natural disasters and technological incidents. It provides an overview of operational concepts, identifies components of the City's emergency management organization within the Standardized Emergency Management System (SEMS) and the National Incident Management System (NIMS), and describes the overall responsibilities of the federal, State, county entities, and the City for protecting life and property and ensuring the overall well-being of the population (Pasadena 2011). Further, the City maintains a SEMS/NIMS Emergency Response Plan, which addresses planned responses to emergency/disaster situations associated with natural disasters, technological incidents, and national security emergencies. In case of a disaster, the Pasadena Fire Department is responsible for implementing the plan, and the Pasadena Police Department devises evacuation routes based on the specific circumstance of the emergency.

The construction and operation of the Project would not place any permanent or temporary physical barriers on any existing public streets. As such, the proposed Project would not obstruct any emergency evacuation or response activities. Construction staging would not interfere with circulation along Oak Grove Drive or any other nearby roadways. As discussed in Section 2.17, Transportation, construction traffic would not result in a direct or cumulative impact. For these reasons, the proposed Project would not interfere with any emergency response or emergency evacuation plans. There would be no impact and no mitigation is required.

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
h) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires?	☐	☐	☒	☐

WHY? As shown on Plate P-2 of the General Plan Safety Element, the majority of the Project site is within a low fire hazard zone; however, portions of the western edge of the Project site were designated as areas of moderate or very high fire hazard (Pasadena 2002a). However, the more recent 2011 Local Responsibility Area map for Pasadena indicates that the Very High Fire Hazard Severity Zone (VHFHSZ) encompasses the southern tip of the Project site, primarily overlapping the segment of California sagebrush scrub on the south side of the access road (refer to Exhibit 3, Proposed Project Components) (CAL FIRE 2011).

Construction activities within the VHFHSZ would be limited to hand tools, such as a walk-behind trencher and weed trimmer. Larger construction equipment would be used in areas immediately to the north of the VHFHSZ-designated area. However, any use of construction equipment presents a risk of accidental fire, whether within a VHFHSZ or nearby and spreading to the more flammable VHFHSZ. Therefore, construction specifications would include fire prevention practices derived from Caltrans' *Standard Specifications* (Caltrans 2018), including, but not limited to:

- Except for motor trucks, truck tractors, buses, and passenger vehicles, equip all hydrocarbon-fueled engines, both stationary and mobile including motorcycles, with spark arresters that meet USFS standards as specified in the *Forest Service Spark Arrester Guide*. Maintain the spark arresters in good operating condition;
- Locate flammable materials at least 50 feet away from equipment service, parking, and gas and oil storage areas. Each small mobile or stationary engine site must be cleared of flammable material for a radius of at least 15 feet from the engine;
- Furnish a pickup truck and driver that will be available for fire control during working hours. The pickup truck and operator must patrol the area of construction for at least one-half hour after job site activities have ended.
- If the fire danger rating reaches very high:
    - Falling of dead trees or snags must be discontinued.
    - Welding must be discontinued except in an enclosed building or within an area cleared of flammable material for a radius of 15 feet.
    - Smoking is allowed only in automobiles and cabs of trucks equipped with an ashtray or in cleared areas immediately surrounded by a fire break unless prohibited by other authority.
    - Vehicular travel is restricted to cleared areas except in case of emergency.
- If the fire danger rating reaches extreme, take the precautions specified for a very high fire danger rating except smoking is not allowed in an area immediately surrounded by a firebreak and work of a nature that could start a fire requires that properly equipped fire guards be assigned to such operation for the duration of the work.

Further, in the event a fire begins during construction of the Project, the nearest fire station of Los Angeles County Fire Department Station 82, is located approximately 0.75-mile to the northwest at 352 Foothills Boulevard in La Cañada Flintridge. Being in a dense urban area, there are several fire protection facilities in the Project vicinity that could respond to an emergency at the site. The contours of Berkshire Creek would be changed, and non-native vegetation would be removed and replaced with native vegetation; however, these changes would not exacerbate wildfire risk in the long term. Finally, the proposed Project would not introduce structures, or change uses or activities in the VHFHSZ-designated area or nearby areas. There would be a less than significant impact and no mitigation is required.

MITIGATION MEASURES

There would be no significant impacts and no mitigation is required.

2.10 HYDROLOGY AND WATER QUALITY

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality?	☐	☐	☒	☐

WHY? The Project site is within the jurisdiction of the Los Angeles (Region 4) RWQCB. The Project could result in short-term, construction-related impacts to surface water quality from grading and other construction activities (e.g., erosion, spills, and leaks from construction equipment). Compliance with non-storm water management and pollution-control BMPs, as outlined in the SWPPP for the Project consistent with the NPDES Construction General Permit, would ensure the pollutant levels in runoff do not violate standards. Operation of the Project would not violate any water quality standards, as the Project would not result in increased flows or introduce new contaminants to the runoff flowing through the Arroyo Seco due to increased impervious surfaces. The proposed Project would include an irrigation system; however, the system has been designed and would be controlled and monitored to minimize runoff. The proposed Berkshire Creek and equestrian picnic area improvements would enhance water quality compared to the current condition, allowing for riparian habitat restoration by reducing surface flows that scour the creek, and would eliminate flooding on the service road and the Berkshire Creek trail crossing. The proposed Project would remove the entirety of the paving at the equestrian picnic area lot and a portion of the paving along the adjacent trail and replace with permeable surfaces. These surfaces would remain permeable, either as a trail surface, gravel lot, or native meadow garden. This removal and replacement of impervious surfaces facilitates on-site storm water runoff infiltration. There would be less than significant impacts and no mitigation is required.

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?	☐	☐	☐	☒

WHY? A project can result in a significant impact on groundwater supplies if it causes a demonstrable and sustained reduction of groundwater recharge capacity or changes the potable water levels such that it reduces the ability of a water utility to use the groundwater basin for public water supplies or storage of imported water, reduces the yields of adjacent wells or well fields, or adversely changes the rate or direction of groundwater flow. The proposed Project would minimally increase demand for water associated with use of the proposed irrigation system to support restored habitat. Additionally, a nominal amount of water may be used during construction for dust suppression. These potable water supplies may be in part derived from the City's groundwater sources but would not change the volume of water withdrawn from the Raymond Basin, as such withdrawal is controlled by the Raymond Basin Management Board. Additionally, the Project would not involve an increase in impervious surfaces that would impede stormwater infiltration. To the contrary, as discussed under Threshold 2.10(a) above, the Project would remove the entirety of the paving at the equestrian picnic area lot and a portion of the paving along the adjacent trail and replace with permeable surfaces. These surfaces would remain permeable, either as a trail surface, gravel lot, or native meadow garden. This removal and replacement of impervious surfaces facilitates on-site storm water runoff infiltration. There would be no impact and no mitigation is required.

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course or a stream or river or through the addition of impervious surfaces, in a manner that would: i) Result in substantial erosion or siltation on- or off-site?	☐	☐	☒	☐

WHY? The proposed Project includes restoring a portion of Berkshire Creek that flows through the Project site. While implementation of the Berkshire Creek restoration component of the Project would alter the course of the Berkshire Creek drainage, there would be no alteration of drainage patterns within the remainder of the Project site. Furthermore, a primary purpose of the Project is to repair the existing condition of Berkshire Creek that results in substantial erosion and siltation off-site (i.e., in the Devil's Gate basin). The Berkshire Creek restoration concept, including use of materials, is intended to present a naturalized visual and ecological condition at the surface while adequately managing the high runoff volumes and velocities that occur at the Berkshire Drain outlet. Therefore, the Project would not result in substantial erosion or siltation on- or off-site and would repair the existing erosion and siltation that occurs within the drainage and would have no adverse effects. There would be a less than significant impact and no mitigation is required.

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course or a stream or river or through the addition of impervious surfaces, in a manner that would: ii) Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?	☐	☐	☒	☐

WHY? As discussed under Threshold 2.10(c)(i) above, the proposed Project includes restoring a portion of Berkshire Creek that flows through the Project site. While this would alter the course of the Berkshire Creek drainage, there would be no alteration of drainage patterns within the remainder of the Project site. With Project implementation, storm water runoff would continue to flow from Berkshire Drain, through Berkshire Creek, and outlet into the Devil's Gate basin. Therefore, the Project would not result in flooding on- or off-site and would help to alleviate the existing flooding that occurs on the access road and within the drainage and would have no adverse effects. As discussed under Threshold 2.10(a) above, the Project would remove the entirety of the paving at the equestrian picnic area lot and a portion of the paving along the adjacent trail and replace with permeable surfaces. These surfaces would remain permeable, either as a trail surface, gravel lot, or native meadow garden. As such, there would be a net decrease in the amount of impervious surfaces with Project implementation. Therefore, the Project would not substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site. There would be a less than significant impact and no mitigation is required.

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course or a stream or river or through the addition of impervious surfaces, in a manner that would: iii) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☐	☐	☒	☐

WHY? As discussed under Threshold 2.10(a) above, the Project would remove the entirety of the paving at the equestrian picnic area lot and a portion of the paving along the adjacent trail and replace with permeable surfaces. These surfaces would remain permeable, either as a trail surface, gravel lot, or native meadow garden. As discussed under Threshold 2.10(c)(i) above, the proposed Project includes restoring a portion of Berkshire Creek that flows through the Project site. While this would alter the course of the Berkshire Creek drainage, there would be no alteration of drainage patterns within the remainder of the Project site. There would be a net decrease in the amount of impervious surfaces with Project implementation. As such, the amount of stormwater runoff from the Project would not increase, and would not, therefore, exceed the capacity of existing or planned stormwater drainage systems. Further, the Berkshire Creek restoration would repair the existing problem with storm water system capacity in this drainage, wherein there is inadequate infrastructure to convey the volume and velocity of flows from Berkshire Drain. There would be no adverse effects related to storm water drainage capacity. There would be less than significant impacts and no mitigation is required.

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course or a stream or river or through the addition of impervious surfaces, in a manner that would: iv) Impede or redirect flood flows?	☐	☐	☒	☐

WHY? As discussed under Threshold 2.10(a) above, the Project would remove the entirety of the paving at the equestrian picnic area lot and a portion of the paving along the adjacent trail and replace with permeable surfaces. These surfaces would remain permeable, either as a trail surface, gravel lot, or native meadow garden. As discussed under Threshold 2.10(c)(i) above, the proposed Project includes restoring a portion of Berkshire Creek that flows through the Project site. While this would alter the course of the Berkshire Creek drainage, there would be no alteration of drainage patterns within the remainder of the Project site. There would be a net decrease in the amount of impervious surfaces with Project implementation. Therefore, the Project would not impede or redirect flood flows and would repair the existing flooding that occurs on the access road and within the drainage and would have no adverse effects. There would be less than significant impacts and no mitigation is required.

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?	☐	☐	☐	☒

WHY? No portions of the City are within a 100-year floodplain, as identified by the Federal Emergency Management Agency (FEMA). As shown on FEMA FIRM panel 06037C1375F, the Project site is located in Zone X (FEMA 2008). Zone X is located outside of the special flood hazard areas subject to inundation by the one percent annual chance of flood (100-year floodplain), and no floodplain management regulations are required. In addition, according to the City's Dam Failure Inundation Map (Plate P-2 of the Safety Element) the Project site is not located in a dam inundation area (City of Pasadena 2002a). The City is not located in proximity to any inland bodies of water or the Pacific Ocean to be inundated by either a seiche or tsunami. Therefore, the Project would neither introduce pollutants to the site nor risk release of pollutants due to inundation, including during intense storm events. There would be no impact and no mitigation is required.

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	☐	☐	☐	☒

WHY? As discussed under Threshold 2.10(a) above, the proposed Berkshire Creek and equestrian picnic area improvements would enhance water quality compared to the current condition, allowing for riparian habitat restoration by reducing surface flows that scour the creek, and would eliminate flooding on the service road and the Berkshire Creek trail crossing. The proposed Project would remove the entirety of the paving at the equestrian picnic area lot and a portion of the paving along the adjacent trail and replace with permeable surfaces. These surfaces would remain permeable, either as a trail surface, gravel lot, or native meadow garden. This removal and replacement of impervious surfaces facilitates on-site storm water runoff infiltration.

As discussed under Threshold 2.10(b) above, the proposed Project would minimally increase demand for water associated with use of the proposed irrigation system to support restored habitat. Additionally, a nominal amount of water may be used during construction for dust suppression. These potable water supplies may be in part derived from groundwater sources. Additionally, the Project would not involve an increase in impervious surfaces that would impede stormwater infiltration. As discussed under Threshold 2.10(a) above, the Project would remove the entirety of the paving at the equestrian picnic area lot and a portion of the paving along the adjacent trail and replace with permeable surfaces. These surfaces would remain permeable, either as a trail surface, gravel lot, or native meadow garden. This removal and replacement of impervious surfaces facilitates on-site storm water runoff infiltration. As such, the proposed Project would neither conflict with nor obstruct implementation of the LARWQCB's Water Quality Control

Plan. The Raymond Basin, PWP's source of groundwater, is defined by the California Department of Water Resources (DWR) as a very-low priority pursuant to the 2014 Sustainable Groundwater Management Act (DWR 2019). As such, there is currently no sustainable groundwater management plan applicable to the Project site. There would be no impact and no mitigation is required.

MITIGATION MEASURES

There would be no significant impacts and no mitigation is required.

2.11 LAND USE AND PLANNING

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
a) Physically divide an established community?	☐	☐	☐	☒

WHY? The proposed Project would not physically divide an existing community, as the proposed Project consists of drainage improvements, recreational improvements, and habitat restoration within an existing recreational facility. There would be no impact and no mitigation is required.

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
b) Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☒

WHY? The primary land use planning documents that govern the Project site are the City's General Plan and the Pasadena Zoning Code. The Project site's General Plan land use designation is Open Space, and zoning designation is OS (Open Space). Per Section 17.26.020(A) of the City's Zoning Code, "[t]he OS district is applied to sites with open space, parks, and recreational facilities of a landscaped, open character having a minimum contiguous site area of two acres." Section 17.26.030 of the PMC specifies that most uses in the OS zone require Conditional Use Permits (CUP), excepting short-term filming, accessory antenna array, and minor utility. The proposed Project is considered minor utility work, and there is no change in existing uses. The City of Pasadena Department of Planning has reviewed the Project and concluded that no CUP is required. The proposed Project has been designed to provide improved physical facilities and open space resources to existing users of the Oak Grove area of the HWP, consistent with the HWP Master Plan. Therefore, the proposed Project would not conflict with any applicable land use plans, policies, or regulations adopted for the purpose of avoiding or mitigating an environmental effect. There would be no impact and no mitigation is required.

MITIGATION MEASURES

There would be no significant impacts and no mitigation is required.

2.12 MINERAL RESOURCES

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☒

WHY? No active mining operations exist in the City. There are two areas in Pasadena that have been identified by the CGS as Mineral Resource Zone (MRZ) 2, which is defined as areas where geologic data indicate the significant PCC-Grade aggregate resources are present. These two areas are Eaton Wash and Devil's Gate Reservoir, which were both formerly mined for aggregate (CGS 1982, 2010). Specifically, Devil's Gate Reservoir has been mined periodically to a maximum depth of about 30 ft to provide channel maintenance for the Los Angeles County Flood Control District. The aggregate removed was sold for a variety of uses including PCC aggregate. Drill hole data indicates that the sector contains sand and gravel deposits to a depth of 100 ft below the present-day (i.e., in 2010) channel surface. Since there is little information on the quality of material below 30 ft, this depth was used for resource calculations. There is no active mine operations and there are no reserves. The Project site is identified as MRZ-3, defined as areas containing mineral deposits the significance of which cannot be evaluated from available data (CGS 2010)

The Project site lies adjacent to the Devil's Gate Reservoir. Neither the Project site nor surrounding areas, such as Devil's Gate Reservoir, are presently utilized for mineral production and mining is not an allowed use in the City's zoning code. Nevertheless, implementation of the Project would not obstruct any future aggregate mining operations in Devil's Gate Reservoir. Therefore, the proposed Project would not result in the loss of an available known mineral resource with value to the region, including concrete aggregate. There would be no impact and no mitigation is required.

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?	☐	☐	☐	☒

WHY? The City's General Plan Land Use Element does not identify any mineral recovery sites within the City (Pasadena 2015b). No active mining operations exist in the City, and mining is not currently allowed within any of the City's designated land uses. Therefore, the proposed Project would not result in significant impacts from the loss of a locally important mineral resource recovery site. There would be no impact and no mitigation is required.

MITIGATION MEASURES

There would be no significant impacts and no mitigation is required.

2.13 NOISE

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☒	☐

WHY? The proposed Project would generate noise from temporary construction activity. Construction of the proposed Project would include demolition, grading, export of demolition debris, import of fill and permeable paving material, and installation of new stormwater infrastructure, habitat restoration, and a bridge crossing.

Noise-Sensitive Receptors

Noise-sensitive receptors include land uses where an excessive amount of noise would interfere with normal operations or activities and where a high degree of noise control may be necessary. Examples include schools, hospitals, and residential areas. Recreational areas may be considered noise-sensitive where quiet and solitude may be an important aspect of the specific recreational experience. Noise-sensitive uses proximate to the Project site include the Hillside School and Learning Center and the La Cañada Methodist Church, both of which are located west of Oak Grove Drive approximately 80 ft to the west of the Project site in the City of La Cañada Flintridge. La Cañada High School is located approximately 200 ft to the northwest of the site. The nearest residential uses are located 700 ft to the south of the Project site beyond I-210 along Normandy Court in the City of La Cañada Flintridge.

Existing Noise Levels

To characterize the existing noise environment, Psomas conducted an ambient noise survey at the site on March 29, 2019. Short-term (approximately 20 minutes each) noise level measurements were taken using a Larson Davis Laboratories SoundTrack LxT® sound level meter (LD LxT). This sound level meter was placed proximate to the eastern, western, and northwestern Project site boundaries. Noise measurement locations are shown in Exhibit 16, Noise Monitoring Locations. The existing noise levels are shown in Table 2-14, Existing Ambient Noise Levels. As shown, existing noise levels at the Project site are considered low and typical of recreational areas. Noise monitoring data and calculations are provided in Appendix F of this IS/MND.

TABLE 2-14
EXISTING AMBIENT NOISE LEVELS

	L_{min} (Minimum)	L_{eq} (Average)	L_{max} (Maximum)
Western Project Site Boundary (Location 1)	54.2	59.7	65.7
Eastern Project Site Boundary (Location 2)	48.1	52.3	58.7
Northwestern Project Site Boundary (Location 3)	55.7	63.2	76.1
See Attachment D for Noise Measurement Data.			

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Noise Monitoring Locations

Exhibit 16

Berkshire Creek Area Improvements Project

N W E S

150 75 0 150 Feet

PSOMAS

(Rev: 05/21/2019 MMD) R:\Projects\PAS_Pasaden\3PAS010801\Graphics\Berkshire_Creek\MND\ex_Noise_Monitoring.pdf

Applicable Noise Standards

The Project site is located in the City of Pasadena, and there are also noise-sensitive receptors in City of La Cañada Flintridge situated adjacent to the site on the west. The unincorporated community of Altadena is located on the east side of the Devil's Gate Basin. However, the noise generation from construction of the proposed Project would not be expected to be audible by receptors in Altadena because of noise attenuation over a distance of at least approximately 1,500 ft at the nearest points. Noise would have attenuated substantially over this distance and would not contribute significantly to the ambient noise environment in Altadena. Therefore, the applicable noise standards of the cities of Pasadena and La Cañada Flintridge are provided below and used in the following analysis.

City of Pasadena

The Noise Element of the General Plan recognizes that construction activity is a source of occasional temporary nuisance noise throughout the City and that these and other such nuisance noises are common to cities and, because of their unpredictable nature, must be addressed on a case-by-case basis (Pasadena 2015b). The following General Plan policies are applicable to the Project:

> *Policy 7b:* The City will encourage limitations on construction activities adjacent to sensitive noise receptors.
>
> *Policy 7c:* The City will encourage construction and landscaping activities that employ techniques to minimize noise.

Chapter 9.36, Noise Restrictions, of the PMC is the City's Noise Ordinance. It states it is the City's policy ". . . to prohibit unnecessary, excessive and annoying noises from all sources. Noise at certain levels is detrimental to the health and welfare of the general public." The following sections of the Noise Ordinance are applicable to the Project:

Section 9.36.050, General Noise Sources, of the PMC is applicable for long-term, operational noise and states, "It is unlawful for any person to create, cause, make or continue to make or permit to be made or continued any noise or sound which exceeds the ambient noise level at the property line of any property by more than 5 decibels". In accordance with Section 9.36.040 of the PMC, adjustments are made to the allowable noise level for steady audible tones, repeated impulsive noise, and noise occurring for limited time periods.

Section 9.36.070, Construction Projects, of the PMC states:

A. No person shall operate any pile driver, power shovel, pneumatic hammer, derrick power hoist, forklift, cement mixer or any other similar construction equipment within a residential district or within a radius of 500 ft therefrom at any time other than as listed below:
    1. From 7:00 AM to 7:00 PM Monday through Friday;
    2. From 8:00 AM to 5:00 PM on Saturday; and
    3. Operation of any of the listed construction equipment is prohibited on Sundays and holidays.

B. No person shall perform any construction or repair work on buildings, structures or projects within a residential district or within a radius of 500 feet there from in such a manner that a reasonable person of normal sensitiveness residing in the area is caused discomfort or annoyance at any time other than as listed below:

   1. From 7:00 AM to 7:00 PM Monday through Friday;
   2. From 8:00 AM to 5:00 PM on Saturday; and
   3. Performance of construction or repair work is prohibited on Sundays and holidays.

C. For purposes of this section, holidays are New Year's Day, Martin Luther King Jr. Day, Lincoln's Birthday, Washington's Birthday, Memorial Day, Independence Day, Labor Day, Veterans Day, Thanksgiving Day, Day after Thanksgiving, and Christmas.

Section 9.36.080, Construction Equipment, of the PMC states, "It is unlawful for any person to operate any powered construction equipment if the operation of such equipment emits noise at a level in excess of 85 dBA when measured within a radius of 100 feet from such equipment."

City of La Cañada Flintridge

Chapter 5.02, Regulation of Community Noise, of the La Cañada Flintridge Municipal Code (LCFMC) is the City of La Cañada Flintridge's Noise Ordinance. It states, "it is the policy of La Cañada Flintridge to prevent excessive sound that may jeopardize the health, welfare, or safety of the citizens or degrade the quality of life." Section 5.02.110, Temporary construction activities, of the LCFMC is applicable to the Project and states that where technically and economically feasible, temporary construction activity shall be conducted in such a manner that the one-hour average sound levels at affected properties shall not exceed the noise levels shown in Table 2-15, La Cañada Flintridge Construction Limits. The land uses to the west across Oak Grove Drive (i.e., schools, church) are considered Public/Semi-Public Zones.

TABLE 2-15
LA CAÑADA FLINTRIDGE CONSTRUCTION NOISE LIMITS

	R-1 Zone (Single-Family Residential)	R-3, RPD, Mixed Use Zones (Multifamily Residential)	CPD, FCD, Public/Semi-Public, Open Space Zones (Commercial)
Weekdays* 7:00 AM to 6:00 PM	75 dBA	80 dBA	85 dBA
Saturdays** 9:00 AM to 5:00 PM	60 dBA	65 dBA	70 dBA

* During Daylight Savings Time, weekday hours shall be from 7:00 AM to 7:00 PM
** Construction, except emergency work, is not permitted on Sunday or holidays.
Source: Ordinance 450 Section 2, La Cañada Flintridge Municipal Code

Construction (Short-Term) Noise

The primary noise sources during construction of the Project are the diesel engines of construction equipment. Construction equipment can be considered to operate in two modes: stationary and mobile. Stationary equipment operates in one location for one or more days at a time, with either a fixed-power operation (such as pumps, generators and compressors) or a variable noise operation (such as rock drills and pavement breakers). Mobile equipment moves around the construction site with power applied in cyclic fashion, such as bulldozers, graders, and loaders. Noise generation from stationary equipment is assessed from the location of the specific equipment, while noise generation from mobile construction equipment is assessed from the center of the equipment activity or construction site. The noise level at a receptor is dependent on the distance from the source to the receptor and the intervening topography and groundcover. Typical noise levels generated by construction equipment are listed in Table 2-16, Typical Construction Equipment Noise Levels.

TABLE 2-16
TYPICAL CONSTRUCTION EQUIPMENT NOISE LEVELS

Equipment	Typical Noise Level (dBA) 50 ft from Source
Air Compressor	81
Backhoe	80
Ballast Equalizer	82
Ballast Tamper	83
Compactor	82
Concrete Mixer	85
Concrete Pump	82
Concrete Vibrator	76
Crane, Derrick	88
Crane, Mobile	83
Dozer	85
Generator	81
Grader	85
Impact Wrench	85
Jack Hammer	88
Loader	85
Paver	89
Pile-driver (Impact)	101
Pile-driver (Sonic)	96
Pneumatic Tool	85
Pump	76
Rail Saw	90
Rock Drill	98
Roller	74
Saw	76
Scarifier	83
Scraper	89
Shovel	82
Spike Driver	77
Tie Cutter	84
Tie Handler	80
Tie Inserter	85
Truck	88
Source: FTA 2006.	

Each phase of construction has a specific equipment mix, depending on the work to be accomplished during that phase. Each phase also has its own noise characteristics; some would have higher continuous noise levels than others, and some have high-impact noise levels. The L_{eq} of each phase is determined by combining the L_{eq} contributions from each piece of equipment used in that phase. Construction of the Project is anticipated to occur for approximately three months beginning in fall 2019.

Because noise propagation attenuates with distance, the distance from the noise source to a receptor is a primary consideration in determining the noise level experienced at the receptor. Because different construction stages involve different pieces of equipment and may involve only localized portions of a site, each construction stage can result in different noise levels being generated depending on the distance to sensitive receptors. Therefore, the combination of construction activity at one time that would involve the largest number of equipment and equipment that generates the highest noise levels was modeled using the noise levels for construction activities developed by the U.S. Environmental Protection Agency's *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances.* (USEPA 1971). It is noted that noise analysis associated with the Project's construction activities is conservative and may be overestimated because it is based on noise levels from construction engines developed in the 1970s and earlier, which did not have modern engine designs or noise attenuation systems. Construction activities were also assessed with noise for all construction equipment being utilized at the same time, which would not occur for the majority of the construction period. Finally, the construction noise levels presented below do not consider intervening topography or structures that may reduce noise.

Table 2-17, Construction Noise Levels and Noise-Sensitive Uses shows both the estimated maximum and average noise levels for the most intense (i.e., noise generating) construction activity anticipated to occur during Project implementation.

TABLE 2-17
CONSTRUCTION NOISE LEVELS AT NOISE-SENSITIVE USES

	Noise Levels (L_{eq} dBA)							
	School West of the Site (La Cañada Flintridge)		Religious Use Northwest of the Site (La Cañada Flintridge)		Residential Uses South of the Site (La Cañada Flintridge)		Oak Grove Area (Project Site)	
Construction Activity	**Max (80 ft)**	**Avg (235 ft)**	**Max (80 ft)**	**Avg (205 ft)**	**Max (700 ft)**	**Avg (1,400 ft)**	**Max (100 ft)[a]**	**Avg (2,300 ft)**
Demolition	78	71	77	72	61	55	78	51
Excavation	83	76	82	77	66	60	83	56
Paving and Site Cleanup	83	76	82	77	66	60	83	56
Significance Threshold	***85[b]***	***85[b]***	***85[b]***	***85[b]***	***75[b]***	***75[b]***	***85[a]***	***85[a]***
Significant? (Yes/No)	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**

dBA: A-weighted decibels; Leq: average noise energy level; max: maximum; avg: average

[a] Distance and significance threshold based on the Pasadena Municipal Code Section 9.36.080.

[b] Significance threshold based on the La Cañada Flintridge Municipal Code Section 5.02.110.

Note: Noise levels from construction activities do not account for attenuation provided by intervening structures.

Source: USEPA 1971.

Maximum noise levels represent the noise from construction equipment occurring nearest to the identified noise sensitive receptor. The nearest receptor is measured as the shortest distance from the Project's construction activity to the property line of the noise sensitive use/receptor. Site preparation, grading, and construction would occur up to approximately 35 ft from the City right-of-way (ROW), the edge of Oak Grove Drive, for the Berkshire Creek restoration activities and approximately 25 ft from the City ROW for the equestrian picnic area improvements. Average noise levels represent the noise exposure to noise sensitive receptors based on the distance to the approximate center of Project site's construction activities.

For the proposed Project, because the construction noise generation would be within two main areas (i.e., Berkshire Creek and equestrian picnic area), the average noise levels are based on the distance from a point approximately halfway between these two areas, similar to the location of monitoring Location 1 shown on Exhibit 16. Noise levels from Project-related construction activities would range from 61 to 83 dBA L_{eq} for the maximum noise levels and 51 to 77 dBA L_{eq} for the average noise levels.

Noise from construction activities on-site would be clearly audible above the existing ambient noise environment but, as shown in Table 2-17 above, the maximum and average noise levels estimated for Project implementation would not exceed the applicable significance thresholds (i.e., either City of Pasadena or City of La Cañada Flintridge), even with the highly conservative methodology. Because the noise levels using this worst-case construction analysis approach would not exceed the established construction noise limits, noise resulting from Project construction would result in less than significant impacts and no mitigation is required.

The Project would generate construction traffic from vehicle traffic, including workers commuting to and from each of the Project components; vendors bringing materials; and haul trucks removing demolished structural and vegetation from the Project site. Based on the *Berkshire Creek Area Improvements Project Traffic Evaluation* (Psomas 2019c, Appendix G), a total of 99 daily trips and 33 peak hour trips would occur on peak day (i.e., worst-case) for construction-related vehicle trips. These trips would be a combination of both approximately 49 truck and 50 worker passenger vehicle trips and would occur for an anticipated 2 working days of peak construction activity during the entire 3-month construction period. For most of the Project's construction, the only daily traffic would be generated by the workers (approximately 50 total trips per day). Due to the low magnitude of Project-related truck and worker commute trips, the traffic noise produced on a daily and hourly basis would not result in a substantial level of noise exposure. Construction traffic noise generation would be less than significant and no mitigation is required.

Operation (Long-Term) Noise Increases

The proposed Project would not result in additional trip generation and would not, therefore, result in additional traffic-related noise. The Project would also not involve additional stationary sources of noise in the Oak Grove Area. There would be no impact and no mitigation is required.

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
b) Generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☒	☐

WHY? Depending on the type of construction activities employed, construction of the proposed Project could generate groundborne vibration. The City of La Cañada Flintridge does not have vibration standards. The City of Pasadena uses the vibration-induced structural damage criteria developed by Caltrans. Caltrans vibration structural damage potential guideline thresholds are shown in Table 2-18, Vibration Damage Threshold Criteria, further below. The structural damage threshold of 0.2 in/sec for Class III buildings are selected for residential, school, and church buildings for this analysis. These thresholds represent the vibration limits for structural damage to buildings proximate to the Project site from continuous sources of vibration. Project construction activities would occur at an average distance of approximately 250 ft between equipment and off-site structures, with 150 ft to the nearest structures.

TABLE 2-18
VIBRATION DAMAGE THRESHOLD CRITERIA

Building Class	Continuous Source PPV (in/sec)	Single-Event Source PPV (in/sec)
Class I: buildings in steel or reinforced concrete, such as factories, retaining walls, bridges, steel towers, open channels, underground chambers and tunnels with and without concrete alignment	0.5	1.2
Class II: buildings with foundation walls and floors in concrete, walls in concrete or masonry, stone masonry retaining walls, underground chambers and tunnels with masonry alignments, conduits in loose material	0.3	0.7
Class III: buildings as mentioned above but with wooden ceilings and walls in masonry	0.2	0.5
Class IV: construction very sensitive to vibrations; objects of historic interest	0.12	0.3
ppv: peak particle velocity; in/sec: inch(es) per second Source: Caltrans 2013.		

Table 2-19, Vibration Levels for Construction Equipment, summarizes typical vibration levels measured during construction activities for various vibration-inducing pieces of equipment.

TABLE 2-19
VIBRATION LEVELS FOR CONSTRUCTION EQUIPMENT

Equipment		ppv at 25 ft (in/sec)
Pile driver (impact)	upper range	1.518
	typical	0.644
Pile driver (sonic)	upper range	0.734
	typical	0.170
Vibratory roller		0.210
Large bulldozer		0.089
Caisson drilling		0.089
Loaded trucks		0.076
Jackhammer		0.035
Small bulldozer		0.003
ppv: peak particle velocity; ft: feet; in/sec: inches per second. Source: Caltrans 2013; FTA 2006.		

Pile driving and blasting are generally the sources of the most severe vibration during construction. Neither pile driving nor blasting would be used during Project construction. Conventional construction equipment would be used for construction activities. Construction equipment utilized during Project development would produce vibration from vehicle travel as well as demolition, grading, and paving activities.

Table 2-20, Vibration Levels at Nearby Uses, shows the estimated vibration levels from construction-generated vibration activities proposed at the Project site.

TABLE 2-20
VIBRATION LEVELS AT NEARBY USES

Equipment	Vibration Levels		
	School West of the Site (La Cañada Flintridge)	**Religious Use Northwest of the Site (La Cañada Flintridge)**	**Residential Uses South of the Site**
	(ppv @ 150 ft)	**(ppv @ 270 ft)**	**(ppv @ 760 ft)**
Vibratory roller	0.01	0.01	0.00
Small bulldozer	0.00	0.00	0.00
Jackhammer	0.00	0.00	0.00
Loaded trucks	0.01	0.00	0.00
Structural Damage Threshold	***0.2***	***0.2***	***0.2***
Significant (Yes/No)?	**No**	**No**	**No**

ppv: peak particle velocity; ft: feet

Source: California Department of Transportation 2013 (Calculations can be found in Attachment D).

As shown in Table 2-19, the peak particle velocity levels (ppv) generated by Project construction activities would not exceed the significance threshold when construction activities occur under maximum (i.e., closest to the receptor) exposure conditions against Caltrans' structural damage significance criteria. Construction-related vibration levels would be substantially less under average conditions when construction activities are located further away. Because vibration levels would be below the significance thresholds, vibration generated by the Project's construction equipment would not be expected to generate either strongly perceptible levels of vibration or structural damage at the nearest uses. Impacts would be less than significant and no mitigation is required.

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☒	☐

WHY? There are no public or private airports located within two miles of the Project site. The closest airport to the site is the Hollywood Burbank Airport (formerly Bob Hope Airport), located approximately 10 miles due west of the site. There are two helipads in the vicinity of the site, operated by the Los Angeles County Fire Department and the Pasadena Police Department; however, they are not used for regular flight service and would not be anticipated to generate continuous excessive noise. Accordingly, the proposed Project would not expose people to excessive airport-related noise but could expose people to limited, intermittent noise from public-agency helicopters using the helipads. Impacts would be less than significant, and no mitigation is required.

MITIGATION MEASURES

There would be no significant impacts and no mitigation is required.

2.14 POPULATION AND HOUSING

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
a) Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through the extension of roads or other infrastructure)?	☐	☐	☐	☒

WHY? No residential units are included in the proposed Project; therefore, the Project would not directly induce unplanned population growth. Additionally, the Project would not indirectly induce growth, such as through provision of employment or extension of infrastructure. Development of the proposed Project would not require extending or improving infrastructure in a manner that would facilitate off-site growth. The Project site is designated for open space and recreation uses. Implementation of the proposed Project would maintain the existing use and would not displace housing. Therefore, the proposed Project would not induce substantial population growth. There would be no impact and no mitigation is required.

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

WHY? The Project site does not contain any existing dwelling units, and there are no persons currently residing at the site. Therefore, the proposed Project would not displace any people or housing. There would be no impact and no mitigation is required.

MITIGATION MEASURES

There would be no significant impacts and no mitigation is required.

2.15 PUBLIC SERVICES

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
a) Result in substantial adverse physical impacts associated with the provision of new or physically altered government facilities, need for new or physically altered government facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for fire protection?	☐	☐	☐	☒

WHY? As discussed in Section 2.14, Population and Housing, above, the proposed Project would not result in direct or indirect population growth. The proposed Project would include construction of a multi-purpose bridge, new stormwater infrastructure, equestrian picnic area improvements, and habitat restoration. These Project elements would not alter demand and would not result in demand for additional fire protection facilities, such as a new fire station, that would in turn cause adverse environmental impacts. There would be no impact and no mitigation is required.

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
a) Result in substantial adverse physical impacts associated with the provision of new or physically altered government facilities, need for new or physically altered government facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for police protection?	☐	☐	☐	☒

WHY? As discussed in Section 2.14, Population and Housing, above, the proposed Project would not result in direct or indirect population growth. The proposed Project would include construction of a multi-purpose bridge, new stormwater infrastructure, equestrian picnic area improvements, and habitat restoration. These Project elements would not alter demand and would not result in demand for additional police protection facilities, such as a new police station, that would in turn cause adverse environmental impacts. There would be no impact and no mitigation is required.

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
a) Result in substantial adverse physical impacts associated with the provision of new or physically altered government facilities, need for new or physically altered government facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for schools?	☐	☐	☐	☒

WHY? As discussed in Section 2.14, Population and Housing, above, the proposed Project would not result in direct or indirect population growth. Therefore, there would be no additional demand for school services. There would be no impact and no mitigation is required.

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
a) Result in substantial adverse physical impacts associated with the provision of new or physically altered government facilities, need for new or physically altered government facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for parks?	☐	☐	☐	☒

WHY? As discussed in Section 2.14, Population and Housing, above, the proposed Project would not result in direct or indirect population growth. Therefore, there would be no additional demand for parks due to new population. The proposed Project would include construction of a multi-purpose bridge, new stormwater infrastructure, equestrian picnic area improvements, and habitat restoration. The proposed Project has been designed to provide improved physical facilities and open space resources to existing users of the Oak Grove area of the HWP, consistent with the HWP Master Plan, and would not result in increased use of the park. The same amount of parking and internal roads as well as the same type and extent of facilities would be provided. As such, operation of the Project would be essentially the same as the existing condition, with the exception that some areas may need less frequent maintenance. The Project would not directly or indirectly increase the demand for or usage of parks and other recreation facilities such that new parks and recreational facilities would be required. There would be no impact and no mitigation is required.

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
a) Result in substantial adverse physical impacts associated with the provision of new or physically altered government facilities, need for new or physically altered government facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for other public facilities?	☐	☐	☐	☒

WHY? As discussed in Section 2.14, Population and Housing, above, the proposed Project would not result in direct or indirect population growth. Therefore, there would be no additional demand for other public facilities, such as libraries. There would be no impact and no mitigation is required.

MITIGATION MEASURES

There would be no significant impacts and no mitigation is required.

2.16 RECREATION

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☒

WHY? As discussed under Threshold 2.15 above, the proposed Project would not result in direct or indirect population growth and would not therefore directly or indirectly increase the demand for or usage of existing parks and other recreational facilities. The proposed Project would include construction a multi-purpose bridge, new stormwater infrastructure, equestrian picnic area improvements, and habitat restoration. The proposed Project has been designed to provide improved physical facilities and open space resources to existing users of the Oak Grove area of the HWP, consistent with the HWP Master Plan. However, implementation of the proposed Project would not drive increased use of the Oak Grove area such that physical deterioration of the existing or improved facilities would occur. There would be no impact and no mitigation is required.

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
b) Include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☒	☐	☐

WHY? As discussed under Threshold 2.16(a) above, the proposed Project would not result in direct or indirect population growth; and would not therefore directly or indirectly increase the demand for or usage of existing parks and other recreational facilities. The Project would include construction and improvement, although not expansion, of recreation facilities. The construction of these facilities may have an adverse physical effect on the environment; accordingly, the potential for impacts related due to Project implementation is evaluated through preparation of this IS/MND. There would be less than significant impacts with implementation of the identified mitigation measures for biological resources (refer to Section 2.4), cultural resources (refer to Section 2.5), and tribal cultural resources (refer to Section 2.18).

MITIGATION MEASURES

There would be less than significant impacts with implementation of the identified mitigation measures for biological resources (refer to Section 2.4), cultural resources (refer to Section 2.5), and tribal cultural resources (refer to Section 2.18).

2.17 TRANSPORTATION

Information in this section is derived from the *Berkshire Creek Area Improvements Project Traffic Evaluation* (Traffic Evaluation), dated April 2019 and prepared by Psomas (Psomas 2019c). This document is provided in its entirety in Appendix G of this IS/MND.

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
a) Conflict with a program plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?	☐	☐	☒	☐

WHY? On November 3, 2014, the City of Pasadena City Council adopted a resolution to replace the City's transportation performance measures with five new Transportation Performance Measures and new thresholds of significance to determine transportation and traffic impacts under CEQA. The new performance measures and CEQA thresholds are consistent with the City's adopted General Plan and Senate Bill (SB) 743 and include VMT per capita, vehicle trips (VT) per capita, proximity and quality of bicycle network, proximity and quality of transit network, and pedestrian accessibility. The new measures support the City's vision of creating a community where people can circulate without cars, which relies upon an integrated multimodal transportation system that provides choices and accessibility for everyone in the City.

The City established the *Transportation Impact Analysis Current Practice and Guidelines* (2015) to implement the Transportation Performance Measures and for use in CEQA analysis. These guidelines identify separate approaches for three categories of projects—exempt projects, Category 1: Below Communitywide Significance and Category 2: Communitywide Significance. Per the *Transportation Impact Analysis Current Practice and Guidelines*, any project which is expected to generate fewer than 300 new permanent daily trips is considered exempt, is not expected to generate any impacts, and does not require a full traffic analysis. Also, the City does not require analysis of construction traffic. Therefore, no Project-level analysis of CEQA impacts is required. However, an assessment of construction traffic was conducted for the Project, including consideration of construction traffic associated with the County's Devil's Gate Reservoir project that would be occurring at the same time.

Construction Traffic

As discussed in Section 1.0, Project Information, of this IS/MND, the proposed Project would be constructed beginning in Fall 2019 over a period of three months and would be completed in a single phase. Because the Project includes discrete activities across a moderately-sized geographic area, it is expected that some or all these components would be completed separately and/or sequentially. However, to provide both flexibility for the City during Project implementation and a worst-case scenario for environmental analysis, this IS/MND assumes that completion of the proposed components would all start together and overlap.

Accordingly, the estimate of construction traffic generation assumes that the three Project components, and an initial materials delivery, would begin on the same date. The Traffic Evaluation also assumes that truck trips would be evenly spaced throughout the workday, and that all workers would arrive during the same hour in the morning and would depart in the same hour in the afternoon/evening. Table 2-21, Total Construction Trip Generation, summarizes the total construction traffic expected for all Project activities; and Table 2-22, Peak Day Construction Trip Generation, summarizes the peak day (highest) construction trip generation.

TABLE 2-21
TOTAL CONSTRUCTION TRIP GENERATION

Project Component	Activity	Total Trips	Work Days	Daily Trips	Peak Hour Trips
Berkshire Creek	Demolition	42	2	21	3
	Install stormwater infrastructure, place fill	152	30	6	1
	Road paving	12	1	12	2
	Construction worker trips (per day rate only)			16	8
Equestrian Picnic Area	Demolition	36	2	18	3
	Reconstruction	90	4	23	3
	Construction worker trips (per day rate only)			10	5
Habitat Restoration	Habitat restoration	Negligible			
	Construction worker trips (per day rate only)			24	12
Total Materials Delivery		28	3	28	6
Source: Psomas 2019c; Appendix G.					

TABLE 2-22
PEAK DAY CONSTRUCTION TRIP GENERATION

Component	Activity	Total Trips	Work Days	Daily Trips	Peak Hour Trips
Berkshire Creek	Demolition	42	2	21	3
	Construction worker trips (per day rate only)			16	8
Equestrian Picnic Area	Demolition	36	2	18	3
	Construction worker trips (per day rate only)			10	5
Habitat Restoration	Construction worker trips (per day rate only)			24	12
Initial Materials Delivery		10	1	10	2
			Peak Day Trips	**99**	**33**
Source: Psomas 2019c; Appendix G.					

As shown in Table 2-22, the peak day construction activity is estimated to results in a total of 99 trips, including 33 trips in the peak hour. Of the peak day total trips, 49 would be truck trips and 50 would be construction worker (i.e., passenger vehicle) trips. The peak construction activity is expected to occur for about two days. For the majority of the Project's 3-month construction period, the only daily traffic would be generated by the workers. Therefore, even with conservative assumptions about construction traffic for this Project, it would result in a less than significant traffic impact pursuant to the City's *Transportation Impact Analysis Current Practice and Guidelines* criteria. The Project would result in fewer than 300 new permanent daily trips, which is exempt from further analysis. There would be no impact and no mitigation is required.

Cumulative Construction Trips

As previously discussed, the Devil's Gate project is expected to occur concurrently with the Project. Information for the following analysis was derived from the 2014 *Devil's Gate Reservoir Sediment Removal and Management Project Final Environmental Impact Report*, the 2017 *Recirculated Portions of the Final Environmental Impact Report and Mitigation Monitoring and Reporting Program for Devil's Gate Reservoir Sediment Removal and Management Project*, and the 2017 *Devil's Gate Reservoir Sediment Removal and Management Project Reduced Sediment Removal Alternative Environmental Review* (Psomas 2019c;

Appendix G). Per these documents, the Devil's Gate project will be accessed from Oak Grove Drive near the southern boundary of the Oak Grove area and the truck haul routes have been laid out to avoid residential areas. Steps have also been taken for Devil's Gate truck trips to avoid La Cañada High School during school drop-off hours to minimize impacts. However, after mitigation the Devil's Gate project is expected to have temporary significant and unavoidable impacts at five intersections, including two which are expected to be used by the Project: Berkshire Place and I-210 eastbound ramps, and Figueroa Street/Scholl Canyon Road and I-134 westbound ramps.

The Devil's Gate project is expected to generate a maximum of approximately 425 truck trips each day. Therefore, the combination of the Devil's Gate project and proposed Project is expected to generate approximately 525 daily trips on the peak days of the Project construction traffic, which would occur for 2 to 3 days. For the majority of the 3-month Project construction period, the cumulative Project and Devil's Gate traffic volumes would be approximately 475 daily trips. Although the Project would contribute traffic to intersections, which are expected to have a significant impact from the Devil's Gate project, the trips for both projects are temporary. Both construction worker and truck traffic for the proposed Project would access the site from Oak Grove Drive at the intersection with Berkshire Place. Trucks have access to I-210 less than 1,000 ft from the access location, so no construction truck trips are expected to travel through any residential areas near the Project. Further, the proposed Project would only contribute truck traffic to the impacted intersections for an estimated two work days, and for much of the Project duration, the off-site trips would be only worker trips (not truck trips). As such, the proposed Project would not contribute a cumulatively considerable volume of traffic.

Alternative Transportation Policies

The City has set forth policies for public transit, bicycle, and pedestrian facilities in its General Plan. One of the eight guiding principles of the General Plan is that "Pasadena will be a city where people can circulate without cars." More specific policies regarding non-vehicular transportation modes are provided in the Mobility Element of the General Plan. Objective 2 of the Mobility Element is to "Encourage walking, biking, transit and other alternatives to motor vehicles." This objective is supported by policies including: "Continue to strengthen the marketing and promotion of non-auto transportation to residents, employees and visitors," "Ensure that secure and convenient bicycle parking is available at destinations," and "Provide convenient, safe and accessible transit stops" (City of Pasadena 2015b). The proposed Project would not conflict with the City's policies to encourage walking, biking, and transit. The proposed Project would support some of these policies, as it would improve ease of access and safety of alternative transportation (bicycle and pedestrian) as well as equestrian use within the Oak Grove area.

There would be a less than significant impact and no mitigation is required.

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
b) Would the project conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)(1)?	☐	☐	☒	☐

WHY? Section 15064.3(b)(1) of the State CEQA Guidelines refers to evaluating transportation impacts using vehicle miles traveled for land use projects. The City's *Transportation Impact Analysis Current Practice and Guidelines* were prepared to reflect the requirements of SB 743. The proposed Project is not a land use project and would not generate any long-term change in traffic associated with the Oak Grove area of the HWP.

As discussed under Threshold 2.17(a) above, although not required, an assessment of construction traffic was prepared for the Project, including consideration of construction traffic associated with the County's Devil's Gate Reservoir project that would be occurring at the same time. This analysis determined there would be less than significant direct and cumulative impacts related to construction traffic. As such, the Project would not conflict with or be inconsistent with Section 15064.3(b)(1) of the State CEQA Guidelines or the City's transportation plans and policies. There would be a less than significant impact and no mitigation is required.

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
c) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	☒

WHY? The proposed Project would not involve any alterations to existing public or private roadways. The paved access road at Berkshire Creek would be reconstructed to its existing condition. Therefore, the Project would not increase hazards due to a geometric design feature or incompatible use. There would be no impact and no mitigation is required.

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
d) Result in inadequate emergency access?	☐	☐	☐	☒

WHY? The proposed Project would not involve any alterations to existing public or private roadways and would not result in the elimination of a through-route or the narrowing of any roadways. Furthermore, except for the excavation and reconstruction of the paved access road at Berkshire Creek, no temporary or permanent barriers are proposed on any streets or park access drives. The access road at Berkshire Creek would be subject to intermittent closures for the length of the construction period (i.e., approximately three months). When the road area is not being actively worked on, a safe passageway would be maintained for pedestrian, bicyclists, and equestrians. There would be no impact and no mitigation is required.

MITIGATION MEASURES

There would be no significant impacts and no mitigation is required.

2.18 TRIBAL CULTURAL RESOURCES

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
a) Cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:				
i) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code Section 5020.1(k)?	☐	☐	☐	☒

WHY? As mentioned in Section 2.5, Cultural Resources, the proposed Project is subject to compliance with AB 52, which requires consideration of impacts to “tribal cultural resources” (TCRs), defined in Section 21074 of the *Public Resources Code,* as part of the CEQA process. AB 52 requires the City to notify any groups (who have requested notification) who are traditionally or culturally affiliated with the geographic area of a project for which a negative declaration, mitigation negative declaration, or environmental impact report is required pursuant to CEQA. The AB 52 process was initiated on March 11, 2019, and this consultation process has been completed with a determination of mitigation applicable to the Project. While the Oak Grove area of HWP is considered sensitive for tribal cultural resources, as discussed further under Threshold 2.18(b) below, there are no known tribal cultural resources and therefore no resources listed or eligible for listing in the CRHR or other local register of historical resources. There would be no impact and no mitigation is required.

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
a) Cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:				
ii) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe?	☐	☒	☐	☐

WHY? As discussed under Threshold 2.18(a), the AB 52 process was initiated on March 11, 2019 and this consultation process has been completed. As part of this consultation process, the Gabrielino Band of Mission Indians, Kizh Nation, has indicated that waterways, such as the Arroyo Seco, were used for burial processes and regular daily use, and that there were settlements along the stretch of Arroyo Seco in the Project area. The Project site is also next to an historic trade route. It is understood by the Kizh Nation that the Project area was a heavily used by the Gabrieleno, and the Arroyo Seco is considered a tribal cultural resource as a cultural landscape. Accordingly, the Project site is considered sensitive for tribal cultural resources. Therefore, MM TCR-1 requires observation of ground-disturbing activities by a monitor meeting the satisfaction of a Native American tribe with cultural affinity to the Gabrieleno. Consistent with mitigation adopted as part of the City of Pasadena General Plan EIR, if Native American artifacts are found, ground disturbing activities in the area shall halt until the find is evaluated by a Registered Professional Archaeologist, and all appropriate actions are taken regarding the artifacts handling and disposition. With implementation of MM TCR-1, there would be less than significant impacts.

MITIGATION MEASURES

MM TCR-1 During ground-disturbing activities, a monitor meeting the satisfaction of a Native American tribe with cultural affinity to the Gabrieleno (for example, the Gabrieleno Band of Mission Indians—Kizh Nation) shall be present. Consistent with Mitigation Measure 4-1 in the Pasadena General Plan EIR, if Native American artifacts are found, all ground disturbing activities in the immediate vicinity of the find shall be halted until the find is evaluated by a Registered Professional Archaeologist. If testing determines that significance criteria are met, then the Project shall be required to perform data recovery, professional identification, radiocarbon dates as applicable, and other special studies; and provide a comprehensive final report, including site record to the City and the South Central Coastal Information Center at California State University, Fullerton. No further grading shall occur in the area of the discovery until Planning Department approves the report. Subsequently, the find shall be turned over to the tribe. In addition, any cultural resources found shall be treated in accordance with regulatory requirements. Grading and excavation may continue around the isolated area of the find so long as the activities do not impede or jeopardize the protection and preservation of any cultural resources as determined by the monitor.

2.19 UTILITIES AND SERVICE SYSTEMS

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
a) Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities the construction or relocation of which could cause significant environmental effects?	☐	☐	☒	☐

WHY? The Project would minimally increase demand for water associated with use of the proposed irrigation system to support restored habitat. Additionally, a nominal amount of water may be used during construction for dust suppression. However, this demand would not result in the need for new or expanded water supply infrastructure outside the Project site, nor would it result in insufficient water supplies.

The Project would not result in waste water generation and would not, therefore, result in the need for new or expanded wastewater treatment facilities. There would be no additional stormwater runoff; in fact, runoff would be slightly reduced from the existing condition due to removal of imperious surfaces and replacement with pervious surfaces (i.e., trail, gravel lot, native meadow garden). The Project would not, therefore, result in the need for new or expanded stormwater drainage facilities. While operation of the irrigation system would generate a negligible demand for electricity, this demand would not result in the need for new or expanded electric power facilities outside the Project site. Finally, the proposed Project would not require natural gas or telecommunications facilities.

Implementation of the Project would not result in the need for water, wastewater, storm water drainage, electricity, natural gas, or telecommunication facilities the construction of which could cause significant effects. Impacts on utilities would be less than significant and no mitigation is required.

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?	☐	☐	☒	☐

WHY? As discussed under Threshold 2.19(a) above, the Project would minimally increase demand for water associated with use of the proposed irrigation system to support restored habitat. Additionally, a nominal amount of water may be used during construction for dust suppression. However, this demand would not result in insufficient water supplies, such that the City would be unable to meet the Project's demands and existing and foreseeable demands for potable water. Impacts would be less than significant and no mitigation is required.

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
c) Result in a determination by the wastewater treatment provider which serves or may serve the Project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	☒

WHY? As discussed under Threshold 2.19(a) above, the Project would not result in waste water generation and would not, therefore, result in a determination by the wastewater treatment provider that there is inadequate capacity. There would be no impact and no mitigation is required.

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
d) Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?	☐	☐	☒	☐

WHY? Construction of the Project would generate an estimated 355 cy of construction and demolition debris, including concrete, existing stormwater infrastructure (e.g., concrete, steel) asphalt, substrate, and soils beneath the paved lot. In addition, there would be a limited volume of greenwaste, comprised of removed trees and non-native vegetation (e.g., shrubs, grasses). For purposes of this analysis, a conservative estimate of 400 cy of construction waste is anticipated.

Section 8.62 et. seq. of the PMC is the City's construction and demolition waste management ordinance (C&D ordinance). The proposed Project would be subject to the C&D ordinance and therefore required to divert at least 75 percent of the construction waste stream from landfill disposal. Therefore, implementation of the Project would result in an estimated 100 cy of construction waste requiring landfill disposal. Waste from the Project site would be exported at Scholl Canyon Landfill, located at 3001 Scholl Canyon Road. As of December 31, 2017, Scholl Canyon Landfill has a remaining permitted capacity of 4.7 million tons (7.76 million cy) (LACPW 2019). As such, the Project's finite construction waste stream represents an infinitesimal (less than one one-thousandth of a percent) of the landfills remaining capacity. Operation of the Project would not generate any additional solid waste compared to existing conditions. Therefore, the proposed Project would be served by a landfill with sufficient permitted capacity. There would be a less than significant impact and no mitigation is required.

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
e) Comply with federal, State, and local management and reduction statutes and regulations related to solid waste?	☐	☐	☐	☒

WHY? As discussed under Threshold 2.19(f) above, the Project would be subject to, and comply with, the City's C&D ordinance. The finite amount of construction waste requiring landfill disposal would not interfere with the City's attainment of its waste management goals pursuant to AB 939, the California Integrated Waste Management Act. As such, the proposed Project would comply with federal, State, and local regulations related to solid waste. There would be no impact and no mitigation is required.

MITIGATION MEASURES

There would be no significant impacts and no mitigation is required.

2.20 WILDFIRE

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
If located in or near State Responsibility Areas or lands classified as Very High Fire Hazard Severity Zones, would the project:				
a) Substantially impair an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒

WHY? As discussed under Threshold 2.20(b) below, a VHFHSZ-designated area encompasses the southern edge of the Project site, primarily overlapping the segment of California sagebrush scrub on the south side of the access road. Construction activities in this portion of the Project site would be limited to hand tools, and no impairment of emergency evacuation routes impact associated with response to a wildfire in the Project area would occur. There would be no impact and no mitigation is required.

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
If located in or near State Responsibility Areas or lands classified as Very High Fire Hazard Severity Zones, would the project:				
b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?	☐	☐	☒	☐

WHY? As shown on Plate P-2 of the General Plan Safety Element, the majority of the Project site is within a low fire hazard zone; but, portions of the western edge of the Project site were designated as areas of moderate or very high fire hazard (City of Pasadena 2002a). However, the more recent 2011 Local Responsibility Area map for Pasadena indicates that the VHFHSZ encompasses the southern edge of the Project site, primarily overlapping the segment of California sagebrush scrub on the south side of the access road (refer to Exhibit 3, Proposed Project Components) (CAL FIRE 2011). Construction activities within the VHFHSZ would be limited to hand tools, such as a walk-behind trencher and weed trimmer. Larger construction equipment would be used in areas immediately to the north of the VHFHSZ-designated area. However, any use of construction equipment presents a risk of accidental fire, whether within a VHFHSZ or nearby and spreading to the more flammable VHFHSZ. As discussed under Threshold 2.9(h), the Project's construction specifications would include fire prevention practices derived from Caltrans' *Standard Specifications* (Caltrans 2018). In the event a fire begins during construction of the Project, the nearest fire station is Los Angeles County Fire Department Station 82, located approximately 0.75-mile to the northwest at 352 Foothills Boulevard in La Cañada Flintridge. Being in a dense urban area, there are several fire protection facilities in the Project vicinity that could respond to an emergency at the site. In the long term, the Project does not propose any habitable structures, change the topography or vegetation types, and would not change uses or activities in the VHFHSZ-designated area. Therefore, operation of the proposed Project would not exacerbate wildfire risks at the Project site. There would be a less than significant impact and no mitigation is required.

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
If located in or near State Responsibility Areas or lands classified as Very High Fire Hazard Severity Zones, would the project:				
c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?	☐	☐	☒	☐

WHY? As discussed in Threshold 2.20(a) above, the southernmost tip of the Project site is located within a VHFHSZ-designated area. This area is proposed for habitat restoration, which would include installation of irrigation infrastructure. The Project would not require the installation or maintenance of infrastructure that would directly exacerbate fire risk. However, the bridge would require occasional maintenance to ensure the safety of the bridge crossing. This would involve checking and tightening fasteners, the condition of the wood, and the overall integrity of the bridge. This work would generally involve use of hand tools, such as a cordless drill. In the event that segments of wood require replacement, a more intensive effort would be undertaken but this would not involve large equipment such as an excavator. Although use of any construction equipment presents a risk of accidental fire, given the bridges location outside the VHFHSZ-designated area and in a riparian habitat, which is not as flammable as oak woodland or California sage scrub habitats, this is not considered a substantial exacerbation of wildfire risk. There would be a less than significant impact and no mitigation is required.

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
If located in or near State Responsibility Areas or lands classified as Very High Fire Hazard Severity Zones, would the project:				
c) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?	☐	☐	☐	☒

WHY? As discussed in Threshold 2.20(a) above, the southernmost tip of the Project site is located within a VHFHSZ-designated area. This area is proposed for habitat restoration, which would not introduce people or structures within the fire hazard area. Nor would implementation of habitat restoration expose people or structures to risks associated with downstream or downslope flooding or landslides, as no residents or structures exist downstream of the site. There would be no drainage changes or other alteration of the VHFHSZ area that would result on significant risks due to proximity to a VHFHSZ-designated area. There would be no impact and no mitigation is required.

MITIGATION MEASURES

There would be no significant impacts and no mitigation is required.

2.21 EARLIER ANALYSIS

Earlier analysis may be used where, pursuant to the tiering, program EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR or negative declaration. See CEQA Guidelines Section 15063(c)(3)(D).

As discussed previously, based on the differentiation between the current design concept and the extent of Oak Grove Area improvements in the HWP Master Plan, the CEQA review for the Project is not being tiered from the Master Plan Program EIR. However, the following documents relevant to the Project area were used as information sources in the preparation of this IS/MND:

- *Hahamongna Watershed Park Master Plan*; September 29, 2003 (adopted); Prepared by the City of Pasadena
- *Hahamongna Watershed Park Master Plan Final Master Environmental Impact Report*; March 12, 2003; Prepared by Sapphos Environmental, Inc. for the City of Pasadena
- *Hahamongna Watershed Park Master Plan Addendum for the Hahamongna Annex*; February 1, 2010; Prepared by the City of Pasadena

All documents used in the preparation of this IS/MND are provided in Section 3.0, Initial Study Reference Documents.

2.22 MANDATORY FINDINGS OF SIGNIFICANCE

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Does the project:				
a) Have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?	☐	☒	☐	☐

WHY? As discussed in Section 2.4, Biological Resources, the proposed Project has the potential to impact natural habitat as a result of temporary construction activities. With implementation of MMs BIO-1 through BIO-4, there would be less than significant impacts related to sensitive plant and wildlife species. The Project would not degrade the quality of the environment; would not substantially reduce the habitat of fish or wildlife species; would not cause a fish or wildlife population to drop below self-sustaining levels; would not threaten to eliminate a plant or animal community; and would not reduce the number of or restrict the range of a Rare or Endangered plant or animal with implementation of mitigation.

As discussed in Section 2.5, Cultural Resources, and Section 2.18, Tribal Cultural Resources, no impacts would occur to known historic, archaeological, tribal cultural, and/or paleontological resources. Potential impacts to unknown human remains from implementation of the Project would be less than significant through compliance with State regulations. Potential impacts to unknown archaeological resources and tribal cultural resources would be less than significant with implementation of MM CUL-1 and MM TCR-1. Therefore, the Project does not have the potential to eliminate important examples of the major periods of California history or prehistory with implementation of mitigation.

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
Would the project:				
b) Have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	☐	☐	☒	☐

WHY? As shown in the analysis in Sections 2.1 through 2.20 above, all construction-related impacts would be either less than significant or mitigated to a less than significant level. As demonstrated by the analysis in this IS/MND, there would be no long-term operational impacts, because the Project consists of improvements to existing recreational and stormwater management facilities that would continue operating similar to existing conditions. As such, there is no potential contribution to long-term cumulative impacts from operation of the proposed Project.

The City has previously implemented improvement projects in Oak Grove Park. In fall and winter of 2018–2019, oak woodland and riparian habitat restoration activities were implemented across the central third of the Oak Grove area of the HWP. Approximately two years ago, the City implemented habitat restoration along the northwest Perimeter Trail extending from the lower parking lot to the Rose Bowl Riders area, and emergency oak tree drought measures consisting of temporary irrigation for about 40 trees. Approximately six years ago, the City implemented restroom renovations and installed new park furnishings, including picnic tables, barbeques, benches, horse ties, and interpretive signage. The effects of these past projects in the Oak Grove area are individually and cumulatively less than significant.

The recent habitat restoration project and the Berkshire Creek Project are both City projects located in the Oak Grove area; however, they are being implemented from separate funding sources, are reflected as separate projects in the City's Capital Improvement Program (CIP), and have independent goals and values. The City may also implement additional projects in Oak Grove Park that are reflected in the Master Plan separately from either the recent habitat restoration project or the Berkshire Creek Project, pending funding. These projects include improvements to the Disc Golf Course, repair of the Foothill Drain and the associated drainage area, and improvements to parking areas and other infrastructure. The Berkshire Creek Project and the recent habitat restoration project are both expected to result in cumulatively beneficial effects, particularly related to aesthetics, habitat values, hydrology, and recreation in the southernmost portion of Oak Grove Park. Additionally, other improvements identified in the Master Plan, which may be implemented as separate projects in the future, would also be expected to be beneficial to the park users and environment when considered in connection with the proposed Project.

It is acknowledged that of the Devil's Gate project would be in progress during the implementation of the proposed Project. The County and City have been in communication and would coordinate during implementation of the Project to ensure that potential conflicts related to access, equipment use and staging, and all construction activity are avoided. The proposed Project is minor in both geographic scope and intensity of activity relative to the Devil's Gate project. In light of this and close coordination between the two agencies throughout Project implementation, the proposed Project would result in less than significant cumulative impacts when considered in connection with the effects of the Devil's Gate Dam Project. Also, Threshold 2.17(a) in Section 2.17, Transportation, of this IS/MND, which evaluates the potential cumulative transportation impacts from the proposed Project and the Devil's Gate project. There would be a less than significant impact and no mitigation is required.

	Potentially Significant Impact	**Less than Significant with Mitigation**	**Less than Significant Impact**	**No Impact**
Would the project:				
c) Have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☐	☒

WHY? As shown in the analysis in Sections 2.1 through 2.20 above, the Project would not have environmental effects that could cause substantial adverse effects on human beings, either directly or indirectly. There would be no impact and no mitigation is required.

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Appendix A

CalEEMod Data

Berkshire Creek Restoration Project

Los Angeles-South Coast County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Asphalt Surfaces	0.50	Acre	0.50	21,780.00	0
Other Non-Asphalt Surfaces	0.50	Acre	0.50	21,780.00	0
City Park	2.00	Acre	2.00	87,120.00	0

1.2 Other Project Characteristics

Urbanization Urban **Wind Speed (m/s)** 2.2 **Precipitation Freq (Days)** 33

Climate Zone 12 **Operational Year** 2020

Utility Company Pasadena Water & Power

CO2 Intensity (lb/MWhr) 1664.14 **CH4 Intensity (lb/MWhr)** 0.029 **N2O Intensity (lb/MWhr)** 0.006

1.3 User Entered Comments & Non-Default Data

Berkshire Creek Restoration Project

Los Angeles-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Asphalt Surfaces	0.50	Acre	0.50	21,780.00	0
Other Non-Asphalt Surfaces	0.50	Acre	0.50	21,780.00	0
City Park	2.00	Acre	2.00	87,120.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	33
Climate Zone	12			**Operational Year**	2020
Utility Company	Pasadena Water & Power				
CO2 Intensity (lb/MWhr)	1664.14	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - .

Land Use - conservative estimates of land use acreage

Construction Phase - Overlapping phasing

Off-road Equipment - .

Off-road Equipment - .

Off-road Equipment - .

Off-road Equipment - .

Off-road Equipment - .

Trips and VMT - Trips from Traffic Memo. Assuming 10CY/12.5 ton trucks.

Demolition - .

Grading - .

Vehicle Trips - No new trips

Area Coating -

Energy Use -

Water And Wastewater - Default

Construction Off-road Equipment Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	20.00	3.00
tblConstructionPhase	NumDays	6.00	20.00
tblConstructionPhase	NumDays	10.00	30.00
tblConstructionPhase	NumDays	10.00	1.00
tblConstructionPhase	NumDays	3.00	2.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00

tblConstructionPhase	NumDaysWeek	5.00	6.00
tblGrading	MaterialExported	0.00	153.00
tblGrading	MaterialImported	0.00	1,345.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	0.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblTripsAndVMT	HaulingTripLength	20.00	8.00
tblTripsAndVMT	HaulingTripLength	20.00	8.00
tblTripsAndVMT	HaulingTripLength	20.00	8.00
tblTripsAndVMT	HaulingTripLength	20.00	8.00
tblTripsAndVMT	HaulingTripLength	20.00	8.00
tblTripsAndVMT	HaulingTripNumber	46.00	155.00

tblTripsAndVMT	WorkerTripNumber	8.00	15.00
tblTripsAndVMT	WorkerTripNumber	3.00	6.00
tblTripsAndVMT	WorkerTripNumber	8.00	15.00
tblTripsAndVMT	WorkerTripNumber	3.00	6.00
tblTripsAndVMT	WorkerTripNumber	5.00	9.00
tblVehicleTrips	ST_TR	22.75	0.00
tblVehicleTrips	SU_TR	16.74	0.00
tblVehicleTrips	WD_TR	1.89	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	4.9006	41.2814	34.0566	0.0818	4.3514	1.6120	5.9634	0.7763	1.5025	2.2787	0.0000	8,284.6392	8,284.6392	1.7104	0.0000	8,327.4007
Maximum	**4.9006**	**41.2814**	**34.0566**	**0.0818**	**4.3514**	**1.6120**	**5.9634**	**0.7763**	**1.5025**	**2.2787**	**0.0000**	**8,284.6392**	**8,284.6392**	**1.7104**	**0.0000**	**8,327.4007**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	4.9006	41.2814	34.0566	0.0818	2.5068	1.6120	4.1188	0.4970	1.5025	1.9994	0.0000	8,284.6392	8,284.6392	1.7104	0.0000	8,327.4007
Maximum	**4.9006**	**41.2814**	**34.0566**	**0.0818**	**2.5068**	**1.6120**	**4.1188**	**0.4970**	**1.5025**	**1.9994**	**0.0000**	**8,284.6392**	**8,284.6392**	**1.7104**	**0.0000**	**8,327.4007**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**42.39**	**0.00**	**30.93**	**35.98**	**0.00**	**12.26**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0233	0.0000	3.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.6000e-004	6.6000e-004	0.0000		7.0000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0233**	**0.0000**	**3.1000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**6.6000e-004**	**6.6000e-004**	**0.0000**	**0.0000**	**7.0000e-004**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0233	0.0000	3.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.6000e-004	6.6000e-004	0.0000		7.0000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0233**	**0.0000**	**3.1000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**6.6000e-004**	**6.6000e-004**	**0.0000**	**0.0000**	**7.0000e-004**

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

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	9/1/2019	9/4/2019	6	3	
2	Trenching/Site Preparation	Site Preparation	9/1/2019	9/3/2019	6	2	
3	Grading	Grading	9/1/2019	9/24/2019	6	20	
4	Paving Bridge/Infrastructure	Paving	9/1/2019	10/5/2019	6	30	
5	Paving Road	Paving	9/1/2019	9/2/2019	6	1	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 1

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	2	8.00	158	0.38
Demolition	Rubber Tired Dozers	0	8.00	247	0.40
Demolition	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Trenching/Site Preparation	Cranes	0		231	0.29

Trenching/Site Preparation	Forklifts	0		89	0.20
Trenching/Site Preparation	Generator Sets	0		84	0.74
Trenching/Site Preparation	Graders	0	8.00	187	0.41
Trenching/Site Preparation	Rubber Tired Dozers	0	8.00	247	0.40
Trenching/Site Preparation	Scrapers	0	8.00	367	0.48
Trenching/Site Preparation	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Trenching/Site Preparation	Trenchers	1	8.00	78	0.50
Trenching/Site Preparation	Welders	0		46	0.45
Grading	Bore/Drill Rigs	1	8.00	221	0.50
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	0	8.00	187	0.41
Grading	Rubber Tired Dozers	0	8.00	247	0.40
Grading	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Paving Bridge/Infrastructure	Cement and Mortar Mixers	0	6.00	9	0.56
Paving Bridge/Infrastructure	Excavators	1	8.00	158	0.38
Paving Bridge/Infrastructure	Pavers	0	8.00	130	0.42
Paving Bridge/Infrastructure	Paving Equipment	0	6.00	132	0.36
Paving Bridge/Infrastructure	Rollers	0	6.00	80	0.38
Paving Bridge/Infrastructure	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Paving Road	Air Compressors	0	6.00	78	0.48
Paving Road	Cement and Mortar Mixers	0	6.00	9	0.56
Paving Road	Pavers	1	8.00	130	0.42
Paving Road	Paving Equipment	0	6.00	132	0.36
Paving Road	Rollers	1	8.00	80	0.38
Paving Road	Tractors/Loaders/Backhoes	0	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	3	15.00	0.00	155.00	14.70	6.90	8.00	LD_Mix	HDT_Mix	HHDT
Trenching/Site Preparation	1	6.00	0.00	0.00	14.70	6.90	8.00	LD_Mix	HDT_Mix	HHDT
Grading	3	15.00	0.00	187.00	14.70	6.90	8.00	LD_Mix	HDT_Mix	HHDT
Paving Bridge/Infrastructure	1	6.00	0.00	0.00	14.70	6.90	8.00	LD_Mix	HDT_Mix	HHDT
Paving Road	2	9.00	0.00	0.00	14.70	6.90	8.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Demolition - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.3454	0.0000	3.3454	0.5065	0.0000	0.5065			0.0000			0.0000
Off-Road	0.9835	8.9523	10.2286	0.0166		0.4881	0.4881		0.4674	0.4674		1,614.9168	1,614.9168	0.3651		1,624.0454
Total	**0.9835**	**8.9523**	**10.2286**	**0.0166**	**3.3454**	**0.4881**	**3.8335**	**0.5065**	**0.4674**	**0.9739**		**1,614.9168**	**1,614.9168**	**0.3651**		**1,624.0454**

3.2 Demolition - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.2528	9.4174	1.7480	0.0198	0.3620	0.0252	0.3872	0.0993	0.0241	0.1234		2,143.533 8	2,143.533 8	0.1782		2,147.989 4
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0749	0.0551	0.7233	1.8300e-003	0.1677	1.4500e-003	0.1691	0.0445	1.3300e-003	0.0458		181.9429	181.9429	6.2500e-003		182.0992
Total	**0.3278**	**9.4724**	**2.4712**	**0.0217**	**0.5297**	**0.0267**	**0.5563**	**0.1438**	**0.0254**	**0.1692**		**2,325.476 7**	**2,325.476 7**	**0.1845**		**2,330.088 6**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.5054	0.0000	1.5054	0.2279	0.0000	0.2279			0.0000			0.0000
Off-Road	0.9835	8.9523	10.2286	0.0166		0.4881	0.4881		0.4674	0.4674	0.0000	1,614.916 8	1,614.916 8	0.3651		1,624.045 4
Total	**0.9835**	**8.9523**	**10.2286**	**0.0166**	**1.5054**	**0.4881**	**1.9935**	**0.2279**	**0.4674**	**0.6953**	**0.0000**	**1,614.916 8**	**1,614.916 8**	**0.3651**		**1,624.045 4**

3.2 Demolition - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.2528	9.4174	1.7480	0.0198	0.3620	0.0252	0.3872	0.0993	0.0241	0.1234		2,143.533 8	2,143.533 8	0.1782		2,147.989 4
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0749	0.0551	0.7233	1.8300e-003	0.1677	1.4500e-003	0.1691	0.0445	1.3300e-003	0.0458		181.9429	181.9429	6.2500e-003		182.0992
Total	**0.3278**	**9.4724**	**2.4712**	**0.0217**	**0.5297**	**0.0267**	**0.5563**	**0.1438**	**0.0254**	**0.1692**		**2,325.476 7**	**2,325.476 7**	**0.1845**		**2,330.088 6**

3.3 Trenching/Site Preparation - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.4343	3.9173	2.6391	3.3700e-003		0.2962	0.2962		0.2725	0.2725		333.8536	333.8536	0.1056		336.4943
Total	**0.4343**	**3.9173**	**2.6391**	**3.3700e-003**	**0.0000**	**0.2962**	**0.2962**	**0.0000**	**0.2725**	**0.2725**		**333.8536**	**333.8536**	**0.1056**		**336.4943**

3.3 Trenching/Site Preparation - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0300	0.0220	0.2893	7.3000e-004	0.0671	5.8000e-004	0.0676	0.0178	5.3000e-004	0.0183		72.7772	72.7772	2.5000e-003		72.8397
Total	**0.0300**	**0.0220**	**0.2893**	**7.3000e-004**	**0.0671**	**5.8000e-004**	**0.0676**	**0.0178**	**5.3000e-004**	**0.0183**		**72.7772**	**72.7772**	**2.5000e-003**		**72.8397**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.4343	3.9173	2.6391	3.3700e-003		0.2962	0.2962		0.2725	0.2725	0.0000	333.8536	333.8536	0.1056		336.4943
Total	**0.4343**	**3.9173**	**2.6391**	**3.3700e-003**	**0.0000**	**0.2962**	**0.2962**	**0.0000**	**0.2725**	**0.2725**	**0.0000**	**333.8536**	**333.8536**	**0.1056**		**336.4943**

3.3 Trenching/Site Preparation - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0300	0.0220	0.2893	7.3000e-004	0.0671	5.8000e-004	0.0676	0.0178	5.3000e-004	0.0183		72.7772	72.7772	2.5000e-003		72.8397
Total	**0.0300**	**0.0220**	**0.2893**	**7.3000e-004**	**0.0671**	**5.8000e-004**	**0.0676**	**0.0178**	**5.3000e-004**	**0.0183**		**72.7772**	**72.7772**	**2.5000e-003**		**72.8397**

3.4 Grading - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.4700e-003	0.0000	8.4700e-003	1.2800e-003	0.0000	1.2800e-003			0.0000			0.0000
Off-Road	0.8009	9.0555	8.5934	0.0197		0.3634	0.3634		0.3343	0.3343		1,949.5111	1,949.5111	0.6168		1,964.9312
Total	**0.8009**	**9.0555**	**8.5934**	**0.0197**	**8.4700e-003**	**0.3634**	**0.3718**	**1.2800e-003**	**0.3343**	**0.3356**		**1,949.5111**	**1,949.5111**	**0.6168**		**1,964.9312**

3.4 Grading - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category						lb/day							lb/day			
Hauling	0.0458	1.7042	0.3163	3.5900e-003	0.0655	4.5600e-003	0.0701	0.0180	4.3600e-003	0.0223		387.9105	387.9105	0.0323		388.7168
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0749	0.0551	0.7233	1.8300e-003	0.1677	1.4500e-003	0.1691	0.0445	1.3300e-003	0.0458		181.9429	181.9429	6.2500e-003		182.0992
Total	**0.1207**	**1.7593**	**1.0396**	**5.4200e-003**	**0.2332**	**6.0100e-003**	**0.2392**	**0.0624**	**5.6900e-003**	**0.0681**		**569.8534**	**569.8534**	**0.0385**		**570.8160**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category						lb/day							lb/day			
Fugitive Dust					3.8100e-003	0.0000	3.8100e-003	5.8000e-004	0.0000	5.8000e-004			0.0000			0.0000
Off-Road	0.8009	9.0555	8.5934	0.0197		0.3634	0.3634		0.3343	0.3343	0.0000	1,949.5111	1,949.5111	0.6168		1,964.9312
Total	**0.8009**	**9.0555**	**8.5934**	**0.0197**	**3.8100e-003**	**0.3634**	**0.3672**	**5.8000e-004**	**0.3343**	**0.3349**	**0.0000**	**1,949.5111**	**1,949.5111**	**0.6168**		**1,964.9312**

3.4 Grading - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0458	1.7042	0.3163	3.5900e-003	0.0655	4.5600e-003	0.0701	0.0180	4.3600e-003	0.0223		387.9105	387.9105	0.0323		388.7168
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0749	0.0551	0.7233	1.8300e-003	0.1677	1.4500e-003	0.1691	0.0445	1.3300e-003	0.0458		181.9429	181.9429	6.2500e-003		182.0992
Total	**0.1207**	**1.7593**	**1.0396**	**5.4200e-003**	**0.2332**	**6.0100e-003**	**0.2392**	**0.0624**	**5.6900e-003**	**0.0681**		**569.8534**	**569.8534**	**0.0385**		**570.8160**

3.5 Paving Bridge/Infrastructure - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.2607	2.6819	3.2632	5.1600e-003		0.1293	0.1293		0.1190	0.1190		511.1256	511.1256	0.1617		515.1684
Paving	0.0437					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.3044**	**2.6819**	**3.2632**	**5.1600e-003**		**0.1293**	**0.1293**		**0.1190**	**0.1190**		**511.1256**	**511.1256**	**0.1617**		**515.1684**

3.5 Paving Bridge/Infrastructure - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0300	0.0220	0.2893	7.3000e-004	0.0671	5.8000e-004	0.0676	0.0178	5.3000e-004	0.0183		72.7772	72.7772	2.5000e-003		72.8397
Total	**0.0300**	**0.0220**	**0.2893**	**7.3000e-004**	**0.0671**	**5.8000e-004**	**0.0676**	**0.0178**	**5.3000e-004**	**0.0183**		**72.7772**	**72.7772**	**2.5000e-003**		**72.8397**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.2607	2.6819	3.2632	5.1600e-003		0.1293	0.1293		0.1190	0.1190	0.0000	511.1256	511.1256	0.1617		515.1684
Paving	0.0437					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.3044**	**2.6819**	**3.2632**	**5.1600e-003**		**0.1293**	**0.1293**		**0.1190**	**0.1190**	**0.0000**	**511.1256**	**511.1256**	**0.1617**		**515.1684**

3.5 Paving Bridge/Infrastructure - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0300	0.0220	0.2893	7.3000e-004	0.0671	5.8000e-004	0.0676	0.0178	5.3000e-004	0.0183		72.7772	72.7772	2.5000e-003		72.8397
Total	**0.0300**	**0.0220**	**0.2893**	**7.3000e-004**	**0.0671**	**5.8000e-004**	**0.0676**	**0.0178**	**5.3000e-004**	**0.0183**		**72.7772**	**72.7772**	**2.5000e-003**		**72.8397**

3.6 Paving Road - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.5143	5.3655	4.8090	7.3200e-003		0.3003	0.3003		0.2763	0.2763		725.1820	725.1820	0.2294		730.9180
Paving	1.3100					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.8243**	**5.3655**	**4.8090**	**7.3200e-003**		**0.3003**	**0.3003**		**0.2763**	**0.2763**		**725.1820**	**725.1820**	**0.2294**		**730.9180**

3.6 Paving Road - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0450	0.0330	0.4340	1.1000e-003	0.1006	8.7000e-004	0.1015	0.0267	8.0000e-004	0.0275		109.1658	109.1658	3.7500e-003		109.2595
Total	**0.0450**	**0.0330**	**0.4340**	**1.1000e-003**	**0.1006**	**8.7000e-004**	**0.1015**	**0.0267**	**8.0000e-004**	**0.0275**		**109.1658**	**109.1658**	**3.7500e-003**		**109.2595**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.5143	5.3655	4.8090	7.3200e-003		0.3003	0.3003		0.2763	0.2763	0.0000	725.1820	725.1820	0.2294		730.9180
Paving	1.3100					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.8243**	**5.3655**	**4.8090**	**7.3200e-003**		**0.3003**	**0.3003**		**0.2763**	**0.2763**	**0.0000**	**725.1820**	**725.1820**	**0.2294**		**730.9180**

3.6 Paving Road - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0450	0.0330	0.4340	1.1000e-003	0.1006	8.7000e-004	0.1015	0.0267	8.0000e-004	0.0275		109.1658	109.1658	3.7500e-003		109.2595
Total	**0.0450**	**0.0330**	**0.4340**	**1.1000e-003**	**0.1006**	**8.7000e-004**	**0.1015**	**0.0267**	**8.0000e-004**	**0.0275**		**109.1658**	**109.1658**	**3.7500e-003**		**109.2595**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

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

4.2 Trip Summary Information

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

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
City Park	16.60	8.40	6.90	33.00	48.00	19.00	66	28	6
Other Asphalt Surfaces	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Other Non-Asphalt Surfaces	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
City Park	0.547726	0.045437	0.201480	0.122768	0.016614	0.006090	0.019326	0.029174	0.002438	0.002359	0.005005	0.000677	0.000907
Other Asphalt Surfaces	0.547726	0.045437	0.201480	0.122768	0.016614	0.006090	0.019326	0.029174	0.002438	0.002359	0.005005	0.000677	0.000907
Other Non-Asphalt Surfaces	0.547726	0.045437	0.201480	0.122768	0.016614	0.006090	0.019326	0.029174	0.002438	0.002359	0.005005	0.000677	0.000907

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

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

5.2 Energy by Land Use - NaturalGas

Unmitigated

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

Mitigated

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

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0233	0.0000	3.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.6000e-004	6.6000e-004	0.0000		7.0000e-004
Unmitigated	0.0233	0.0000	3.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.6000e-004	6.6000e-004	0.0000		7.0000e-004

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	3.3200e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0199					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	3.0000e-005	0.0000	3.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.6000e-004	6.6000e-004	0.0000		7.0000e-004
Total	**0.0233**	**0.0000**	**3.1000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**6.6000e-004**	**6.6000e-004**	**0.0000**		**7.0000e-004**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	3.3200e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0199					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	3.0000e-005	0.0000	3.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.6000e-004	6.6000e-004	0.0000		7.0000e-004
Total	**0.0233**	**0.0000**	**3.1000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**6.6000e-004**	**6.6000e-004**	**0.0000**		**7.0000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

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

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

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

Boilers

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

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Berkshire Creek Restoration Project

Los Angeles-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Asphalt Surfaces	0.50	Acre	0.50	21,780.00	0
Other Non-Asphalt Surfaces	0.50	Acre	0.50	21,780.00	0
City Park	2.00	Acre	2.00	87,120.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	33
Climate Zone	12			**Operational Year**	2020
Utility Company	Pasadena Water & Power				
CO2 Intensity (lb/MWhr)	1664.14	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Berkshire Creek Restoration Project - Los Angeles-South Coast County, Annual

Project Characteristics - .

Land Use - conservative estimates of land use acreage

Construction Phase - Overlapping phasing

Off-road Equipment - .

Off-road Equipment - .

Off-road Equipment - .

Off-road Equipment - .

Off-road Equipment - .

Trips and VMT - Trips from Traffic Memo. Assuming 10CY/12.5 ton trucks.

Demolition - .

Grading - .

Vehicle Trips - No new trips

Area Coating -

Energy Use -

Water And Wastewater - Default

Construction Off-road Equipment Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	20.00	3.00
tblConstructionPhase	NumDays	6.00	20.00
tblConstructionPhase	NumDays	10.00	30.00
tblConstructionPhase	NumDays	10.00	1.00
tblConstructionPhase	NumDays	3.00	2.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00

tblConstructionPhase	NumDaysWeek	5.00	6.00
tblGrading	MaterialExported	0.00	153.00
tblGrading	MaterialImported	0.00	1,345.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	0.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblTripsAndVMT	HaulingTripLength	20.00	8.00
tblTripsAndVMT	HaulingTripLength	20.00	8.00
tblTripsAndVMT	HaulingTripLength	20.00	8.00
tblTripsAndVMT	HaulingTripLength	20.00	8.00
tblTripsAndVMT	HaulingTripLength	20.00	8.00
tblTripsAndVMT	HaulingTripNumber	46.00	155.00

tblTripsAndVMT	WorkerTripNumber	8.00	15.00
tblTripsAndVMT	WorkerTripNumber	3.00	6.00
tblTripsAndVMT	WorkerTripNumber	8.00	15.00
tblTripsAndVMT	WorkerTripNumber	3.00	6.00
tblTripsAndVMT	WorkerTripNumber	5.00	9.00
tblVehicleTrips	ST_TR	22.75	0.00
tblVehicleTrips	SU_TR	16.74	0.00
tblVehicleTrips	WD_TR	1.89	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2019	0.0176	0.1837	0.1738	4.0000e-004	9.2700e-003	6.8600e-003	0.0161	1.8900e-003	6.3500e-003	8.2400e-003	0.0000	36.6864	36.6864	9.1400e-003	0.0000	36.9149
Maximum	**0.0176**	**0.1837**	**0.1738**	**4.0000e-004**	**9.2700e-003**	**6.8600e-003**	**0.0161**	**1.8900e-003**	**6.3500e-003**	**8.2400e-003**	**0.0000**	**36.6864**	**36.6864**	**9.1400e-003**	**0.0000**	**36.9149**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2019	0.0176	0.1837	0.1738	4.0000e-004	6.4700e-003	6.8600e-003	0.0133	1.4700e-003	6.3500e-003	7.8100e-003	0.0000	36.6863	36.6863	9.1400e-003	0.0000	36.9149
Maximum	**0.0176**	**0.1837**	**0.1738**	**4.0000e-004**	**6.4700e-003**	**6.8600e-003**	**0.0133**	**1.4700e-003**	**6.3500e-003**	**7.8100e-003**	**0.0000**	**36.6863**	**36.6863**	**9.1400e-003**	**0.0000**	**36.9149**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**30.20**	**0.00**	**17.41**	**22.22**	**0.00**	**5.22**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**9-1-2019**	**9-30-2019**	0.2055	0.2055
		Highest	0.2055	0.2055

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	4.2400e-003	0.0000	4.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	7.0000e-005	7.0000e-005	0.0000	0.0000	8.0000e-005
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0345	0.0000	0.0345	2.0400e-003	0.0000	0.0855
Water						0.0000	0.0000		0.0000	0.0000	0.0000	19.9842	19.9842	3.5000e-004	7.0000e-005	20.0144
Total	**4.2400e-003**	**0.0000**	**4.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0345**	**19.9843**	**20.0188**	**2.3900e-003**	**7.0000e-005**	**20.1000**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	4.2400e-003	0.0000	4.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	7.0000e-005	7.0000e-005	0.0000	0.0000	8.0000e-005
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0345	0.0000	0.0345	2.0400e-003	0.0000	0.0855
Water						0.0000	0.0000		0.0000	0.0000	0.0000	19.9842	19.9842	3.5000e-004	7.0000e-005	20.0144
Total	**4.2400e-003**	**0.0000**	**4.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0345**	**19.9843**	**20.0188**	**2.3900e-003**	**7.0000e-005**	**20.1000**

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

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	9/1/2019	9/4/2019	6	3	
2	Trenching/Site Preparation	Site Preparation	9/1/2019	9/3/2019	6	2	
3	Grading	Grading	9/1/2019	9/24/2019	6	20	
4	Paving Bridge/Infrastructure	Paving	9/1/2019	10/5/2019	6	30	
5	Paving Road	Paving	9/1/2019	9/2/2019	6	1	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 1

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

<u>OffRoad Equipment</u>

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	2	8.00	158	0.38
Demolition	Rubber Tired Dozers	0	8.00	247	0.40
Demolition	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Trenching/Site Preparation	Cranes	0		231	0.29
Trenching/Site Preparation	Forklifts	0		89	0.20
Trenching/Site Preparation	Generator Sets	0		84	0.74
Trenching/Site Preparation	Graders	0	8.00	187	0.41
Trenching/Site Preparation	Rubber Tired Dozers	0	8.00	247	0.40
Trenching/Site Preparation	Scrapers	0	8.00	367	0.48
Trenching/Site Preparation	Tractors/Loaders/Backhoes	0	8.00	97	0.37

Trenching/Site Preparation	Trenchers	1	8.00	78	0.50
Trenching/Site Preparation	Welders	0		46	0.45
Grading	Bore/Drill Rigs	1	8.00	221	0.50
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	0	8.00	187	0.41
Grading	Rubber Tired Dozers	0	8.00	247	0.40
Grading	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Paving Bridge/Infrastructure	Cement and Mortar Mixers	0	6.00	9	0.56
Paving Bridge/Infrastructure	Excavators	1	8.00	158	0.38
Paving Bridge/Infrastructure	Pavers	0	8.00	130	0.42
Paving Bridge/Infrastructure	Paving Equipment	0	6.00	132	0.36
Paving Bridge/Infrastructure	Rollers	0	6.00	80	0.38
Paving Bridge/Infrastructure	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Paving Road	Air Compressors	0	6.00	78	0.48
Paving Road	Cement and Mortar Mixers	0	6.00	9	0.56
Paving Road	Pavers	1	8.00	130	0.42
Paving Road	Paving Equipment	0	6.00	132	0.36
Paving Road	Rollers	1	8.00	80	0.38
Paving Road	Tractors/Loaders/Backhoes	0	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	3	15.00	0.00	155.00	14.70	6.90	8.00	LD_Mix	HDT_Mix	HHDT
Trenching/Site Preparation	1	6.00	0.00	0.00	14.70	6.90	8.00	LD_Mix	HDT_Mix	HHDT
Grading	3	15.00	0.00	187.00	14.70	6.90	8.00	LD_Mix	HDT_Mix	HHDT
Paving Bridge/Infrastructure	1	6.00	0.00	0.00	14.70	6.90	8.00	LD_Mix	HDT_Mix	HHDT
Paving Road	2	9.00	0.00	0.00	14.70	6.90	8.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Demolition - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					5.0200e-003	0.0000	5.0200e-003	7.6000e-004	0.0000	7.6000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.4800e-003	0.0134	0.0153	2.0000e-005		7.3000e-004	7.3000e-004		7.0000e-004	7.0000e-004	0.0000	2.1975	2.1975	5.0000e-004	0.0000	2.2100
Total	**1.4800e-003**	**0.0134**	**0.0153**	**2.0000e-005**	**5.0200e-003**	**7.3000e-004**	**5.7500e-003**	**7.6000e-004**	**7.0000e-004**	**1.4600e-003**	**0.0000**	**2.1975**	**2.1975**	**5.0000e-004**	**0.0000**	**2.2100**

3.2 Demolition - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	3.9000e-004	0.0144	2.7800e-003	3.0000e-005	5.3000e-004	4.0000e-005	5.7000e-004	1.5000e-004	4.0000e-005	1.8000e-004	0.0000	2.8736	2.8736	2.5000e-004	0.0000	2.8798
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.1000e-004	9.0000e-005	1.0200e-003	0.0000	2.5000e-004	0.0000	2.5000e-004	7.0000e-005	0.0000	7.0000e-005	0.0000	0.2370	0.2370	1.0000e-005	0.0000	0.2372
Total	**5.0000e-004**	**0.0145**	**3.8000e-003**	**3.0000e-005**	**7.8000e-004**	**4.0000e-005**	**8.2000e-004**	**2.2000e-004**	**4.0000e-005**	**2.5000e-004**	**0.0000**	**3.1106**	**3.1106**	**2.6000e-004**	**0.0000**	**3.1170**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.2600e-003	0.0000	2.2600e-003	3.4000e-004	0.0000	3.4000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.4800e-003	0.0134	0.0153	2.0000e-005		7.3000e-004	7.3000e-004		7.0000e-004	7.0000e-004	0.0000	2.1975	2.1975	5.0000e-004	0.0000	2.2100
Total	**1.4800e-003**	**0.0134**	**0.0153**	**2.0000e-005**	**2.2600e-003**	**7.3000e-004**	**2.9900e-003**	**3.4000e-004**	**7.0000e-004**	**1.0400e-003**	**0.0000**	**2.1975**	**2.1975**	**5.0000e-004**	**0.0000**	**2.2100**

3.2 Demolition - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	3.9000e-004	0.0144	2.7800e-003	3.0000e-005	5.3000e-004	4.0000e-005	5.7000e-004	1.5000e-004	4.0000e-005	1.8000e-004	0.0000	2.8736	2.8736	2.5000e-004	0.0000	2.8798
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.1000e-004	9.0000e-005	1.0200e-003	0.0000	2.5000e-004	0.0000	2.5000e-004	7.0000e-005	0.0000	7.0000e-005	0.0000	0.2370	0.2370	1.0000e-005	0.0000	0.2372
Total	**5.0000e-004**	**0.0145**	**3.8000e-003**	**3.0000e-005**	**7.8000e-004**	**4.0000e-005**	**8.2000e-004**	**2.2000e-004**	**4.0000e-005**	**2.5000e-004**	**0.0000**	**3.1106**	**3.1106**	**2.6000e-004**	**0.0000**	**3.1170**

3.3 Trenching/Site Preparation - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.3000e-004	3.9200e-003	2.6400e-003	0.0000		3.0000e-004	3.0000e-004		2.7000e-004	2.7000e-004	0.0000	0.3029	0.3029	1.0000e-004	0.0000	0.3053
Total	**4.3000e-004**	**3.9200e-003**	**2.6400e-003**	**0.0000**	**0.0000**	**3.0000e-004**	**3.0000e-004**	**0.0000**	**2.7000e-004**	**2.7000e-004**	**0.0000**	**0.3029**	**0.3029**	**1.0000e-004**	**0.0000**	**0.3053**

3.3 Trenching/Site Preparation - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.0000e-005	3.0000e-005	2.7000e-004	0.0000	7.0000e-005	0.0000	7.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0632	0.0632	0.0000	0.0000	0.0633
Total	**3.0000e-005**	**3.0000e-005**	**2.7000e-004**	**0.0000**	**7.0000e-005**	**0.0000**	**7.0000e-005**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**0.0000**	**0.0632**	**0.0632**	**0.0000**	**0.0000**	**0.0633**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.3000e-004	3.9200e-003	2.6400e-003	0.0000		3.0000e-004	3.0000e-004		2.7000e-004	2.7000e-004	0.0000	0.3029	0.3029	1.0000e-004	0.0000	0.3053
Total	**4.3000e-004**	**3.9200e-003**	**2.6400e-003**	**0.0000**	**0.0000**	**3.0000e-004**	**3.0000e-004**	**0.0000**	**2.7000e-004**	**2.7000e-004**	**0.0000**	**0.3029**	**0.3029**	**1.0000e-004**	**0.0000**	**0.3053**

3.3 Trenching/Site Preparation - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.0000e-005	3.0000e-005	2.7000e-004	0.0000	7.0000e-005	0.0000	7.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0632	0.0632	0.0000	0.0000	0.0633
Total	**3.0000e-005**	**3.0000e-005**	**2.7000e-004**	**0.0000**	**7.0000e-005**	**0.0000**	**7.0000e-005**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**0.0000**	**0.0632**	**0.0632**	**0.0000**	**0.0000**	**0.0633**

3.4 Grading - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					8.0000e-005	0.0000	8.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	8.0100e-003	0.0906	0.0859	2.0000e-004		3.6300e-003	3.6300e-003		3.3400e-003	3.3400e-003	0.0000	17.6857	17.6857	5.6000e-003	0.0000	17.8256
Total	**8.0100e-003**	**0.0906**	**0.0859**	**2.0000e-004**	**8.0000e-005**	**3.6300e-003**	**3.7100e-003**	**1.0000e-005**	**3.3400e-003**	**3.3500e-003**	**0.0000**	**17.6857**	**17.6857**	**5.6000e-003**	**0.0000**	**17.8256**

3.4 Grading - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	4.7000e-004	0.0173	3.3600e-003	4.0000e-005	6.4000e-004	5.0000e-005	6.9000e-004	1.8000e-004	4.0000e-005	2.2000e-004	0.0000	3.4668	3.4668	3.0000e-004	0.0000	3.4744
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.5000e-004	6.3000e-004	6.8100e-003	2.0000e-005	1.6400e-003	1.0000e-005	1.6600e-003	4.4000e-004	1.0000e-005	4.5000e-004	0.0000	1.5800	1.5800	5.0000e-005	0.0000	1.5814
Total	**1.2200e-003**	**0.0180**	**0.0102**	**6.0000e-005**	**2.2800e-003**	**6.0000e-005**	**2.3500e-003**	**6.2000e-004**	**5.0000e-005**	**6.7000e-004**	**0.0000**	**5.0469**	**5.0469**	**3.5000e-004**	**0.0000**	**5.0558**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					4.0000e-005	0.0000	4.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	8.0100e-003	0.0906	0.0859	2.0000e-004		3.6300e-003	3.6300e-003		3.3400e-003	3.3400e-003	0.0000	17.6857	17.6857	5.6000e-003	0.0000	17.8255
Total	**8.0100e-003**	**0.0906**	**0.0859**	**2.0000e-004**	**4.0000e-005**	**3.6300e-003**	**3.6700e-003**	**1.0000e-005**	**3.3400e-003**	**3.3500e-003**	**0.0000**	**17.6857**	**17.6857**	**5.6000e-003**	**0.0000**	**17.8255**

3.4 Grading - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	4.7000e-004	0.0173	3.3600e-003	4.0000e-005	6.4000e-004	5.0000e-005	6.9000e-004	1.8000e-004	4.0000e-005	2.2000e-004	0.0000	3.4668	3.4668	3.0000e-004	0.0000	3.4744
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.5000e-004	6.3000e-004	6.8100e-003	2.0000e-005	1.6400e-003	1.0000e-005	1.6600e-003	4.4000e-004	1.0000e-005	4.5000e-004	0.0000	1.5800	1.5800	5.0000e-005	0.0000	1.5814
Total	**1.2200e-003**	**0.0180**	**0.0102**	**6.0000e-005**	**2.2800e-003**	**6.0000e-005**	**2.3500e-003**	**6.2000e-004**	**5.0000e-005**	**6.7000e-004**	**0.0000**	**5.0469**	**5.0469**	**3.5000e-004**	**0.0000**	**5.0558**

3.5 Paving Bridge/Infrastructure - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	3.9100e-003	0.0402	0.0490	8.0000e-005		1.9400e-003	1.9400e-003		1.7800e-003	1.7800e-003	0.0000	6.9553	6.9553	2.2000e-003	0.0000	7.0103
Paving	6.6000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**4.5700e-003**	**0.0402**	**0.0490**	**8.0000e-005**		**1.9400e-003**	**1.9400e-003**		**1.7800e-003**	**1.7800e-003**	**0.0000**	**6.9553**	**6.9553**	**2.2000e-003**	**0.0000**	**7.0103**

3.5 Paving Bridge/Infrastructure - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.5000e-004	3.8000e-004	4.0900e-003	1.0000e-005	9.9000e-004	1.0000e-005	9.9000e-004	2.6000e-004	1.0000e-005	2.7000e-004	0.0000	0.9480	0.9480	3.0000e-005	0.0000	0.9488
Total	**4.5000e-004**	**3.8000e-004**	**4.0900e-003**	**1.0000e-005**	**9.9000e-004**	**1.0000e-005**	**9.9000e-004**	**2.6000e-004**	**1.0000e-005**	**2.7000e-004**	**0.0000**	**0.9480**	**0.9480**	**3.0000e-005**	**0.0000**	**0.9488**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	3.9100e-003	0.0402	0.0490	8.0000e-005		1.9400e-003	1.9400e-003		1.7800e-003	1.7800e-003	0.0000	6.9553	6.9553	2.2000e-003	0.0000	7.0103
Paving	6.6000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**4.5700e-003**	**0.0402**	**0.0490**	**8.0000e-005**		**1.9400e-003**	**1.9400e-003**		**1.7800e-003**	**1.7800e-003**	**0.0000**	**6.9553**	**6.9553**	**2.2000e-003**	**0.0000**	**7.0103**

3.5 Paving Bridge/Infrastructure - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.5000e-004	3.8000e-004	4.0900e-003	1.0000e-005	9.9000e-004	1.0000e-005	9.9000e-004	2.6000e-004	1.0000e-005	2.7000e-004	0.0000	0.9480	0.9480	3.0000e-005	0.0000	0.9488
Total	**4.5000e-004**	**3.8000e-004**	**4.0900e-003**	**1.0000e-005**	**9.9000e-004**	**1.0000e-005**	**9.9000e-004**	**2.6000e-004**	**1.0000e-005**	**2.7000e-004**	**0.0000**	**0.9480**	**0.9480**	**3.0000e-005**	**0.0000**	**0.9488**

3.6 Paving Road - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	2.6000e-004	2.6800e-003	2.4000e-003	0.0000		1.5000e-004	1.5000e-004		1.4000e-004	1.4000e-004	0.0000	0.3289	0.3289	1.0000e-004	0.0000	0.3315
Paving	6.6000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**9.2000e-004**	**2.6800e-003**	**2.4000e-003**	**0.0000**		**1.5000e-004**	**1.5000e-004**		**1.4000e-004**	**1.4000e-004**	**0.0000**	**0.3289**	**0.3289**	**1.0000e-004**	**0.0000**	**0.3315**

3.6 Paving Road - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.0000e-005	2.0000e-005	2.0000e-004	0.0000	5.0000e-005	0.0000	5.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0474	0.0474	0.0000	0.0000	0.0474
Total	**2.0000e-005**	**2.0000e-005**	**2.0000e-004**	**0.0000**	**5.0000e-005**	**0.0000**	**5.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0474**	**0.0474**	**0.0000**	**0.0000**	**0.0474**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	2.6000e-004	2.6800e-003	2.4000e-003	0.0000		1.5000e-004	1.5000e-004		1.4000e-004	1.4000e-004	0.0000	0.3289	0.3289	1.0000e-004	0.0000	0.3315
Paving	6.6000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**9.2000e-004**	**2.6800e-003**	**2.4000e-003**	**0.0000**		**1.5000e-004**	**1.5000e-004**		**1.4000e-004**	**1.4000e-004**	**0.0000**	**0.3289**	**0.3289**	**1.0000e-004**	**0.0000**	**0.3315**

3.6 Paving Road - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.0000e-005	2.0000e-005	2.0000e-004	0.0000	5.0000e-005	0.0000	5.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0474	0.0474	0.0000	0.0000	0.0474
Total	**2.0000e-005**	**2.0000e-005**	**2.0000e-004**	**0.0000**	**5.0000e-005**	**0.0000**	**5.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0474**	**0.0474**	**0.0000**	**0.0000**	**0.0474**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

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

4.2 Trip Summary Information

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

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
City Park	16.60	8.40	6.90	33.00	48.00	19.00	66	28	6
Other Asphalt Surfaces	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Other Non-Asphalt Surfaces	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
City Park	0.547726	0.045437	0.201480	0.122768	0.016614	0.006090	0.019326	0.029174	0.002438	0.002359	0.005005	0.000677	0.000907
Other Asphalt Surfaces	0.547726	0.045437	0.201480	0.122768	0.016614	0.006090	0.019326	0.029174	0.002438	0.002359	0.005005	0.000677	0.000907
Other Non-Asphalt Surfaces	0.547726	0.045437	0.201480	0.122768	0.016614	0.006090	0.019326	0.029174	0.002438	0.002359	0.005005	0.000677	0.000907

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

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

5.2 Energy by Land Use - NaturalGas

Unmitigated

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

Mitigated

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

5.3 Energy by Land Use - Electricity

Unmitigated

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

Mitigated

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

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	4.2400e-003	0.0000	4.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	7.0000e-005	7.0000e-005	0.0000	0.0000	8.0000e-005
Unmitigated	4.2400e-003	0.0000	4.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	7.0000e-005	7.0000e-005	0.0000	0.0000	8.0000e-005

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	6.1000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	3.6300e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	4.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	7.0000e-005	7.0000e-005	0.0000	0.0000	8.0000e-005
Total	**4.2400e-003**	**0.0000**	**4.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**7.0000e-005**	**7.0000e-005**	**0.0000**	**0.0000**	**8.0000e-005**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	6.1000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	3.6300e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	4.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	7.0000e-005	7.0000e-005	0.0000	0.0000	8.0000e-005
Total	**4.2400e-003**	**0.0000**	**4.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**7.0000e-005**	**7.0000e-005**	**0.0000**	**0.0000**	**8.0000e-005**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	19.9842	3.5000e-004	7.0000e-005	20.0144
Unmitigated	19.9842	3.5000e-004	7.0000e-005	20.0144

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
City Park	0 / 2.38296	19.9842	3.5000e-004	7.0000e-005	20.0144
Other Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Other Non-Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**19.9842**	**3.5000e-004**	**7.0000e-005**	**20.0144**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
City Park	0 / 2.38296	19.9842	3.5000e-004	7.0000e-005	20.0144
Other Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Other Non-Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**19.9842**	**3.5000e-004**	**7.0000e-005**	**20.0144**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0345	2.0400e-003	0.0000	0.0855
Unmitigated	0.0345	2.0400e-003	0.0000	0.0855

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
City Park	0.17	0.0345	2.0400e-003	0.0000	0.0855
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0345**	**2.0400e-003**	**0.0000**	**0.0855**

8.2 Waste by Land Use

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
City Park	0.17	0.0345	2.0400e-003	0.0000	0.0855
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0345**	**2.0400e-003**	**0.0000**	**0.0855**

9.0 Operational Offroad

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

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

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

Boilers

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

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Project Characteristics - .

Land Use - conservative estimates of land use acreage

Construction Phase - Overlapping phasing

Off-road Equipment - .

Off-road Equipment - .

Off-road Equipment - .

Off-road Equipment - .

Off-road Equipment - .

Trips and VMT - Trips from Traffic Memo. Assuming 10CY/12.5 ton trucks.

Demolition - .

Grading - .

Vehicle Trips - No new trips

Area Coating -

Energy Use -

Water And Wastewater - Default

Construction Off-road Equipment Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	20.00	3.00
tblConstructionPhase	NumDays	6.00	20.00
tblConstructionPhase	NumDays	10.00	30.00
tblConstructionPhase	NumDays	10.00	1.00
tblConstructionPhase	NumDays	3.00	2.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00

tblConstructionPhase	NumDaysWeek	5.00	6.00
tblGrading	MaterialExported	0.00	153.00
tblGrading	MaterialImported	0.00	1,345.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	0.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblTripsAndVMT	HaulingTripLength	20.00	8.00
tblTripsAndVMT	HaulingTripLength	20.00	8.00
tblTripsAndVMT	HaulingTripLength	20.00	8.00
tblTripsAndVMT	HaulingTripLength	20.00	8.00
tblTripsAndVMT	HaulingTripLength	20.00	8.00
tblTripsAndVMT	HaulingTripNumber	46.00	155.00

tblTripsAndVMT	WorkerTripNumber	8.00	15.00
tblTripsAndVMT	WorkerTripNumber	3.00	6.00
tblTripsAndVMT	WorkerTripNumber	8.00	15.00
tblTripsAndVMT	WorkerTripNumber	3.00	6.00
tblTripsAndVMT	WorkerTripNumber	5.00	9.00
tblVehicleTrips	ST_TR	22.75	0.00
tblVehicleTrips	SU_TR	16.74	0.00
tblVehicleTrips	WD_TR	1.89	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	4.9428	41.2554	34.1369	0.0806	4.3514	1.6133	5.9647	0.7763	1.5037	2.2800	0.0000	8,159.0569	8,159.0569	1.7232	0.0000	8,202.1364
Maximum	**4.9428**	**41.2554**	**34.1369**	**0.0806**	**4.3514**	**1.6133**	**5.9647**	**0.7763**	**1.5037**	**2.2800**	**0.0000**	**8,159.0569**	**8,159.0569**	**1.7232**	**0.0000**	**8,202.1364**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	4.9428	41.2554	34.1369	0.0806	2.5068	1.6133	4.1201	0.4970	1.5037	2.0007	0.0000	8,159.0569	8,159.0569	1.7232	0.0000	8,202.1364
Maximum	**4.9428**	**41.2554**	**34.1369**	**0.0806**	**2.5068**	**1.6133**	**4.1201**	**0.4970**	**1.5037**	**2.0007**	**0.0000**	**8,159.0569**	**8,159.0569**	**1.7232**	**0.0000**	**8,202.1364**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**42.39**	**0.00**	**30.93**	**35.98**	**0.00**	**12.25**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0233	0.0000	3.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.6000e-004	6.6000e-004	0.0000		7.0000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0233**	**0.0000**	**3.1000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**6.6000e-004**	**6.6000e-004**	**0.0000**	**0.0000**	**7.0000e-004**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0233	0.0000	3.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.6000e-004	6.6000e-004	0.0000		7.0000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0233**	**0.0000**	**3.1000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**6.6000e-004**	**6.6000e-004**	**0.0000**	**0.0000**	**7.0000e-004**

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

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	9/1/2019	9/4/2019	6	3	
2	Trenching/Site Preparation	Site Preparation	9/1/2019	9/3/2019	6	2	
3	Grading	Grading	9/1/2019	9/24/2019	6	20	
4	Paving Bridge/Infrastructure	Paving	9/1/2019	10/5/2019	6	30	
5	Paving Road	Paving	9/1/2019	9/2/2019	6	1	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 1

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	2	8.00	158	0.38
Demolition	Rubber Tired Dozers	0	8.00	247	0.40
Demolition	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Trenching/Site Preparation	Cranes	0		231	0.29

Trenching/Site Preparation	Forklifts	0		89	0.20
Trenching/Site Preparation	Generator Sets	0		84	0.74
Trenching/Site Preparation	Graders	0	8.00	187	0.41
Trenching/Site Preparation	Rubber Tired Dozers	0	8.00	247	0.40
Trenching/Site Preparation	Scrapers	0	8.00	367	0.48
Trenching/Site Preparation	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Trenching/Site Preparation	Trenchers	1	8.00	78	0.50
Trenching/Site Preparation	Welders	0		46	0.45
Grading	Bore/Drill Rigs	1	8.00	221	0.50
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	0	8.00	187	0.41
Grading	Rubber Tired Dozers	0	8.00	247	0.40
Grading	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Paving Bridge/Infrastructure	Cement and Mortar Mixers	0	6.00	9	0.56
Paving Bridge/Infrastructure	Excavators	1	8.00	158	0.38
Paving Bridge/Infrastructure	Pavers	0	8.00	130	0.42
Paving Bridge/Infrastructure	Paving Equipment	0	6.00	132	0.36
Paving Bridge/Infrastructure	Rollers	0	6.00	80	0.38
Paving Bridge/Infrastructure	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Paving Road	Air Compressors	0	6.00	78	0.48
Paving Road	Cement and Mortar Mixers	0	6.00	9	0.56
Paving Road	Pavers	1	8.00	130	0.42
Paving Road	Paving Equipment	0	6.00	132	0.36
Paving Road	Rollers	1	8.00	80	0.38
Paving Road	Tractors/Loaders/Backhoes	0	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	3	15.00	0.00	155.00	14.70	6.90	8.00	LD_Mix	HDT_Mix	HHDT
Trenching/Site Preparation	1	6.00	0.00	0.00	14.70	6.90	8.00	LD_Mix	HDT_Mix	HHDT
Grading	3	15.00	0.00	187.00	14.70	6.90	8.00	LD_Mix	HDT_Mix	HHDT
Paving Bridge/Infrastructure	1	6.00	0.00	0.00	14.70	6.90	8.00	LD_Mix	HDT_Mix	HHDT
Paving Road	2	9.00	0.00	0.00	14.70	6.90	8.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Demolition - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.3454	0.0000	3.3454	0.5065	0.0000	0.5065			0.0000			0.0000
Off-Road	0.9835	8.9523	10.2286	0.0166		0.4881	0.4881		0.4674	0.4674		1,614.916 8	1,614.916 8	0.3651		1,624.045 4
Total	**0.9835**	**8.9523**	**10.2286**	**0.0166**	**3.3454**	**0.4881**	**3.8335**	**0.5065**	**0.4674**	**0.9739**		**1,614.916 8**	**1,614.916 8**	**0.3651**		**1,624.045 4**

3.2 Demolition - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.2651	9.3784	1.9874	0.0191	0.3620	0.0263	0.3883	0.0993	0.0252	0.1244		2,067.779 7	2,067.779 7	0.1900		2,072.530 3
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0831	0.0610	0.6637	1.7200e-003	0.1677	1.4500e-003	0.1691	0.0445	1.3300e-003	0.0458		171.3196	171.3196	5.8900e-003		171.4670
Total	**0.3482**	**9.4393**	**2.6511**	**0.0208**	**0.5297**	**0.0277**	**0.5574**	**0.1438**	**0.0265**	**0.1702**		**2,239.099 4**	**2,239.099 4**	**0.1959**		**2,243.997 3**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.5054	0.0000	1.5054	0.2279	0.0000	0.2279			0.0000			0.0000
Off-Road	0.9835	8.9523	10.2286	0.0166		0.4881	0.4881		0.4674	0.4674	0.0000	1,614.916 8	1,614.916 8	0.3651		1,624.045 4
Total	**0.9835**	**8.9523**	**10.2286**	**0.0166**	**1.5054**	**0.4881**	**1.9935**	**0.2279**	**0.4674**	**0.6953**	**0.0000**	**1,614.916 8**	**1,614.916 8**	**0.3651**		**1,624.045 4**

3.2 Demolition - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.2651	9.3784	1.9874	0.0191	0.3620	0.0263	0.3883	0.0993	0.0252	0.1244		2,067.779 7	2,067.779 7	0.1900		2,072.530 3
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0831	0.0610	0.6637	1.7200e-003	0.1677	1.4500e-003	0.1691	0.0445	1.3300e-003	0.0458		171.3196	171.3196	5.8900e-003		171.4670
Total	**0.3482**	**9.4393**	**2.6511**	**0.0208**	**0.5297**	**0.0277**	**0.5574**	**0.1438**	**0.0265**	**0.1702**		**2,239.099 4**	**2,239.099 4**	**0.1959**		**2,243.997 3**

3.3 Trenching/Site Preparation - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.4343	3.9173	2.6391	3.3700e-003		0.2962	0.2962		0.2725	0.2725		333.8536	333.8536	0.1056		336.4943
Total	**0.4343**	**3.9173**	**2.6391**	**3.3700e-003**	**0.0000**	**0.2962**	**0.2962**	**0.0000**	**0.2725**	**0.2725**		**333.8536**	**333.8536**	**0.1056**		**336.4943**

3.3 Trenching/Site Preparation - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0332	0.0244	0.2655	6.9000e-004	0.0671	5.8000e-004	0.0676	0.0178	5.3000e-004	0.0183		68.5279	68.5279	2.3600e-003		68.5868
Total	**0.0332**	**0.0244**	**0.2655**	**6.9000e-004**	**0.0671**	**5.8000e-004**	**0.0676**	**0.0178**	**5.3000e-004**	**0.0183**		**68.5279**	**68.5279**	**2.3600e-003**		**68.5868**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.4343	3.9173	2.6391	3.3700e-003		0.2962	0.2962		0.2725	0.2725	0.0000	333.8536	333.8536	0.1056		336.4943
Total	**0.4343**	**3.9173**	**2.6391**	**3.3700e-003**	**0.0000**	**0.2962**	**0.2962**	**0.0000**	**0.2725**	**0.2725**	**0.0000**	**333.8536**	**333.8536**	**0.1056**		**336.4943**

3.3 Trenching/Site Preparation - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0332	0.0244	0.2655	6.9000e-004	0.0671	5.8000e-004	0.0676	0.0178	5.3000e-004	0.0183		68.5279	68.5279	2.3600e-003		68.5868
Total	**0.0332**	**0.0244**	**0.2655**	**6.9000e-004**	**0.0671**	**5.8000e-004**	**0.0676**	**0.0178**	**5.3000e-004**	**0.0183**		**68.5279**	**68.5279**	**2.3600e-003**		**68.5868**

3.4 Grading - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.4700e-003	0.0000	8.4700e-003	1.2800e-003	0.0000	1.2800e-003			0.0000			0.0000
Off-Road	0.8009	9.0555	8.5934	0.0197		0.3634	0.3634		0.3343	0.3343		1,949.5111	1,949.5111	0.6168		1,964.9312
Total	**0.8009**	**9.0555**	**8.5934**	**0.0197**	**8.4700e-003**	**0.3634**	**0.3718**	**1.2800e-003**	**0.3343**	**0.3356**		**1,949.5111**	**1,949.5111**	**0.6168**		**1,964.9312**

3.4 Grading - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0480	1.6972	0.3597	3.4600e-003	0.0655	4.7600e-003	0.0703	0.0180	4.5500e-003	0.0225		374.2014	374.2014	0.0344		375.0611
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0831	0.0610	0.6637	1.7200e-003	0.1677	1.4500e-003	0.1691	0.0445	1.3300e-003	0.0458		171.3196	171.3196	5.8900e-003		171.4670
Total	**0.1310**	**1.7582**	**1.0234**	**5.1800e-003**	**0.2332**	**6.2100e-003**	**0.2394**	**0.0624**	**5.8800e-003**	**0.0683**		**545.5211**	**545.5211**	**0.0403**		**546.5281**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.8100e-003	0.0000	3.8100e-003	5.8000e-004	0.0000	5.8000e-004			0.0000			0.0000
Off-Road	0.8009	9.0555	8.5934	0.0197		0.3634	0.3634		0.3343	0.3343	0.0000	1,949.5111	1,949.5111	0.6168		1,964.9312
Total	**0.8009**	**9.0555**	**8.5934**	**0.0197**	**3.8100e-003**	**0.3634**	**0.3672**	**5.8000e-004**	**0.3343**	**0.3349**	**0.0000**	**1,949.5111**	**1,949.5111**	**0.6168**		**1,964.9312**

3.4 Grading - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0480	1.6972	0.3597	3.4600e-003	0.0655	4.7600e-003	0.0703	0.0180	4.5500e-003	0.0225		374.2014	374.2014	0.0344		375.0611
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0831	0.0610	0.6637	1.7200e-003	0.1677	1.4500e-003	0.1691	0.0445	1.3300e-003	0.0458		171.3196	171.3196	5.8900e-003		171.4670
Total	**0.1310**	**1.7582**	**1.0234**	**5.1800e-003**	**0.2332**	**6.2100e-003**	**0.2394**	**0.0624**	**5.8800e-003**	**0.0683**		**545.5211**	**545.5211**	**0.0403**		**546.5281**

3.5 Paving Bridge/Infrastructure - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.2607	2.6819	3.2632	5.1600e-003		0.1293	0.1293		0.1190	0.1190		511.1256	511.1256	0.1617		515.1684
Paving	0.0437					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.3044**	**2.6819**	**3.2632**	**5.1600e-003**		**0.1293**	**0.1293**		**0.1190**	**0.1190**		**511.1256**	**511.1256**	**0.1617**		**515.1684**

3.5 Paving Bridge/Infrastructure - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0332	0.0244	0.2655	6.9000e-004	0.0671	5.8000e-004	0.0676	0.0178	5.3000e-004	0.0183		68.5279	68.5279	2.3600e-003		68.5868
Total	**0.0332**	**0.0244**	**0.2655**	**6.9000e-004**	**0.0671**	**5.8000e-004**	**0.0676**	**0.0178**	**5.3000e-004**	**0.0183**		**68.5279**	**68.5279**	**2.3600e-003**		**68.5868**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.2607	2.6819	3.2632	5.1600e-003		0.1293	0.1293		0.1190	0.1190	0.0000	511.1256	511.1256	0.1617		515.1684
Paving	0.0437					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.3044**	**2.6819**	**3.2632**	**5.1600e-003**		**0.1293**	**0.1293**		**0.1190**	**0.1190**	**0.0000**	**511.1256**	**511.1256**	**0.1617**		**515.1684**

3.5 Paving Bridge/Infrastructure - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0332	0.0244	0.2655	6.9000e-004	0.0671	5.8000e-004	0.0676	0.0178	5.3000e-004	0.0183		68.5279	68.5279	2.3600e-003		68.5868
Total	**0.0332**	**0.0244**	**0.2655**	**6.9000e-004**	**0.0671**	**5.8000e-004**	**0.0676**	**0.0178**	**5.3000e-004**	**0.0183**		**68.5279**	**68.5279**	**2.3600e-003**		**68.5868**

3.6 Paving Road - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.5143	5.3655	4.8090	7.3200e-003		0.3003	0.3003		0.2763	0.2763		725.1820	725.1820	0.2294		730.9180
Paving	1.3100					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.8243**	**5.3655**	**4.8090**	**7.3200e-003**		**0.3003**	**0.3003**		**0.2763**	**0.2763**		**725.1820**	**725.1820**	**0.2294**		**730.9180**

3.6 Paving Road - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0498	0.0366	0.3982	1.0300e-003	0.1006	8.7000e-004	0.1015	0.0267	8.0000e-004	0.0275		102.7918	102.7918	3.5400e-003		102.8802
Total	**0.0498**	**0.0366**	**0.3982**	**1.0300e-003**	**0.1006**	**8.7000e-004**	**0.1015**	**0.0267**	**8.0000e-004**	**0.0275**		**102.7918**	**102.7918**	**3.5400e-003**		**102.8802**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.5143	5.3655	4.8090	7.3200e-003		0.3003	0.3003		0.2763	0.2763	0.0000	725.1820	725.1820	0.2294		730.9180
Paving	1.3100					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.8243**	**5.3655**	**4.8090**	**7.3200e-003**		**0.3003**	**0.3003**		**0.2763**	**0.2763**	**0.0000**	**725.1820**	**725.1820**	**0.2294**		**730.9180**

3.6 Paving Road - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0498	0.0366	0.3982	1.0300e-003	0.1006	8.7000e-004	0.1015	0.0267	8.0000e-004	0.0275		102.7918	102.7918	3.5400e-003		102.8802
Total	**0.0498**	**0.0366**	**0.3982**	**1.0300e-003**	**0.1006**	**8.7000e-004**	**0.1015**	**0.0267**	**8.0000e-004**	**0.0275**		**102.7918**	**102.7918**	**3.5400e-003**		**102.8802**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

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

4.2 Trip Summary Information

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

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
City Park	16.60	8.40	6.90	33.00	48.00	19.00	66	28	6
Other Asphalt Surfaces	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Other Non-Asphalt Surfaces	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
City Park	0.547726	0.045437	0.201480	0.122768	0.016614	0.006090	0.019326	0.029174	0.002438	0.002359	0.005005	0.000677	0.000907
Other Asphalt Surfaces	0.547726	0.045437	0.201480	0.122768	0.016614	0.006090	0.019326	0.029174	0.002438	0.002359	0.005005	0.000677	0.000907
Other Non-Asphalt Surfaces	0.547726	0.045437	0.201480	0.122768	0.016614	0.006090	0.019326	0.029174	0.002438	0.002359	0.005005	0.000677	0.000907

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

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

5.2 Energy by Land Use - NaturalGas

Unmitigated

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

Mitigated

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

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0233	0.0000	3.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.6000e-004	6.6000e-004	0.0000		7.0000e-004
Unmitigated	0.0233	0.0000	3.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.6000e-004	6.6000e-004	0.0000		7.0000e-004

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	3.3200e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0199					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	3.0000e-005	0.0000	3.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.6000e-004	6.6000e-004	0.0000		7.0000e-004
Total	**0.0233**	**0.0000**	**3.1000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**6.6000e-004**	**6.6000e-004**	**0.0000**		**7.0000e-004**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	3.3200e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0199					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	3.0000e-005	0.0000	3.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.6000e-004	6.6000e-004	0.0000		7.0000e-004
Total	**0.0233**	**0.0000**	**3.1000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**6.6000e-004**	**6.6000e-004**	**0.0000**		**7.0000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

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

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

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

Boilers

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

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Appendix B-1

Biological Technical Report

Biological Technical Report

Berkshire Creek Area Improvements Project

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May 2019

TABLE OF CONTENTS

TABLES

EXHIBITS

Exhibit **Follows Page**

APPENDICES

Appendix

1.0 INTRODUCTION

This Biological Technical Report has been prepared to support California Environmental Quality Act (CEQA) documentation for the proposed Berkshire Creek Area Improvements Project (hereafter referred to as "the project"). This information has been reported in accordance with accepted scientific and technical standards that are consistent with the requirements of the U.S. Fish and Wildlife Service (USFWS) and the California Department of Fish and Wildlife (CDFW).

1.1 PROJECT LOCATION

The project site is located in Hahamongna Watershed Park in the City of Pasadena in the south-central section of Los Angeles County (Exhibit 1). The project site's northern boundary is located approximately 100 feet southeast of the intersection of Berkshire Place and Oak Grove Drive and extends southward to approximately 0.10 of a mile northwest of the Foothill Freeway Overpass of Interstate 210 (I-210).

Land uses in the surrounding area include flood control, industrial, residential developments, transportation, recreation, education, and open space. The project site is located on U.S. Geological Survey's (USGS) 7.5-minute Pasadena quadrangle, within Township 01N, Range 12W, and Section 07 (Exhibit 2).

1.1.1 Topography and Vegetation

Approximately 50 percent of the project site is supports coast live oak woodland vegetation. The balance of the vegetation on the site consists of black willow – California sycamore woodland, black willow thickets/mulefat thickets, California sagebrush scrub, non-native ornamental woodland, developed and disturbed. Berkshire Creek is a major topographical feature on the project site (Exhibit 3). Topography is generally mixed with flat and sloped areas with on-site elevations ranging from approximately 1,060 to 1,100 feet above mean sea level (msl). The Upper Arroyo Seco, a tributary of the Los Angeles River, is located directly east of the project site. The Arroyo Seco to the northeast and north of the site has is largely left in its natural state and has not been channelized. Immediately east of the project site, the Arroyo Seco spreads into a large reservoir area behind Devils Gate Dam. The concrete-lined portion of the Arroyo Seco occurs approximately 0.45 miles southeast of the project site.

Soil types on the site include: urban land-Soboba complex, urban land-Montebello-Xerorthents, and Soboba and Tujunga soils (USDA 1969). See Exhibit 4 for a map of the soils on the project site.

1.2 RELEVANT PLANS, POLICIES AND REGULATIONS

1.2.1 Federal

Endangered Species Act

The Federal Endangered Species Act of 1973 (FESA) protects plants and animals that the government has listed as "Endangered" or "Threatened". The FESA is implemented by enforcing Sections 7 and 9 of the Act. A federally listed species is protected from unauthorized "take" pursuant to Section 9 of the FESA. "Take", as defined by the FESA, means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or to attempt to engage in any such conduct. All persons are presently prohibited from taking a federally listed species unless and until (1) the appropriate Section 10(a) permit has been issued by the U.S. Fish and Wildlife Service (USFWS)

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Regional Location and Local Vicinity

Exhibit 1

Berkshire Creek Area Improvements Project

N W E S

500 250 0 500 Feet

PSOMAS

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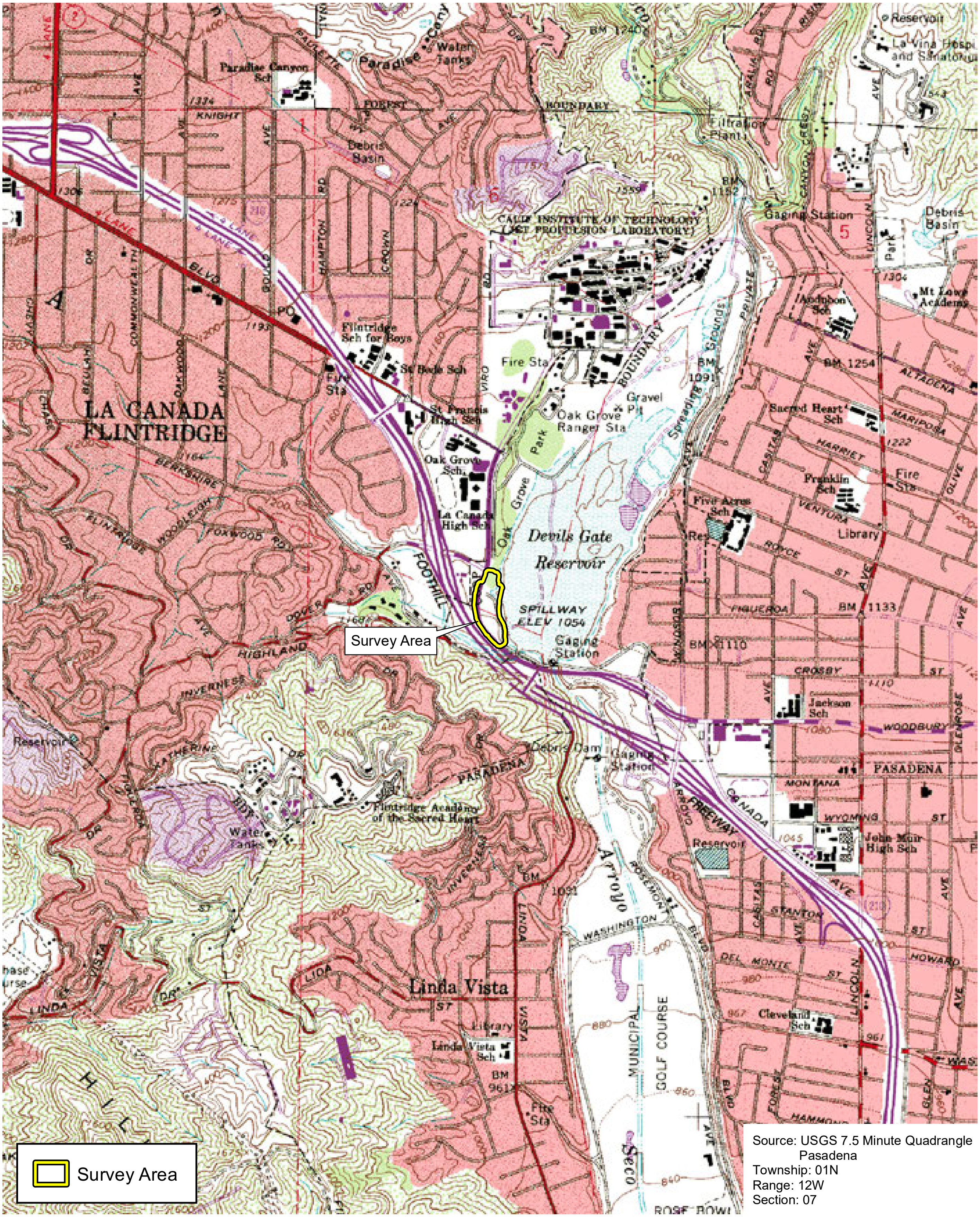

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U.S. Geological Survey 7.5-Minute Quadrangle

Exhibit 2

Berkshire Creek Area Improvements Project

N W E S

2,000 1,000 0 2,000 Feet

PSOMAS

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Project Location

Exhibit 3

Berkshire Creek Area Improvements Project

PSOMAS

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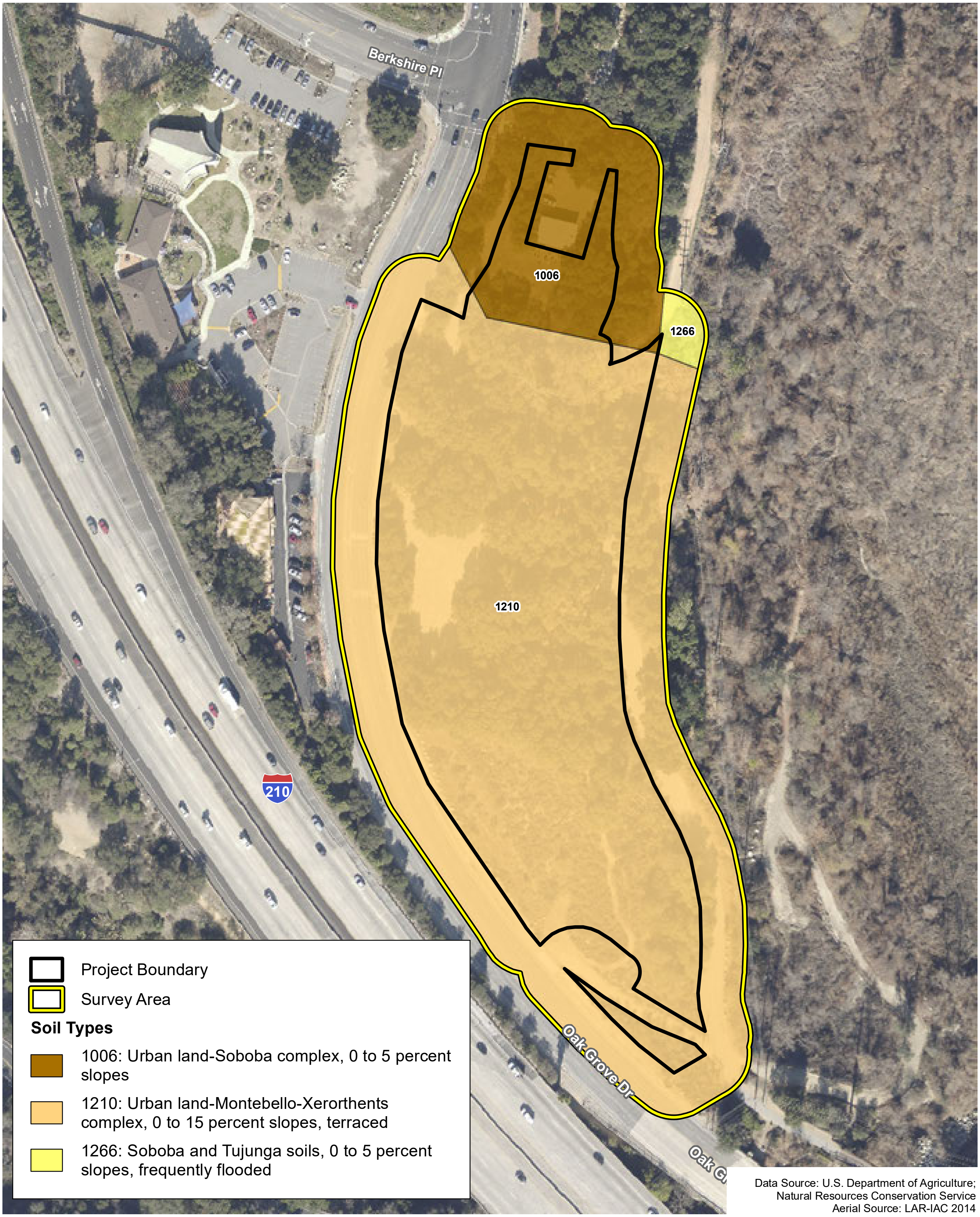
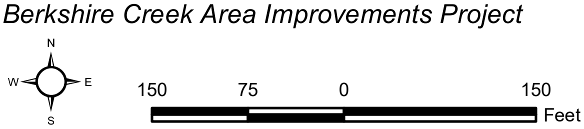


Soils Map

Exhibit 4

Berkshire Creek Area Improvements Project



PSOMAS

(Rev: 05/22/2019 MMD) R:\Projects\PAS_Pasaden\3PAS010801\Graphics\Berkshire_Creek\Biotech\ex_Soils.pdf or (2) an Incidental Take Statement is obtained as a result of formal consultation between a federal agency and the USFWS pursuant to Section 7 of the FESA and the implementing regulations that pertain to it (50 *Code of Federal Regulations* [CFR] 402). “Person” is defined in the FESA as an individual, corporation, partnership, trust, association, or any private entity; any officer, employee, agent, department or instrument of the federal government; any State, Municipality, or political subdivision of the State; or any other entity subject to the jurisdiction of the United States. The Project Applicant is a “person” for purposes of the FESA.

Section 401 and 404 of the Clean Water Act of 1972 (33 United States Code 1251 et seq.)

Section 404 of the Clean Water Act (CWA) regulates the discharge of dredge and fill material into “Waters of the U.S.” including wetlands. Dredge and fill activities are typically associated with development projects; water-resource related projects; infrastructure development and wetland conversion to farming; forestry; and urban development. The U.S. Army Corps of Engineers (USACE) is the designated regulatory agency responsible for administering the 404 permit program and for making jurisdictional determinations.

Under Section 401 of the CWA, an activity requiring a USACE Section 404 permit must obtain a State Water Quality Certification (or waiver thereof) to ensure that the activity will not violate established State water quality standards. The State Water Resources Control Board (SWRCB), in conjunction with the nine California Regional Water Quality Control Boards (RWQCBs), is responsible for administering the Section 401 water quality certification program.

Under Section 401 of the federal CWA, an activity involving discharge into a water body must obtain a federal permit and a State Water Quality Certification to ensure that the activity will not violate established water quality standards. The U.S. Environmental Protection Agency (USEPA) is the federal regulatory agency responsible for implementing the CWA. However, it is the SWRCB in conjunction with the nine RWQCBs who essentially have been delegated the responsibility for administering the water quality certification (401) program.

The U.S. Supreme Court has issued three decisions that provide context and guidance in determining the appropriate scope of “waters of the U.S.” In *United States v. Riverside Bayview Homes*, the Court upheld the inclusion of adjacent wetlands in the regulatory definition of “waters of the U.S.”. In *Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers* (SWANCC), the Court held that the use of “isolated” non-navigable intrastate ponds by migratory birds was not, by itself, sufficient basis for the exercise of federal regulatory authority under the CWA. In *Rapanos v. United States* (Rapanos),[1] a majority of the U.S. Supreme Court overturned two Sixth Circuit Court of Appeals decisions, finding that certain wetlands constituted “waters of the U.S.” under the CWA. In his plurality opinion, Justice Scalia argued that “waters of the U.S.” should not include channels through which water flows intermittently or ephemerally or channels that periodically provide drainage for rainfall. He also stated that a wetland may not be considered “adjacent to” remote “waters of the U.S.” based on a mere hydrologic connection. Justice Kennedy authored a separate concurring opinion concluding that wetlands are “waters of the U.S.” if they, either alone or in combination with similarly situated lands in the region, significantly affect the chemical, physical, and biological integrity of other covered waters more readily understood as “navigable”. Lacking a majority opinion, regulatory jurisdiction under the CWA exists over a water body if either the plurality’s or Justice Kennedy’s “significant nexus” standard is satisfied.

In May 2015, in response to these Supreme Court decisions, the USACE and the U.S. Environmental Protection Agency (USEPA) published a Final Clean Water Rule (Water Rule) clarifying the scope of “waters of the U.S.” protected under the CWA (USACE and USEPA 2015).

1 Consolidated cases: *Rapanos v. United States* and *Carabell v. United States* refer to the U.S. Supreme Court’s decision concerning USACE jurisdiction over “waters of the U.S.” under the CWA.

They define "waters of the U.S." to include eight categories of jurisdictional waters. The first four types of waters are considered jurisdictional by rule in all cases: (1) Traditional Navigable Waters (TNWs); (2) interstate waters, (3) territorial seas, and (4) impoundments of jurisdictional waters. The next two types of waters are jurisdictional by rule, as defined, because the science confirms that they have a significant nexus to TNWs, interstate waters, or territorial seas: (5) tributaries and (6) adjacent waters. The final two types of jurisdictional waters require a case-specific analysis to determine if they have a significant nexus to TNWs, interstate waters, or territorial seas: (7) five subcategories of waters considered to be "similarly situated"—Prairie potholes, Carolina and Delmarva bays, pocosins, western vernal pools in California, and Texas coastal prairie wetlands—that must be analyzed "in combination" when making a significant nexus analysis and (8) waters within the 100-year floodplain of a TNW, interstate water, or territorial sea and waters within 4,000 feet from the high tide line or the Ordinary High Water Mark (OHWM) of a TNW, interstate water, territorial sea, impoundment, or covered tributary.

Based on the Final Clean Water Rule, the USACE and the USEPA will apply the significant standard as follows:

1. Waters are "waters of the U.S." if they, either alone or in combination with similarly situated waters in the region, significantly affect the chemical, physical, or biological integrity of TNWs, interstate waters, or the territorial seas.
2. Waters are considered "similarly situated" where they function alike and are sufficiently close to function together in affecting the nearest TNW, interstate water, or territorial sea.
3. The "region" is considered to be the single point of entry watershed (i.e., the drainage basin within whose boundaries all precipitation ultimately flows to the nearest single TNW), interstate water, or territorial sea.
4. The functions of a water that affect the chemical, physical, or biological integrity of a TNW, interstate water, or territorial seas must be "significant" and more than "speculative or insubstantial". To determine whether there is a significant nexus, the following functions should be considered: sediment trapping; nutrient recycling; pollutant trapping, transformation, filtering, and transport; retention and attenuation of floodwaters; runoff storage; contribution of flow; export of organic matter; export of food resources; and provision of life-cycle dependent aquatic habitat for species.

On August 27, 2015, the United States District Court for the District of North Dakota enjoined the USEPA from implementing the Final Clean Water Rule, the result of a lawsuit filed by several states that challenged the statutory authority of the USEPA and USACE to issue these new regulations. Therefore, currently the USACE is not implementing the definitions in the Final Clean Water Rule.

1.2.2 State

California Endangered Species Act

Pursuant to the California Endangered Species Act (CESA) and Section 2081 of the *California Fish and Game Code*, an incidental take permit from the California Department of Fish and Wildlife (CDFW) is required for projects that could result in the take of a State-listed Threatened or Endangered species. Under the CESA, "take" is defined as an activity that would directly or indirectly kill an individual of a species, but the definition does not include "harm" or "harass", as the federal act does. As a result, the threshold for a take under the CESA is higher than that under the FESA. A CDFW-authorized Incidental Take Permit under Section 2081(b) is required when a project could result in the take of a State-listed Threatened or Endangered Species. The application for an Incidental Take Permit under Section 2081(b) has a number of requirements, including the preparation of a conservation plan, generally referred to as a Habitat Conservation Plan.

California Fish and Game Code

Section 1602

State law confers upon the CDFW the trustee responsibility and authority for the public trust resource of wildlife in California. The CDFW may play various roles under the CEQA process. By State law, the CDFW has jurisdiction over the conservation, protection, and management of the wildlife, native plants, and habitat necessary to maintain biologically sustainable populations. The CDFW shall consult with lead and responsible agencies and shall provide the requisite biological expertise to review and comment upon environmental documents and impacts arising from project activities.

As a trustee agency, the CDFW has jurisdiction over certain resources held in trust for the people of California. Trustee agencies are generally required to be notified of CEQA documents relevant to their jurisdiction, whether or not these agencies have actual permitting authority or approval power over aspects of the underlying project (14 *California Code of Regulations* [CCR] Section 15386). The CDFW, as a trustee agency, must be notified of CEQA documents regarding projects involving fish and wildlife of the state as well as Rare and Endangered native plants, wildlife areas, and ecological reserves. Although, the CDFW cannot approve or disapprove a project since it is a trustee agency, lead and responsible agencies are required to consult with them. The CDFW, as the trustee agency for fish and wildlife resources, shall provide the requisite biological expertise to review and comment upon environmental documents and impacts arising from project activities and shall make recommendations regarding those resources held in trust for the people of California (*California Fish and Game Code*, Section 1602).

Sections 1600–1616

All diversions, obstructions, or changes to the natural flow or bed, channel, or bank of any river, stream, or lake in California that support wildlife resources and/or riparian vegetation are subject to CDFW regulations, pursuant to Section 1600 through 1603 of the *California Fish and Game Code*. Under Section 1602, it is unlawful for any person to substantially divert or obstruct the natural flow or substantially change the bed, channel or bank of any river, stream, or lake designated by CDFW as waters within their jurisdiction, nor can a person use any material from streambeds without first notifying the CDFW of such activity. For a project that may affect stream channels and/or riparian vegetation regulated under Sections 1600 through 1603, CDFW authorization is required in the form of a Streambed Alteration Agreement.

California Porter-Cologne Water Quality Control Act

Pursuant to the California Porter-Cologne Water Quality Control Act, the SWRCB and the nine RWQCBs may require permits (known as waste discharge requirements or WDRs) for the fill or alteration of “waters of the State”. The term “waters of the State” is defined as “any surface water or groundwater, including saline waters, within the boundaries of the state” (*California Water Code,* Section 13050[e]). The State and Regional Boards have interpreted their authority to require WDRs to extend to any proposal to fill or alter “waters of the State”, even if those same waters are not under USACE jurisdiction. Pursuant to this authority, the State and Regional Boards may require the submission of a “report of waste discharge” under Section 13260, which is treated as an application for WDRs.

1.2.3 Local

City of Pasadena City Trees and Tree Protection Ordinance

The City maintains a local tree ordinance (Ord. No. 7184, § 10, 3-15-2010) which sets forth requirements for obtaining a tree removal permit for all "protected trees," which includes trees whose trunk (or collective trunks) exceed a diameter of eight inches measured four and ½ feet above natural ground level. The following native tree species are considered protected under this ordinance: coast live oak (*Quercus agrifolia*), Engelmann oak (*Quercus englemannii*), canyon oak (*Quercus chrysolepis*), western sycamore (*Platanus racemosa*), California walnut (*Juglans californica*), scrub oak (*Quercus berberidifolia*), valley oak (*Quercus lobata*), California bay (*Umbellularia californica*), Fremont's cottonwood (*Populus fremontii*), white alder (*Alnus rhombifolia*), black cottonwood (*Populus trichocarpa*), arroyo willow (*Salix lasiolepis*), and California buckeye (*Aesculus californica*). In addition to these protected native trees, there are an additional 103 non-native tree species addressed by the ordinance. These non-native species are protected at various sizes. The survey area is known to contain some of the above listed species, and approval may be required prior to any project-related activities that would trim or remove these trees.

Hahamongna Watershed Park Master Plan

The project site is located within the southwestern portion of the Hahamongna Watershed Park Master Plan (HWP Master Plan) boundaries. Stated goals of the HWP Master Plan include:

- Goal 1: Preserve, restore, and enhance the native habitats.
- Goal 2: The Devil's Gate flood control basin will be managed to provide protection to
- the developed and natural downstream areas.
- Goal 3: Conserve and protect the water resources of the Arroyo Seco.
- Goal 4: Provide diverse recreation opportunities for the Pasadena community.
- Goal 5: Enrich and promote the unique history and culture of Hahamongna Watershed Park.
- Goal 6: Provide a safe and secure park.
- Goal 7: Provide adequate circulation, access and parking.

The proposed Berkshire Creek Restoration Project includes improvements within approximately the southern third portion of Oak Grove Park that are consistent with the HWP Master Plan.

1.3 REGIONAL ENVIRONMENTAL SETTING

The City is bordered by the unincorporated community of Altadena to the north, the City of La Cañada Flintridge to the north and west, the Cities of Sierra Madre and Arcadia to the east, and the Cities of Los Angeles, Alhambra, and San Marino to the south. The City is generally flat while the northwestern portion, which includes Arroyo Seco Canyon, is comprised of the foothills of the San Gabriel Mountains. Pasadena has average elevations ranging from approximately 540 to 1,675 feet above msl. The City has an area of approximately 23 square miles located in the northwestern portion of the San Gabriel Valley. The valley lies at the base of the San Gabriel Mountains and is bound by the San Gabriel Mountains to the north, San Rafael Hills to the west, Chino Hills and San Jose Hills to the east, and the Puente Hills to the south. The valley floor is crossed by both the San Gabriel River and the Arroyo Seco.

1.3.1 Climate

Southern California is located in a Mediterranean climate, which is characterized by mild, rainy winters and hot, dry summers. There can also be dramatic differences in rainfall from year to year. Consequently, the vegetation types consist of drought-tolerant, woody shrubs and trees and annual, fall-sprouting grasses.

The temperature is moderated by the coastal influence of the Pacific Ocean, making for mild conditions through most of the year. In Loma Linda, the warmest average monthly temperature is 96 degrees Fahrenheit (°F), while the coolest monthly is 40°F (The Weather Company 2018). The stable atmosphere creates cloudless conditions, giving the dry, summer subtropical climate many days of sunshine (Ritter 2006).

The most distinguishing characteristic of a Mediterranean climate is its seasonal precipitation. In Southern California, precipitation is characterized by brief, intense storms between November and March. It is not unusual for a majority of the annual precipitation to fall during a few storms in close proximity to each other. Average annual rainfall in Loma Linda is approximately 3.13 to 0.07 inches per year (The Weather Company 2018). Rainfall patterns are subject to extreme variations from year to year and longer term wet and dry cycles.

Climate change is projected to be a powerful stressor, posing a risk of abrupt and irreversible regional-scale change in the composition, structure, and function of terrestrial, freshwater, and marine ecosystems (IPCC 2014). It may affect air temperature, precipitation, snowpack, streamflow, water availability, fire, and vegetation. In addition, marine environments may experience rising ocean temperature, sea level rise, ocean acidification, and upwelling. In response to climate change's effects on the environment, terrestrial plant and wildlife species shift their geographic ranges and seasonal activities. This can lead to changing interactions among species, including competition and predator-prey dynamics. Species are expected to generally relocate upward in elevation and to higher latitudes; however, the response varies across species, with some are projected to move to lower elevations (Schuetz et. al. 2015).

1.4 PROJECT DESCRIPTION

The primary goal of the Berkshire Creek Area Restoration Project is to improve the ecological, hydrological, and recreational conditions throughout the lower third portion of Oak Grove Park. This would be achieved by addressing the degraded conditions at the Berkshire Place Storm Drain (Berkshire Drain) storm drain outlet and downstream areas; implementing localized trail improvements; replacing asphalt paving with a permeable surface at the equestrian picnic area parking lot; installing interpretive signage; and restoring the riparian, coastal sage scrub, and oak woodland habitats throughout the Project site (Exhibit 5).

Proposed Project Components

Exhibit 5

Berkshire Creek Area Improvements Project

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2.0 SURVEY METHODOLOGIES

Psomas conducted a literature search to identify special status plants, wildlife, and vegetation types known to occur in the project region. This included a review of the Pasadena, Mt. Wilson, Burbank, and Condor Peak USGS 7.5-minute quadrangles in the California Native Plant Society's (CNPS) Electronic Inventory of Rare and Endangered Vascular Plants of California (CNPS 2018) and the CDFW's California Natural Diversity Database (CNDDB) (CDFW 2018). In addition, the compendium of special status species published by the USFWS and CDFW were reviewed.

2.1 GENERAL SURVEY AND VEGETATION MAPPING

A general survey was performed by Psomas Biologist Sarah Thomas on November 2 and 3, 2018; and February 26, 2019. The purpose of the general surveys was to assess the vegetation present on the project site plus a 50-foot buffer, and to evaluate the habitats' potential to support special status species. During the surveys, each habitat type was evaluated for its potential to support special status species that are known or expected to occur in the region. Active searches for reptiles and amphibians included lifting, overturning, and carefully replacing rocks and debris. Birds were identified by visual and auditory recognition. Surveys for mammals were conducted during the day and included searching for and identifying diagnostic signs, including scat, footprints, scratch-outs, dust bowls, burrows, and trails. Taxonomy and nomenclature for wildlife generally follows Stebbins (2012) for amphibians and reptiles, American Ornithologists' Union (2017) for birds, and Baker et al. (2003) for mammals.

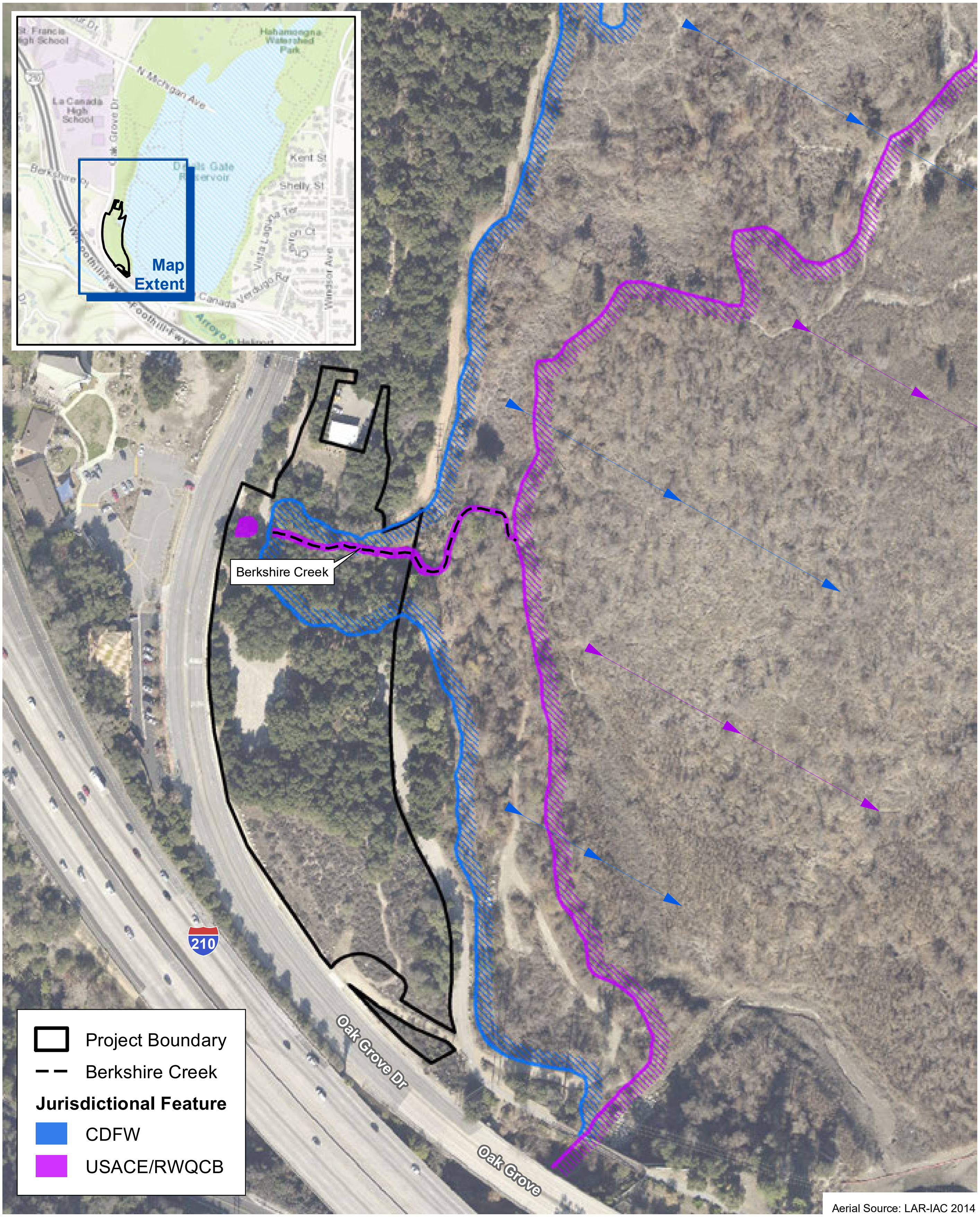
In addition to the general survey, vegetation mapping was performed. Vegetation types follow that of *The Vegetation Classification and Mapping Program: List of California Terrestrial Natural Communities recognized by the CNDDB* (CDFG 2010), and *Manual of California Vegetation* (Sawyer et al. 2009). Vegetation types that are not represented in the CDFW list are described based on the dominant feature(s) occurring within that vegetation type. Vegetation was mapped in the field on an aerial photograph at a scale of 1 inch equals 200 feet (1"=200'). All plant and wildlife species observed were recorded in field notes and a list of wildlife species observed are included in the table included in Appendix A.

2.2 FOCUSED NEVIN'S BARBERRY SURVEY

A focused survey for Nevin's barberry (*Berberis nevinii*), a special status plant, was conducted on May 17, 2019 by Psomas Biologist Sarah Thomas. The blooming period for this species is between March and May, however, it is detectable year-round. The biologist conducting the survey is familiar with and has had previous experience with the species. The area within the project boundary was searched on foot in all accessible areas for Nevin's barberry. Binoculars were used in those few areas where access was not feasible. All plant species detected during the survey were recorded in field notes. Please see Table 3 for survey results.

2.3 JURISDICTIONAL DELINEATION

A jurisdictional delineation was conducted by Psomas Regulatory Specialist David Hughes on May 25, 2018 and July 24, 2018, to describe and map the extent of resources under the jurisdiction of the USACE, the RWQCB, and the CDFW (Exhibit 6). The delineation followed guidelines presented in the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (USACE 2008). This regional supplement is designed for use with the 1987 Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory 1987). Both the 1987 Wetlands Manual and the Arid West Supplement to the manual provide technical methods and guidelines for determining the presence of "waters of the U.S." and wetland resources. A three-parameter approach—which requires evidence of (1) wetland hydrology, (2)



Jurisdictional Features - Berkshire Creek

Exhibit 6

Berkshire Creek Area Improvements Project

N W E S

200 100 0 200 Feet

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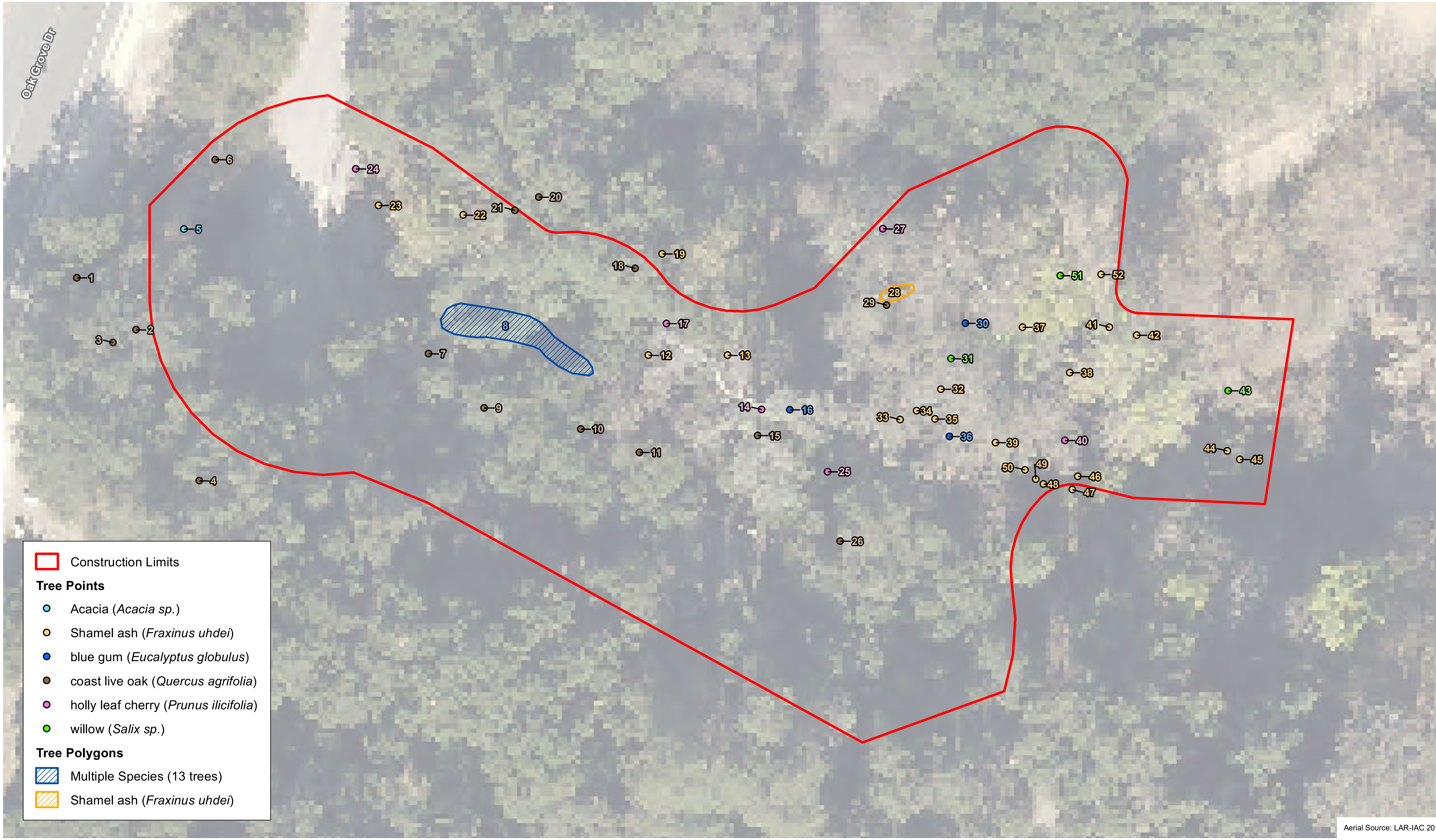
D:\Projects\3PAS\010801\MXD\Biotech\ex_Juris_Resources_20190522.mxd hydrophytic vegetation, and (3) hydric soils—was used to identify wetlands in the study area. To be considered a wetland, an area must exhibit at least minimal hydric characteristics within the three parameters. However, problem areas may periodically or permanently lack certain indicators due to seasonal or annual variability of the nature of the soils or plant species in a study area. Atypical wetlands lack certain indicators due to recent human activities or natural events. Guidance for determining the presence of wetlands in these situations is presented in the regional supplement. Non-wetland "waters of the U.S." are delineated based on the limits of the Ordinary High Water Mark (OHWM), which can be determined by a number of factors including erosion; the deposition of vegetation or debris; and changes in vegetation.

It should be noted that the RWQCB shares the USACE jurisdiction unless isolated conditions are present. If isolated waters conditions are present, the RWQCB takes jurisdiction using the USACE's definition of the OHWM and/or the three-parameter wetlands methodology pursuant to the 1987 Wetlands Manual. The CDFW's jurisdiction is defined as the top of the bank of the stream, channel, or basin or the outer limit of riparian vegetation located within or immediately adjacent to the river, stream, creek, pond, or lake.

A complete description of the survey methodology is included in the Jurisdictional Delineation Report, provided as Appendix B.

2.4 JURISDICTIONAL TREE SURVEYS

Psomas Certified Arborist Trevor Bristle (International Society of Arboriculture Certificate No. WE-10233A) performed a tree inventory in the survey area on March 1, 2019 (Exhibit 7). All trees found within the survey area boundaries (Berkshire Creek Project Component, Exhibit 5) that are subject to regulation by the Pasadena Tree Ordinance and/or the California Fish and Game Code were identified and mapped in the field. Each tree that was surveyed was mapped in the field on a survey map. Each tree that was assessed was given an individual number on the map. Using a diameter tape, the trunk diameter was measured four and one-half feet above mean natural grade; multiple trunks were measured separately. The diameter of the largest two trunks was combined to determine the total diameter of each tree. In addition, the total number of trunks was recorded. The diameter was estimated for trees that were not accessible (e.g., surrounded by poison oak or located on a steep slope). The height of each tree was estimated from mean natural grade to the highest branch. Also, the diameter of each tree's canopy was estimated at its widest point. Tree aesthetics were evaluated with respect to overall form and symmetry, crown balance, branching pattern, and broken branches. The health of each tree was assessed based on visual evidence of vigor (e.g., the amount of foliage; leaf color and size; presence of branch or twig dieback; severity of insect infestation; the presence of disease; heart rot; fire damage; mechanical damage; amount of new growth; appearance of bark; and rate of callous development over wounds). The tree's structural integrity was also evaluated with respect to branch attachment, branch placement, root health, and stability. In addition, the health assessment considered such elements as the presence of decay, weak branch attachments, and the presence of exposed roots due to soil erosion. The health and aesthetic quality of each tree was rated on a scale of 1 (poor) to 5 (excellent).



Jurisdictional Tree Locations

Exhibit 7

Berkshire Creek Area Improvements Project

N W E S

20 10 0 20 Feet

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3.0 EXISTING BIOLOGICAL RESOURCES

This section describes the biological resources that occur on within and adjacent to the project site or within nearby off-site areas associated with the proposed project site. The following topics are discussed below: vegetation types; wildlife populations and movement patterns; special status vegetation types; and special status plant and wildlife species, either known to occur or potentially occurring in the project site or proposed off-site impact areas.

3.1 VEGETATION TYPES

This section describes the vegetation types and other areas that occur on the project site (Exhibit 8). The native vegetation types consist of coast live oak woodland, black willow – California sycamore woodland, black willow thickets/mulefat thickets, and California sagebrush scrub. Non-native vegetation types include non-native ornamental woodland. Other areas include developed and disturbed. A description of each vegetation type/other area is found below. Table 1 below identifies the acreage for the vegetation types and other areas in the survey area.

TABLE 1
VEGETATION TYPES AND OTHER AREAS

Vegetation Types and Other Areas	Acres
Native Vegetation Types	
black willow – California sycamore woodland	0.17
black willow thickets/mulefat thickets	0.21
coast live oak woodland	3.05
California sagebrush scrub	0.72
Subtotal Native Vegetation Types	**4.15**
Non-Native Vegetation Types	
Non-native ornamental woodland	0.28
Subtotal Non-Native Vegetation Types	***0.28***
Other Areas	
developed	0.23
disturbed	0.10
Subtotal Other Areas	**0.33**
Total	**4.76**

3.1.1 Black Willow – California Sycamore Woodland

Black willow – California sycamore woodland occurs in the central-eastern portion of the project site. This vegetation type is dominated by Goodding's black willow trees (*Salix gooddingii*) and California sycamore (*Platanus racemosa*) trees and has an understory of non-native species including brome grasses (*Bromus* sp.), and common fig (*Ficus carica*) as well as some native species such as poison oak (*Toxicodendron diversilobum*) and wild cucumber (*Marah macrocarpa*).

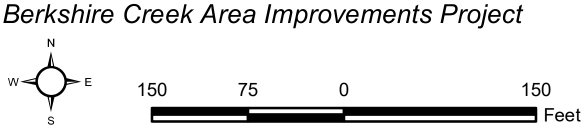
3.1.2 Black Willow Thickets/Mulefat Thickets

The black willow thickets/mulefat thickets occurs in the southeastern and central-eastern portions of the study area. It consists of Goodding's black willow and mulefat (*Baccharis salicifolia*) thickets interspersed. Other species observed include poison oak and poison hemlock (*Conium maculatum*).

Vegetation Types and Other Areas

Exhibit 8

Berkshire Creek Area Improvements Project



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3.1.3 Coast Live Oak Woodland

Coast live oak woodland occurs throughout the central portion of the project site. This vegetation type is dominated by coast live oak trees and has an understory comprised mostly of leaf litter. Non-native species such as wild oat (*Aveena* sp.), horehound (*Marrubium vulgare*), smilo grass (*Stipa miliacea* var. *miliacea*), and short-podded mustard (*Hirschfeldia incana*) also occur in the understory. Native species such as wild cucumber and phacelia (*Phacelia* sp.) were also observed in the understory. The oak woodland area contains various paved roadways, a parking lot, and pedestrian/equestrian trails.

3.1.4 California Sagebrush Scrub

California sagebrush scrub occurs in the southern portion of the project site. This appears to be a remnant patch of sagebrush scrub associated with revegetation following adjacent roadway construction. This area is dominated by California sagebrush (*Artemesia californica*) with California buckwheat (*Eriogonum fasciculatum*), black sage (*Salvia mellifera*), black elderberry (*Sambucus nigra*) and laurel sumac (*Malosma laurina*) also occurring.

3.1.5 Non-Native Ornamental Woodland

Non-native ornamental woodland areas occur in the southeastern and central portions of the project site. These areas consist of non-native trees such as shamel ash (*Fraxinus uhdei*), Eucalyptus (*Eucalyptus* sp.), Acacia (*Acacia* sp.) and edible fig (*Ficus carica*). Ripgut brome can be found in the understory. This vegetation type is not described in the *California Manual of Vegetation*.

3.1.6 Developed

Developed areas are considered “other” areas and occur in the project area as roadways in the western portion and the Oak Grove Maintenance Office in the northern portion.

3.1.7 Disturbed

Disturbed areas are considered “other” areas and consist of dirt roads or other maintained areas that are either devoid of vegetation or support a sparse cover of ruderal species.

3.2 WILDLIFE

Common wildlife species observed or expected to occur within the vegetation types on the project site are discussed below. Special status wildlife species expected to occur are discussed in greater detail in the Special Status Wildlife section (see Section 3.3.4 below).

3.2.1 Fish and Amphibians

No fish or amphibians were observed during the survey due to lack of suitable habitat. During a storm event, when water is flowing or ponded, common fish and amphibian species that may occur include the western mosquitofish (*Gambusia affinis*), American bullfrog (*Lithobates catesbeianus*), California toad (*Anaxyrus boreas halophilus*), Baja California treefrog (*Pseudacris hypochondriaca*), and black-bellied slender salamander (*Batrachoseps nigriventris*).

3.2.2 Reptiles

Potentially suitable habitat for reptile species occurs throughout the project site. Two reptile species, the western fence lizard (*Sceloporus occidentalis*) and side-blotched lizard (*Uta* *stansburiana*), were detected during the surveys. Other common reptile species that may occur in the survey area include San Diego alligator lizard (*Elgaria multicarinata webbii*), California gopher snake (*Pituophis catenifer annectens*), California striped racer (*Coluber literalis literalis*) and Southern Pacific rattlesnake (*Crotalus oreganus helleri*).

3.2.3 Birds

A variety of bird species are expected to be residents on the project site, using the habitats throughout the year. Other species are present only during certain seasons. For example, the white-crowned sparrow (*Zonotrichia leucophrys*) is expected to occur on the project site during the winter season and then migrate north in the spring to breed during the summer.

A variety of bird species are expected to occur on or adjacent to the project site. Species observed during the survey include: Canada goose (*Branta canadensis*), mallard (*Anas platyrhynchos*), ring-necked duck (*Aythya collaris*), hooded merganser (*Lophodytes cucullatus*), rock pigeon (*Columba livia*), Eurasian collared-dove (*Streptopelia decaocto*), mourning dove (*Zenaida macroura*), Anna's hummingbird (*Calypte anna*), western gull (*Larus occidentalis*), California gull (*Larus californicus*), sharp-shinned hawk (*Accipiter striatus*), red-shouldered hawk (*Buteo lineatus*), red-tailed hawk (*Buteo jamaicensis*), Lewis' woodpecker (*Melanerpes lewis*), acorn woodpecker (*Melanerpes formicivorus*), Nuttall's woodpecker (*Picoides nuttallii*), downey woodpecker (*Picoides pubescens*), northern flicker (*Colaptes auratus*), American kestrel (*Falco sparverius*), black phoebe (*Sayornis nigricans*), California scrub-jay (*Aphelocoma californica*), American crow (*Corvus brachyrhynchos*), common raven (*Corvus corax*), oak titmouse (*Baeolophus inornatus*), bushtit (*Psaltriparus minimus*), white-breasted nuthatch (*Sitta carolinensis*), Bewick's wren (*Thryomanes bewickii*), ruby-crowned kinglet (*Regulus calendula*), western bluebird (*Sialia mexicana*), hermit thrush (*Catharus guttatus*), American robin (*Turdus migratorius*), California thrasher (*Toxostoma redivivum*), European starling (*Sturnus vulgaris*), house finch (*Haemorhous mexicanus*), purple finch (*Haemorhous purpureus*), lesser goldfinch (*Spinus psaltria*), spotted towhee (*Pipilo maculatus*), California towhee (*Pipilo crissalis*), song sparrow (*Melospiza melodia*), white-crowned sparrow (*Zonotrichia leucophrys*), dark-eyed junco (*Junco hyemalis*), and yellow-rumped warbler (*Setophaga coronata*).

Other common bird species expected to occur on the project site include but are not limited to: Allen's hummingbird (*Selasphorus sasin*), Say's phoebe (*Sayornis saya*), blue gray gnatcatcher (*Polioptila caerulea*), yellow warbler (*Setophaga petechia*), California quail (*Callipepla californica*), acorn woodpecker (*Melanerpes formicivorus*), and lesser goldfinch (*Spinus psaltria*). Cassin's kingbird (*Tyrannus vociferans*), house wren (*Troglodytes aedon*), wrentit (*Chamaea fasciata*), northern mockingbird (*Mimus polyglottos*), cedar waxwing (*Bombycilla cedrorum*), phainopepla (*Phainopepla nitens*), brown-headed cowbird (*Molothrus ater*), orange-crowned warbler (*Oreothlypis celata*), and black-headed grosbeak (*Pheucticus melanocephalus*).

3.2.4 Mammals

Two small-sized mammals, California ground squirrel (*Spermophilus beecheyi*) and Botta's pocket gopher (*Thomomys bottae*) were observed in the survey area. Other small-sized mammal species expected to occur include eastern fox squirrel (*Sciurus niger*). Medium-sized mammals expected to occur include desert cottontail (*Sylvilagus audubonii*), Virginia opossum (*Didelphis virginiana*), common raccoon (*Procyon lotor*), and striped skunk (*Mephitis mephitis*). Large-sized mammals expected to occur include coyote (*Canis latrans*), bobcat (*Lynx rufus*), and mule deer (*Odocoileus hemionus*).

Bats occur throughout most of Southern California and may use any portion of the study area as foraging habitat. Most of the bats that could potentially occur in the study area are inactive during the winter and either hibernate or migrate, depending on the species. The following common bat species are expected to occur on or adjacent to the project site: big brown bat (*Eptesicus fuscus*), Brazilian free-tailed bat (*Tadarida brasiliensis*), canyon bat (*Parastrellus hesperus*), hoary bat (*Lasiurus cinereus*), yuma myotis (*Myotis yumanensis*), little brown bat (*Myotis lucifigus*), and California myotis (*Myotis californicus*). Bats may roost in crevices of structures, in culverts, under bridges, or in large oak or sycamore trees in the survey area.

3.2.5 Wildlife Movement

Wildlife corridors link together areas of suitable habitat that are otherwise separated by rugged terrain, transitions in vegetation, or human disturbance, which is exacerbated by fragmentation of open space by urbanization creating isolated “islands” of wildlife habitat. In the absence of linkages that allow movement among areas of suitable habitat, various studies have concluded that some wildlife species, especially larger and more mobile mammals, will not likely persist over time in fragmented or isolated habitat since it (i.e., fragmented or isolated habitat) prohibits the immigration of new individuals and genetic information (MacArthur and Wilson 1967; Soule 1987; Harris and Gallagher 1989; Bennett 1990). Corridors mitigate the effects of this fragmentation by (1) allowing animals to move among areas of remaining habitat, thereby permitting depleted populations to be replenished and promoting genetic exchange; (2) providing escape routes from fire, predators and human disturbances, thus reducing the risk that catastrophic events (such as fire or disease) will result in population or local species extirpation; and (3) serving as travel routes for individual animals as they move in their home ranges in search of food, water, mates, and other necessary resources (Noss 1983; Farhig and Merriam 1985; Simberloff and Cox 1987; Harris and Gallagher 1989).

Wildlife movement activities usually fall into one of three movement categories: (1) dispersal (e.g., juvenile animals from natal areas or individuals extending range distributions); (2) seasonal migration; and (3) movement related to home range activities (e.g., foraging for food or water, defending territories, or searching for mates, breeding areas, or cover). A number of terms such as “wildlife corridor,” “travel route,” “habitat linkage,” and “wildlife crossing” have been used in various wildlife movement studies to refer to areas in which wildlife move from one area to another. To clarify the meaning of these terms and to facilitate the discussion of wildlife movement, these terms are defined below.

- ***Travel route.*** A landscape feature (such as a ridgeline, drainage, canyon, or riparian strip) within a larger natural habitat area that is used frequently by animals to facilitate movement and to provide access to necessary resources (e.g., water, food, cover, den sites). The travel route is generally preferred because it provides the least amount of topographic resistance in moving from one area to another. It contains adequate food, water, and/or cover for wildlife moving between habitat areas and provides a relatively direct link between target habitat areas.
- ***Wildlife corridor.*** A piece of habitat, usually linear in nature, that connects two or more habitat patches that would otherwise be fragmented or isolated from one another. Wildlife corridors are usually bound by urban land areas or other areas that are unsuitable for wildlife. The corridor generally contains suitable cover, food, and/or water to support species and to facilitate wildlife movement while in the corridor. Larger, landscape-level corridors (often referred to as “habitat or landscape linkages”) can provide both transitory and resident habitat for a variety of species.
- ***Wildlife crossing.*** A small, narrow area, relatively short in length and generally constricted in nature that allows wildlife to pass under or through an obstacle or barrier that otherwise hinders or prevents movement. Crossings typically are man-made and include culverts, underpasses, drainage pipes, and tunnels that provide access across or under roads, highways, pipelines, or other physical obstacles. These often represent

"choke points" along a movement corridor, which may impede wildlife movement and increase the risk of predation.

It is important to note that wildlife corridors, as defined above, may not yet exist in a large open space area in which there are few or no man-made or naturally occurring physical constraints to wildlife movement. Given an open space area that is large enough to maintain viable populations of species and to provide a variety of travel routes (e.g., canyons, ridgelines, trails, riverbeds, and others), wildlife will use these "local" routes while searching for food, water, shelter, and mates and will not need to cross into other large open space areas. Based on their size, location, vegetative composition and food availability, some of these movement areas (e.g., large drainages and canyons) are used for longer lengths of time and serve as source areas for food, water and cover, particularly for small- and medium-sized animals. This is especially true if the travel route is within a larger open space area. However, once open space areas become constrained and/or fragmented as a result of urban development or construction of physical obstacles (such as roads and highways), the remaining landscape features or travel routes that connect the larger open space areas become corridors as long as they provide adequate space, cover, food, and water and do not contain obstacles or distractions (e.g., man-made noise, lighting) that would generally hinder wildlife movement.

In general, animals discussed within the context of movement corridors typically include the larger, more mobile species such as deer, bear, mountain lion, fox, and coyote, and even some of the mid-size mammals such as raccoon, skunk, badger, and opossum. Most of these species have relatively large home ranges in which to move to find adequate food, water, and breeding and wintering habitat. It is therefore assumed that conclusions and discussions regarding movement corridors for these "indicator" species will, by virtue of their larger movement patterns, include movement corridors for many smaller, less mobile species (such as reptiles, amphibians, and rodents). Conversely, the movement of smaller, less mobile species (e.g., herpetofauna) is generally discussed within the context of local movement. Regional movement for these species occurs as gene flow over many generations and requires at least local movement of individuals to the edges of other individuals' home ranges.

Different bird species are likely to utilize movement corridors to a greater or lesser extent. Most bird species simply fly in more or less direct paths to the desired location. Conversely, some habitat-dependent species will not move very far from their preferred habitat types and are less inclined to fly over unsuitable habitat.

Ideally, a corridor should encompass a heterogeneous mix of habitats to accommodate the ecological requirements of the variety of species in any particular region. Most species typically prefer an adequate amount of vegetation cover during movement periods that serve as both a food source as well as protection from weather and potential predators. Drainages, riparian areas, and canyon bottoms typically serve as natural movement corridors because these features provide cover, food, and often water for a variety of species. Very few species will move across large expanses of open, uncovered habitat unless it is the only option available to them. For some species, habitat linkages and movement corridors should be able to support animals for a sustained period of time, not just for travel. Smaller or less mobile animals (such as rodents and reptiles) may require long periods to traverse a corridor, so the corridor must contain adequate food and cover for survival.

Regional Wildlife Movement

Large areas of mountainous open space in the project region are found in the San Gabriel Mountains to the north and the San Rafael Mountains to the southwest. Between the two areas of mountainous open space are lowlands that are largely urbanized.

Because of the similar adaptations required of animals to survive in the relatively low elevations of the lowlands, most species inhabiting this ecosystem may venture north or southwest into the San Gabriel Mountains or San Rafael foothills, but are not expected to traverse into higher elevations. However, animals living within these mountains are likely to use the variety of drainages, canyons, ridgelines, and other natural linear features to travel locally within these mountains. According to South Coast Missing Linkages: A Wildland Network for the South Coast Ecoregion, most large-scale regional wildlife movement between the San Gabriel Mountains in the north and the San Bernardino Mountains to the east, and the Castaic Ranges, Sierra Madre Ranges, and Santa Monica Mountains to the northwest and west is expected to occur at great distances from the project site.

The proposed project area currently consists mostly of native woodland and scrub habitats with meandering existing trail systems, access roads, and passive or active recreational features surrounded by substantial transportation corridors and low-density residential properties. Project implementation, occurring adjacent to an active transportation corridor, will not create a bottle-neck or choke point for movement within the canyon. Post-construction conditions will enhance existing conditions and will not affect wildlife movement negatively.

Local Wildlife Movement

The majority of the land immediately west of the project site is developed (e.g., residential, educational, transportation), while the land immediately east is open space flood control that is connected to unimproved open space. Wildlife movement in the region is expected to be of high value as wildlife traverse large open space areas of the Angeles National Forest (ANF), and travel between the ANF and large tracts of native vegetation within the upper and central Arroyo Seco to the northeast, east, and southeast of the project site. The project site itself, however, does not occur within a critical linkage or corridor for wildlife movement. Movement occurring through the project area is expected to be local movement only. The wildlife expected to move through the project site would be residents of the area and are expected to be common species habituated to human settlement such as the Virginia opossum, common raccoon, and coyote. The project area does not occur within any feature that would be used by wildlife to travel from one large open space area to another.

Construction activities would create very minimal dust and noise within and adjacent to the work areas. During active construction, wildlife movement may be deterred by noise and human activity; however, most wildlife movement would occur at night while construction activities would occur during the day. In addition, construction activities would be temporary in nature, short-term (approximately three months), and are therefore not expected to impact wildlife movement patterns in the area to any measurable degree.

3.3 JURISDICTIONAL FEATURES

Drainages and associated vegetation types may be subject to permit conditions, as regulated by the USACE, the CDFW, and the RWQCB pursuant to Section 404 of the Clean Water Act and Sections 1600 et seq. of the California Fish and Game Code. The USACE takes jurisdiction over areas considered "waters of the U.S." and wetlands. Jurisdictional waters are typically defined by the OHWM and other specific criteria. Wetlands, a subset of jurisdictional waters, are defined as those that possess the following three parameters: (1) hydrology that provides permanent or periodic inundation by groundwater or surface water; (2) hydric soils; and (3) hydrophytic vegetation. CDFW jurisdictional limits are similar to USACE jurisdiction, but include riparian habitat supported by a river, stream, or lake regardless of the presence or absence of hydric soils and saturated soil conditions. The limits of CDFW jurisdiction are often defined by riparian vegetation.

Berkshire Creek is a narrow intermittent stream that conveys water from an upstream storm drain system in an easterly direction to Devil's Gate Reservoir, a portion of the Arroyo Seco. The stream has been degraded by severe erosion which has resulted in the stream bottom to be incised and scoured to a point that largely prevents establishment of plants that would characterize the understory of an oak woodland.

Jurisdictional "waters of the U.S.", were delineated by the presence of a break in the bank slope caused by water scour. A total of 0.11 acre of "waters of the U.S.", under the jurisdiction of the USACE and RWQCB, were delineated in the survey area.

Areas under the jurisdiction of the CDFW extend to the top of the stream banks, unless riparian vegetation is present so that the CDFW's jurisdiction would extend to the outer canopy of such vegetation. Berkshire Creek has numerous coast live oak trees that overhang the creek bottom and the outer limits of the oak canopies determined the CDFW's jurisdiction. Jurisdictional areas of the CDFW were mapped to the top of bank where non-native trees were present. In all, 0.76 acre of CDFW jurisdictional areas occur in the Berkshire Creek survey area.

3.4 JURISDICTIONAL TREES

A total of 74 trees potentially regulated under the City's Ordinance No. 6896 "City Trees and Tree Protection Ordinance" (codified in Chapter 8.52 of the Pasadena Municipal Code) and/or Fish and Game code as riparian trees associated with Berkshire Creek, were mapped during the tree survey performed in the Berkshire Creek Component of the project site, as shown on Exhibit 7, Jurisdictional Tree Locations. Species observed include acacia, blue gum (*Eucalyptus globulus*), coast live oak, holly leaf cherry (*Prunus ilicifolia*), Shamel ash (*Fraxinus uhdei*), willow (*Salix* sp.), Mexican fan palm (*Washingtonia robusta*). Some of root systems and/or canopies of the listed trees above may fall within the impact area for the Berkshire Creek component of the project. An additional 31 trees proposed for removal were identified during surveys of the balance of the project site and listed in Table 2, Impacted Trees, below. One additional species was observed, Bailey acacia (*Acacia baileyana*).

TABLE 2
IMPACTED TREES

Tree Species		Number of Tree Removals
Common Name	**Scientific Name**	
acacia	*Acacia* sp.	1
arroyo willow	***Salix lasiolepis***	1
Bailey acacia	*Acacia baileyana*	11
blue gum	*Eucalyptus globulus*	3
carob	*Ceratonia siliqua*	3
common fig	*Ficus carica*	1
evergreen ash	*Fraxinus uhdei*	1
holly leaf cherry	***Prunus ilicifolia***	1
Mexican fan palm	*Washingtonia Robusta*	5
Shamel ash	*Fraxinus uhdei*	41
tree of heaven	*Ailanthus altissima*	15
willow	***Salix* sp.**	2
	Total	**85**
* **Bold** indicates native species		

3.5 SPECIAL STATUS BIOLOGICAL RESOURCES

The following section addresses special status biological resources observed, reported, or that have the potential to occur in the project region. These resources include plant and wildlife species that have been afforded special status and/or recognition by federal and State resource agencies, as well as private conservation organizations. In general, the principal reason an individual taxon (i.e., species, subspecies, or variety) is given such recognition is the documented or perceived decline or limitations of its population size, geographic range, and/or distribution resulting in most cases from habitat loss. In addition, special status biological resources include vegetation types and habitats that are either unique, of relatively limited distribution in the region, or of particularly high wildlife value. These resources have been defined by federal, State, and local government conservation programs. Sources used to determine the special status of biological resources are as follows:

- ***Plants.*** Electronic Inventory of Rare and Endangered Vascular Plants of California. (CNPS 2016); the CNDDB (CDFW 2018); and various Federal Register notices from the USFWS regarding plant species' listing status.
- ***Wildlife.*** California Wildlife Habitat Relationships Database System (CDFG 2002); the CNDDB (CDFW 2018); and various Federal Register notices from the USFWS regarding listing status of wildlife species.
- ***Habitats.*** The CNDDB (CDFW 2010).

Tables 2 and 3 further below provide a summary of each special status plant and wildlife species potentially occurring in the project region and include information on the definitions for the various status designations, presence of suitable habitat, and results of focused surveys.

3.5.1 Definitions of Special Status Biological Resources

Special status habitats are vegetation types, associations, or subassociations that support concentrations of special status plant or wildlife species; these habitats are of relatively limited distribution or are of particular value to wildlife. Although special status habitats are not afforded legal protection unless they support protected species, potential impacts on them may increase concerns and mitigation suggestions by resources agencies.

A federally listed Endangered species is a species facing extinction throughout all or a significant portion of its geographic range. A federally listed Threatened species is a species likely to become endangered within the foreseeable future throughout all or a significant portion of its range. The presence of any federally listed Threatened or Endangered species on an area proposed development leads to a CEQA finding of "significance" and (for wildlife or, where there is a federal nexus, for plants) requires consultation with USFWS, particularly if development would result in "take" of the species or its habitat. The term "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in such conduct. "Harm" in this sense can include any disturbance to habitats used by the species during any portion of its life history.

Proposed species are those officially proposed by the USFWS for addition to the federal Threatened and Endangered species list. Because proposed species may become listed as Threatened or Endangered prior to or during implementation of a proposed development project, they are treated here as though they are listed species.

The State of California considers an Endangered species to be a species whose prospects of survival and reproduction are in immediate jeopardy. A Threatened species is a species in such small numbers throughout its range that it is likely to become an Endangered species in the near future in the absence of special protection or management. A Rare species is one present in such small numbers throughout its range that it may become Endangered if its present environment worsens. The Rare designation applies to California native plants listed prior to the State Endangered Species Act. State-listed Threatened and Endangered species are fully protected against take unless an Incidental Take Permit is obtained from the wildlife agencies.

California Species of Special Concern is an informal designation that the CDFW uses for some declining wildlife species that are not State candidates. This designation does not provide legal protection but signifies that the CDFW recognizes these species' special status. This report reflects recent changes that re-categorized several species from California Species of Special Concern to a status of "Watch List". This status refers to all taxa that were previously Species of Special Concern but no longer merit such status or which do not meet Species of Special Concern criteria but for which there is concern and a need for additional information to clarify status. Species which are only designated as Watch List are not included as "special status" in this document.

Sections 650 and 670.7 of the California Code of Regulations (CCR), or Section 2081 of the Fish and Game Code dealing with California Fully Protected species, state that these species "…may not be taken or possessed at any time and no provision of this code or any other law shall be construed to authorize the issuance of permit or licenses to take any fully protected" species, although take may be authorized for necessary scientific research. This language arguably makes the "Fully Protected" designation the strongest and most restrictive regarding the "take" of these species. In 2003, the code sections dealing with fully protected species were amended to allow the CDFW to authorize take resulting from recovery activities for State-listed species.

Special Plant and Special Animal are general terms that refer to all species the CNDDB is interested in tracking, regardless of their legal or protection status. This term includes species designated as any of the above terms, but also includes species that may be considered biologically rare; restricted in distribution; are declining throughout their range; are on the periphery of their range and are threatened with extirpation in California; are associated with special status habitats; or are considered by other State or federal agencies or private organizations to be sensitive or declining.

The CNPS is a local resource conservation organization that has developed an inventory of California's special status plant species (CNPS 2018). This inventory is a summary of information on the distribution, rarity, and endangerment of California's vascular plants and is comprised of four lists. The CNPS presumes that List 1A plant species are extinct in California because they have not been seen in the wild for many years. The CNPS considers List 1B plants as Rare, Threatened, or Endangered throughout their range. List 2 plant species are considered Rare, Threatened, or Endangered in California but are more common in other states. List 3 is a "review" list of plants for which more information is needed, and List 4 is a "watch" list of plants that have limited distribution. CNPS also assigns a threat rank extension to the List categories. An extension of .1 is assigned to plants that are considered "seriously threatened" in California (high degree/immediacy of threat). Extension .2 indicates the plant is "fairly threatened" in California (moderate degree/immediacy of threat). Extension .3 is assigned to plants that are considered "not very threatened" in California (low degree/immediacy of threat or no current threats known).

3.5.2 Special Status Vegetation Types

Three vegetation types in the study area would be considered special status: black willow – California sycamore woodland, black willow thickets/mulefat thickets, and California sagebrush scrub (Table 1).

3.5.3 Special Status Plants

Many special status plant species have potential to occur in the project region (i.e., Pasadena, Mt. Wilson, Burbank, and Condor Peak USGS 7.5-minute quadrangles). These species, along with their potential to occur, are summarized in Table 3. In addition, a focused survey to determine the presence or absence of one special status plant species, Nevins barberry, was conducted by Psomas biologist Sarah Thomas on May 17, 2019. Results of the survey are included within Table 3, Special Status Plant Species Potentially Occurring in the Project Region.

TABLE 3
SPECIAL STATUS PLANT SPECIES
POTENTIALLY OCCURRING IN THE PROJECT REGION

Scientific Name	Common Name	USFWS	CDFW	CRPR	Species Background	Potential
Arctostaphylos glandulosa ssp. *gabrielensis*	San Gabriel manzanita			1B.2	Evergreen shrub. Rocky soil in chaparral; 1,952–4,920 ft. Southern California County Distribution: Los Angeles, San Bernardino. Blooming period: March	Not expected to occur; outside current known elevational range.
Astragalus brauntonii	Braunton's milk-vetch	FE		1B.1	Perennial herb. Recently burned and disturbed areas, in sandstone and carbonite soils, in chaparral, coastal scrub, and grasslands; 13–2,099 ft. Southern California County Distribution: Los Angeles, Orange, Riverside, Ventura. Blooming period: January–August	Not expected to occur; no suitable habitat.
Atriplex parishii	Parish's brittlescale			1B.1	Annual herb. Alkaline soils in chenopod scrub, playas, and vernal pools; 82–6,232 ft. Southern California County Distribution: Los Angeles (Presumed extirpated), Orange (Presumed extirpated), Riverside, San Bernardino (Presumed extirpated), San Diego. Blooming period: June–October	Not expected to occur; no suitable habitat.
Berberis nevinii	Nevin's barberry	FE	SE	1B.1	Evergreen shrub. Sandy or gravelly soils in chaparral, cismontane woodland, coastal scrub, and riparian scrub; 898–2,707 ft. Southern California County Distribution: Los Angeles, Riverside, San Bernardino, San Diego. Blooming period: March–June	Limited potential to occur; marginally suitable habitat. Not observed during focused survey.
Calochortus clavatus var. gracilis	slender mariposa lily			1B.2	Perennial bulbiferous herb. Chaparral, coastal scrub, grassland; 1,050–3,280 ft. Southern California County Distribution: Los Angeles, Ventura. Blooming period: March–June	Not expected to occur; limited marginally suitable habitat.
Calochortus palmeri var. *palmeri*	Palmer's mariposa lily			1B.2	Perennial bulbiferous herb. Mesic soils in chaparral, lower montane coniferous forests, meadows and seeps; 3,280–7,839 ft. Southern California County Distribution: Kern, Los Angeles, Riverside, San Bernardino, Ventura. Blooming period: April–July	Not expected to occur; outside current known elevational range.
Calochortus plummerae	Plummer's mariposa lily			4.2	Perennial bulbiferous herb. Granitic and rocky areas in chaparral, cismontane woodland, coastal scrub, lower montane coniferous forest, and grassland; 328–5,576 ft. Southern California County Distribution: Los Angeles, Orange, Riverside, San Bernardino, Ventura. Blooming period: May–July	Not expected to occur; limited marginally suitable habitat.

TABLE 3
SPECIAL STATUS PLANT SPECIES
POTENTIALLY OCCURRING IN THE PROJECT REGION

Scientific Name	Common Name	USFWS	CDFW	CRPR	Species Background	Potential
Castilleja gleasoni	Mt. Gleason paintbrush		SR	1B.2	Hemiparasitic perennial herb. Granitic soils in chaparral, lower montane coniferous forests, and Pinyon and juniper woodland; 3,805–7,118 ft. Southern California County Distribution: Los Angeles. Blooming period: May–September	Not expected to occur; outside current known elevational range.
Centromadia parryi ssp. *australis*	southern tarplant			1B.1	Annual herb. Found within the margin of marshes and swamps, vernally mesic soils in grassland, and vernal pools; 0–1,574 ft. Southern California County Distribution: Los Angeles, Orange, San Diego, Ventura. Blooming period: May–November	Not expected to occur; no suitable habitat.
Centromadia pungens ssp. *laevis*	smooth tarplant			1B.1	Annual herb. Alkaline soils in chenopod scrub, meadows and seeps, playas, riparian woodland, and grassland; 0–2,100 ft. Southern California County Distribution: Los Angeles, Riverside, San Bernardino, San Diego. Blooming period: April–September	Not expected to occur; records in the region are historic.
Chorizanthe parryi var. *fernandina*	San Fernando Valley spineflower	FC	SE	1B.1	Annual herb. Sandy soil in coastal scrub and grassland; 492–4,002 ft. Southern California County Distribution: Los Angeles, Orange (Presumed extirpated), Ventura. Blooming period: April–July	Not expected to occur; records in the region are historic.
Chorizanthe parryi var. *parryi*	Parry's spineflower			1B.1	Annual herb. Sandy or rocky openings in chaparral, coastal scrub, cismontane woodland, and grassland; 902–4,001 ft. Southern California County Distribution: Los Angeles, Riverside, San Bernardino. Blooming period: April–June	Not expected to occur; records in the region are historic.
Cladium californicum	California sawgrass			2B.2	Perennial rhizomatous herb. Meadows, seeps, marshes, and swamps either alkaline or freshwater; 197–2,837 ft. Southern California County Distribution: Los Angeles (Presumed extirpated), Riverside, San Bernardino. Blooming period: June–September	Not expected to occur; records in the region are historic.
Dodecahema leptoceras	slender-horned spineflower	FE	SE	1B.1	Annual herb. Sandy soils in chaparral, cismontane woodland, and alluvial fan coastal scrub; 656–2,493 ft. Southern California County Distribution: Los Angeles, Riverside, San Bernardino. Blooming period: April–June	Not expected to occur; records in the region are historic.
Dudleya multicaulis	many-stemmed dudleya			1B.2	Perennial herb. Often in clay soils in chaparral, coastal scrub, and grassland; 49–2,591 ft. Southern California County Distribution: Los Angeles, Orange, Riverside, San Bernardino, San Diego. Blooming period: April–July	Not expected to occur; limited, marginally suitable habitat; few records in the region.

TABLE 3
SPECIAL STATUS PLANT SPECIES
POTENTIALLY OCCURRING IN THE PROJECT REGION

Scientific Name	Common Name	USFWS	CDFW	CRPR	Species Background	Potential
Galium grande	San Gabriel bedstraw			1B.2	Deciduous shrub. Chaparral, cismontane woodland, broadleafed upland and lower montane coniferous forest; 1,394–4,920 ft. Southern California County Distribution: Los Angeles. Blooming period: January–July	Not expected to occur; no suitable habitat.
Helianthus nuttallii ssp. *parishii*	Los Angeles sunflower			1A	Perennial rhizomatous herb. Coastal salt and freshwater marshes and swamps; 33–5,494 ft. Southern California County Distribution: Los Angeles (Presumed extirpated), Orange (Presumed extirpated), San Bernardino (Presumed extirpated). Blooming period: August–October	Not expected to occur; records in the region are historic.
Horkelia cuneata var. *puberula*	mesa horkelia			1B.1	Perennial herb. Sandy and gravelly soils in maritime chaparral, cismontane woodland, and coastal scrub; 229–2,657 ft. Southern California County Distribution: Los Angeles, Orange, Riverside (Presumed extirpated), San Bernardino, San Diego (Presumed extirpated), Ventura. Blooming period: February–July (September)	Not expected to occur; records in the region are historic.
Imperata brevifolia	California satintail			2B.1	Perennial rhizomatous herb. Mesic soils in chaparral, coastal scrub, Mojavean desert scrub, riparian scrub, meadows and seeps (often alkali); 0–3,985 ft. Southern California County Distribution: Imperial, Kern, Los Angeles, Orange, Riverside, San Bernardino, Ventura. Blooming period: September–May	Not expected to occur; limited, marginally suitable habitat; few records in the region.
Lasthenia glabrata ssp. *coulteri*	Coulter's goldfields			1B.1	Annual herb. Coastal salt marsh, coastal salt swamps, playas, vernal pools; 3–4,001 ft. Southern California County Distribution: Kern (Presumed extirpated), Los Angeles (Presumed extirpated), Orange, Riverside, San Bernardino (Presumed extirpated), San Diego, Ventura. Blooming period: February–June	Not expected to occur; no suitable habitat.
Lepidium virginicum var. *robinsonii*	Robinson's pepper-grass			4.3	Annual herb. Openings in chaparral and sage scrub; below 2,900 ft. Southern California County Distribution: Los Angeles, Orange, Riverside, San Bernardino, San Diego, Ventura. Blooming Period: January–July	Not expected to occur; limited marginally suitable habitat.
Linanthus concinnus	San Gabriel linanthus			1B.2	Annual herb. Rocky openings in chaparral, lower and upper montane coniferous forest; 4,986–9,184 ft. Southern California County Distribution: Los Angeles, San Bernardino. Blooming period: April–July	Not expected to occur; outside current known elevational range.
Malacothamnus davidsonii	Davidson's bush-mallow			1B.2	Deciduous shrub. Chaparral, coastal scrub, cismontane and riparian woodland; 607–2,804 ft. Southern California County Distribution: Kern, Los Angeles, Ventura. Blooming period: June–January	Not expected to occur; limited marginally suitable habitat.

TABLE 3
SPECIAL STATUS PLANT SPECIES
POTENTIALLY OCCURRING IN THE PROJECT REGION

Scientific Name	Common Name	USFWS	CDFW	CRPR	Species Background	Potential
Pseudognaphalium leucocephalum	white rabbit-tobacco			2B.2	Perennial herb. Sandy or gravelly soils in chaparral, cismontane woodland, coastal scrub, and riparian woodland; 0–6,888 ft. Southern California County Distribution: Los Angeles, Orange, Riverside, San Diego. Blooming period: July–December	Not expected to occur; records in the region are historic.
Ribes divaricatum var. *parishii*	Parish's gooseberry			1A	Deciduous shrub. Riparian woodland; 213–984 ft. Southern California County Distribution: Los Angeles (Presumed extirpated), San Bernardino (Presumed extirpated). Blooming period: February–April	Not expected to occur; records in the region are historic.
Sidalcea neomexicana	salt spring checkerbloom			2B.2	Perennial herb. Alkaline and mesic soils in chaparral, coastal scrub, lower montane coniferous forest, Mojavean desert scrub, and playas; 49–5,020 ft. Southern California County Distribution: Kern, Los Angeles (Presumed extirpated), Orange, Riverside, San Bernardino, San Diego, Ventura. Blooming period: March–June	Not expected to occur; limited marginally suitable habitat.
Symphyotrichum greatae	Greata's aster			1B.3	Perennial rhizomatous herb. Mesic soils in chaparral, cismontane and riparian woodland, broadleaved upland and lower montane coniferous forest; 984–6,593 ft. Southern California County Distribution: Los Angeles, San Bernardino, Ventura. Blooming period: June–October	Not expected to occur; no suitable habitat.

Species Background: California Native Plant Society (CNPS). 2018 (January 25). Inventory of Rare and Endangered Plants (online edition, v8-03). Sacramento, CA: CNPS. http://www.rareplants.cnps.org/.

Listing Status: California Department of Fish and Wildlife (CDFW). 2018 (January). Special Vascular Plants, Bryophytes, and Lichens List. Sacramento, CA: CDFW, Natural Heritage Division.

USFWS: U.S. Fish and Wildlife Service; CDFW: California Department of Fish and Wildlife; CRPR: California Rare Plant Rank; ft: feet

Species Status:

Federal (USFWS)

FE Endangered
FT Threatened

State (CDFW)

SE Endangered
ST Threatened
SR Rare

CRPR

1A Plants presumed extirpated in California and either rare or extinct elsewhere
1B Plants Rare, Threatened, or Endangered in California and elsewhere
2B Plants Rare, Threatened, or Endangered in California, but more common elsewhere
4 Plants of limited distribution - watch list

CRPR Threat Code Extension

None: Plants lacking any threat information
.1 Seriously threatened in California (over 80% of occurrences threatened; high degree and immediacy of threat)
.2 Moderately threatened in California (20–80% of occurrences threatened; moderate degree and immediacy of threat)
.3 Not very threatened in California (<20% of occurrences threatened; low degree and immediacy of threat or no current threats known)

3.5.4 Special Status Wildlife

Many special status wildlife species have potential to occur in the project region (Table 4). A brief description of the habitat the species occurs in with the potential to occur on the project site is included. Note that these species are grouped by taxon and listed alphabetically according to their scientific name.

Additionally, several CDFW Watch List species are reported from the project region but are not included in the table below such as: orange-throated whiptail (*Aspidoscelis hyperythra*), California mountain kingsnake (San Bernardino population) (*Lampropeltis zonata parvirubra*), sharp-shinned hawk (*Accipiter striatus*), Cooper's hawk (*Accipiter cooperii*), merlin (*Falco columbarius*), California horned lark (*Eremophila alpestris actia*), southern California rufous-crowned sparrow (*Aimophila ruficeps canescens*), and Bell's sage sparrow (*Artemisiospiza belli belli*). The orange-throated whiptail (Aspidoscelis hyperythra), Cooper's hawk, sharp-shinned hawk, merlin, and southern California rufous-crowned sparrow may occur on the project site. Cooper's hawk and southern California rufous-crowed sparrow may occur for nesting.

TABLE 4
SPECIAL STATUS WILDLIFE SPECIES REPORTED FROM THE PROJECT AREA

Species	General Habitat/Range Description	USFWS	CDFW	Critical Habitat Present in the Study Area[a]	Potential for Occurrence
Fish					
Gila orcuttii arroyo chub	Occurs in coastal freshwater streams and rivers with sustained flows and emergent vegetation with substrates consisting primarily of sand or mud.	–	SSC	–	Not expected to occur; no suitable habitat.
Rhinichthys osculus ssp. 3 Santa Ana speckled dace	Occurs in perennial streams with riffle habitats in clean, rocky-bottomed streams and rivers.	–	SSC	–	Not expected to occur; no suitable habitat.
Catostomus santaanae Santa Ana sucker	Occurs in shallow streams with flows that run from slow to swift. Stream substrates consist of boulders, gravel, and cobble where there are growths of filamentous algae. This species is occasionally found on sandy or muddy substrates.	FT	SSC	No	Not expected to occur; no suitable habitat.
Amphibians					
Taricha torosa Coast Range newt	Found in wet forests, oak forests, chaparral, and rolling grasslands. In Southern California, drier chaparral, oak woodland, and grasslands are used.	–	SSC	–	Not expected to occur; no suitable habitat.
Anaxyrus [*Bufo*] *californicus* arroyo toad	Occurs in semi-arid regions near washes or intermittent streams. Streams must be of low velocity with sand or gravel substrate.	FE	SSC	No	Not expected to occur; no suitable habitat.
Rana draytonii California red-legged frog	Occurs in deep ponds and slow-moving streams with emergent vegetation in forests, woodlands, grasslands, streams, wetlands, ponds, and lakes from sea level to 8,000 feet above msl.	FT	SSC	No	Not expected to occur; no suitable habitat.
Rana muscosa Southern Mountain yellow-legged frog	Occurs in small, isolated populations in the San Gabriel, San Bernardino, and San Jacinto Mountains in narrow, rock-walled rivers, perennial creeks, and permanent plunge pools with intermittent creeks and pools in montane riparian and/or chaparral between 1,200 and 7,500 feet above msl.	FE	SSC	No	Not expected to occur; no suitable habitat.

TABLE 4
SPECIAL STATUS WILDLIFE SPECIES REPORTED FROM THE PROJECT AREA

Species	General Habitat/Range Description	USFWS	CDFW	Critical Habitat Present in the Study Area[a]	Potential for Occurrence
Spea hammondii Western Spadefoot	Occurs in a wide range of habitats; lowlands to foothills, grasslands, open chaparral, pine-oak woodlands. It prefers shortgrass plains, sandy or gravelly soil (e.g., alkali flats, washes, alluvial fans). It is fossorial and breeds in temporary rain pools and slow-moving streams (e.g., areas flooded by intermittent streams).	–	SSC	–	Not expected to occur; no suitable habitat.
Reptiles					
Emys marmorata western pond turtle	Occurs in ponds, lakes, marshes, rivers, streams, and irrigation ditches with a rocky or muddy bottom and aquatic vegetation at elevations from sea level to approximately 6,696 feet above msl.	–	SSC	–	Not expected to occur; no suitable habitat.
Phrynosoma blainvillii coast horned lizard	Occurs in scrubland, grassland, coniferous forests, and broadleaf woodland vegetation types.	–	SSC	–	Not expected to occur; limited marginally suitable habitat.
Aspidoscelis tigris stejnegeri San Diegan tiger whiptail	Occurs in hot and dry areas with sparse foliage and open areas. Found in forests, woodland, chaparral, and riparian areas.	–	–	–	May occur; potentially suitable habitat.
Anniella sp. California legless lizard	Requires areas with loose sandy soil, moisture, warmth, and plant cover, including leaf litter. Occurs in coastal dune, valley-foothill, chaparral, and coastal scrub types at elevations between sea level and approximately 1,800 m (6,000 ft).	–	SSC	–	May occur; potentially suitable habitat.
Arizona elegans occidentalis California glossy snake	Occurs most commonly in desert habitats but also occur in chaparral, sagebrush, valley-foothill hardwood, pine-juniper, and annual grass, elevation from below sea level to 7,000 feet. Prefer open sandy areas with scattered brush, but also found in rocky areas.	–	SSC	–	Not expected to occur; limited marginally suitable habitat
Thamnophis hammondii two-striped garter snake	Occurs in wetlands, freshwater marsh, and riparian habitats with perennial water.	–	SSC	–	May occur; limited potentially suitable habitat.

TABLE 4
SPECIAL STATUS WILDLIFE SPECIES REPORTED FROM THE PROJECT AREA

Species	General Habitat/Range Description	USFWS	CDFW	Critical Habitat Present in the Study Area[a]	Potential for Occurrence
Birds					
Gymnogyps californianus California condor	Occurs in mountainous country at low to moderate elevations, especially rocky and brushy areas with cliffs available for nest sites. Foraging habitat includes grasslands, oak savannas, mountain plateaus, ridges, and canyons. In lower elevation mountains, they require areas where wind conditions are suitable for take-offs.	FE	SE	No	Not expected to occur; no suitable habitat.
Coccyzus americanus occidentalis western yellow-billed *cuckoo (nesting)*	Uncommon to rare summer resident of valley foothill and desert riparian habitats in scattered locations in California. Requires broad areas of old-growth riparian habitats dominated by willows and cottonwoods with dense understory vegetation.	FT	SE	No	Not expected to occur; no suitable habitat.
Asio otus long-eared owl (nesting)	Occurs in dense woodlands adjacent to open grassland or shrubland, and open forests.	–	SSC	–	May occur for foraging; limited potentially suitable habitat.
Cypseloides niger black swift	Nesting typically occurs in a moist crevice or cave on a sea cliff above the surf or on cliffs behind or adjacent to waterfalls in deep canyons.	–	SSC	–	Not expected to occur; no suitable habitat.
Empidonax traillii extimus southwestern willow flycatcher	Occurs in extensive (greater than 20 acres) riparian habitats along rivers, streams, or other wetlands where dense growth of willows, mule fat, arrow-weed (*Pluchea sericea*), tamarisk (*Tamarix* sp.), or other plants are present, often with a scattered overstory of cottonwood	FE	SE	No	Not expected to occur; lack of suitable habitat of sufficient quantity for breeding. It is noted, the species has not been observed breeding in Los Angeles County in several decades.
Buteo swainsoni Swainson's hawk	Forages in savanna, open pine-oak woodland, and agricultural lands with scattered trees.	–	ST	–	Not expected to occur for breeding; breeding in the county is restricted to the Antelope Valley, no breeding records in the project region since 1919 (one breeding record between 1880-1919) (Allen et al. 2016); may occur as a migrant fly-over.

TABLE 4
SPECIAL STATUS WILDLIFE SPECIES REPORTED FROM THE PROJECT AREA

Species	General Habitat/Range Description	USFWS	CDFW	Critical Habitat Present in the Study Area[a]	Potential for Occurrence
Aquila chrysaetos golden eagle	Uncommon permanent resident and migrant throughout California, except center of Central Valley. More common in southern California than in north. Ranges from sea level up to 3833 m (0-11,500 ft). Generally, occurs in rolling foothills, mountain areas, sage-juniper flats, and desert habitats. Breeding in Southern California breeding birds are primarily restricted to rugged, mountainous country (Garrett and Dunn 1981).	–	FP	–	Not expected to occur for breeding; marginally suitable breeding and foraging habitat due to proximity to developed areas; may occur as a fly-over.
Athene cunicularia burrowing owl (burrow and wintering sites)	Breeds and forages in grasslands and prefers flat to low, rolling hills in treeless terrain. Nests in burrows, typically in open habitats, most often along banks and roadsides.	–	SSC	–	Not expected to occur; no suitable habitat.
Vireo bellii pusillus least Bell's vireo (nesting)	Riparian habitats dominated by willows with dense understory vegetation between sea level and 1,500 feet above msl.	FE	SE	No	Limited potential to occur; marginal potentially suitable habitat
Riparia riparia bank swallow	Breeds in riparian areas with vertical cliffs and banks with fine-textured sandy soil in which it digs nesting holes.	–	ST	–	Not expected to occur; no suitable habitat.
Polioptila californica californica coastal California gnatcatcher	In California, this species is an obligate resident of several distinct sub-associations of the coastal sage scrub vegetation type. The gnatcatcher has been recorded from sea level to approximately 3,000 feet above msl (USFWS 2003); however, greater than 90 percent of gnatcatcher records are from between sea level and 820 feet above msl along the coast and between sea level and 1,800 feet above msl inland (Atwood and Bolsinger 1992).	FT	SSC	No	Not expected to occur; sagescrub habitat on site too isolated and limited in size to support the gnatcatcher.
Icteria virens yellow-breasted chat	For nesting, this species requires dense, brushy tangles near water and riparian woodlands that support a thick understory.	–	SSC	–	Not expected to occur; no suitable habitat.

TABLE 4
SPECIAL STATUS WILDLIFE SPECIES REPORTED FROM THE PROJECT AREA

Species	General Habitat/Range Description	USFWS	CDFW	Critical Habitat Present in the Study Area[a]	Potential for Occurrence
Agelaius tricolor tricolored blackbird (nesting)	This colonial nesting species prefers to breed in freshwater marshes dominated by cattails (*Typha* spp.) and bulrushes (*Scirpus* or *Schoenoplectus* spp.), with willows (*Salix* spp.) and nettles (*Urtica* spp.) also common. The introduced mustards (*Brassica* spp.), blackberries (*Rubus* spp.), thistles (*Circium* spp.), and mallows (*Malva* spp.) have been commonly used for several decades.	–	SCE, SSC	–	Not expected to occur; no suitable habitat.
Setophaga petechia yellow warbler	Riparian habitats dominated by willows with dense understory vegetation between sea level and 9,000 feet above msl.	–	SSC	–	May occur; potentially suitable habitat.
Mammals					
Bassariscus astutus Ring-tailed cat	Dry, rocky, or mountainous areas with scattered oaks and conifers. Dens among rock crevices or in burrows, hollow trees, or attics by day. Strictly nocturnal, seldom emerges before dark. Fairly common throughout range.	–	FP	–	Limited potential to occur; potentially suitable habitat
Neotoma lepida intermedia San Diego desert woodrat	Common to abundant in Joshua tree, Pinyon-juniper, mixed and chamise-redshank chaparral, sagebrush, and most desert habitats. Also found in a variety of other habitats. Most abundant in rocky areas with Joshua trees. Elevational range from sea level to 2600 m (8500 ft). Northern and elevational distribution may be limited by temperature.	–	SSC	–	May occur; potentially suitable habitat.
Onychomys torridus southern grasshopper mouse	Common in arid desert habitats of the Mojave Desert and southern Central Valley of California. Alkali desert scrub and desert scrub habitats are preferred, with somewhat lower densities expected in other desert habitats, including succulent shrub, wash, and riparian areas. Also occurs in coastal scrub, mixed chaparral, sagebrush, low sage, and bitterbrush habitats.	–	SSC	–	May occur; potentially suitable habitat

TABLE 4
SPECIAL STATUS WILDLIFE SPECIES REPORTED FROM THE PROJECT AREA

Species	General Habitat/Range Description	USFWS	CDFW	Critical Habitat Present in the Study Area[a]	Potential for Occurrence
Choeronycteris mexicana Mexican long-tongued bat	Occurs in arid habitats and roosts in caves, buildings, crevices, and mines. Species typically found in dimly lit areas near preferred food source of ornamental trees or large native plants with sufficient nectar, including agaves, cacti, avocado, banana plants, etc.	–	SSC	–	Not expected to occur for foraging or roosting; site or vicinity contains no vegetation with suitable nectar sources.
Macrotus californicus California leaf-nosed bat	Occurs in desert lowlands. The species roosts in caves and cave-like structures, and forages in desert washes and floodplains, and dry, sandy washes with riparian tree vegetation. Extirpated from all known non-desert sites north of San Diego.	–	SSC	–	Not expected to occur; outside known range.
Antrozous pallidus pallid bat	Occurs in grasslands, shrublands, and woodlands and in open habitats with rocky areas or man-made structures for roosting. Species can also roost in caves and trees. Species typically forages in rural or undeveloped, natural areas and is mostly absent in urban and suburban areas.	–	SSC	–	May occur for roosting and foraging; potentially suitable habitat.
Corynorhinus townsendii Townsend's big-eared bat	Occurs in oak woodlands, arid deserts, grasslands, along the coast, and high-elevation forests and meadows. Population centers occur near large, minimally-disturbed cavities, including both natural caves and man-made structures.	–	SSC	–	May occur for foraging, not expected to occur for roosting.
Lasiurus blossevillii western red bat	Roosts in trees typically associated with riparian habitats where cottonwoods, oaks, sycamores, and walnuts are present. Also known to roost in orchards trees.	–	SSC	–	May occur for roosting and foraging, potentially suitable habitat.
Lasiurus xamtjomis western yellow bat	This is a tree-roosting species most commonly found roosting in groves of palm trees with skirts of dead fronds. Also documented roosting in large cottonwood trees. Found in the arid environment of the southwestern U.S., the Mexican Plateau, and coastal western Mexico.	–	SSC	–	Low potential to occur for foraging and not expected for roosting, marginal potentially suitable foraging habitat, no potentially suitable roosting habitat.

TABLE 4
SPECIAL STATUS WILDLIFE SPECIES REPORTED FROM THE PROJECT AREA

Species	General Habitat/Range Description	USFWS	CDFW	Critical Habitat Present in the Study Area[a]	Potential for Occurrence
Eumops perotis californicus western mastiff bat	Found in many open semi-arid to arid habitats, including conifer and deciduous woodlands, coastal scrub, grasslands, palm oases, chaparral, desert scrub, and urban areas. Typically forages in open areas with high cliffs and roosts in crevices on cliff faces and occasionally in man-made structures with at least 15 feet of unobstructed space below roost.	–	SSC	–	May occur for foraging; not expected to occur for roosting; potentially suitable foraging habitat, no suitable roosting habitat.
Nyctinomops macrotis big free-tailed bat	Feeds primarily on moths caught while flying over water sources in suitable habitat in the southwestern U.S. This migratory species prefers rugged, rocky terrain and roosts in crevices in high cliffs or rocky outcrops. Uncommon in Southern California.	–	SSC	–	Not expected to occur for roosting or foraging; no suitable roosting habitat onsite and no records in the project region.
Lepus californicus bennettii San Diego black-tailed jackrabbit	Occurs in herbaceous and desert-shrub areas and open, early stages of forest and chaparral habitats.	–	SSC	–	May occur; potentially suitable habitat.
Taxidea taxus American badger	Most abundant in the drier open stages of most shrub, forest, and herbaceous habitats, with friable soils. When inactive, occupies underground burrow.	–	SSC	–	Not expected to occur; no suitable habitat.

USFWS: U.S. Fish and Wildlife Service; CDFW: California Department of Fish and Wildlife; USFS: U.S. Forest Service; msl: mean sea level

Status Definitions

Federal (USFWS) Status
FE Endangered
FT Threatened
FC Candidate

State (CDFW) Status
SE Endangered
ST Threatened
SCE Candidate Endangered
SSC Species of Special Concern
FP California Fully Protected

Notes: Scientific and common names for wildlife species follow the most current list of Special Animals (October 2017) available from the CDFW (https://www.wildlife.ca.gov/Data/CNDDB/Plants-and-Animals).

[a] Critical Habitat only applies to USFWS-listed species. As such, any species without a USFWS listing, will have a "–".

4.0 PROJECT IMPACTS

4.1 INTRODUCTION

The determination of impacts in this analysis is based on the disturbance limits of the project and maps of biological resources on the project site. All construction activities, including staging, grading, and equipment storage areas, are contained within the impact areas. Impacts acreages are shown in Table 4 below. Both direct and indirect impacts on biological resources have been evaluated. Direct impacts are those that involve the initial loss of habitats due to grading, construction-related activities, and fuel modification. Indirect impacts are those that would be related to impacts on the adjacent remaining habitat due to construction activities (e.g., noise, dust) or operation of the project (e.g., increased human activity, indirect lighting, non-native species).

Biological impacts associated with the proposed project were evaluated with respect to the following special status biological issues:

- Federally or State-listed Endangered or Threatened plant or wildlife species.
- Non-listed species that meet the criteria in the definition of “Rare” or “Endangered” in the CEQA guidelines.
- Streambeds, wetlands, and their associated vegetation.
- Habitats suitable to support a federally or State-listed Endangered or Threatened plant or wildlife species.
- Species designated as California Species of Special Concern.
- Habitat, other than wetlands, considered special status by regulatory agencies (USFWS and/or CDFW) or resource conservation organizations.
- Other species or issues of concern to regulatory agencies or conservation organizations (e.g., CNPS).

The actual and potential occurrence of these resources on the project site was correlated with the following significance criteria to determine whether the proposed project’s impacts on these resources would be considered significant.

4.2 SIGNIFICANCE CRITERIA

Appendix G of the CEQA Guidelines contains the Initial Study Environmental Checklist form which includes questions relating to biological resources. The issues presented in the Initial Study Checklist have been utilized as thresholds of significance in this section. Accordingly, a project may create a significant environmental impact if one or more of the following occurs:

- If the project has 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.
- If the project has 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.

- If the project has a substantial adverse effect on State or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.
- If the project interferes substantially with the movement of any native or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impedes the use of native wildlife nursery sites.
- If the project conflicts with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.
- If the project conflicts with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

Section 15065(a), Mandatory Findings of Significance, of the State CEQA Guidelines states that a project may have a significant effect on the environment if "the project has the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of an endangered, rare or threatened species."

An evaluation of whether an impact on biological resources would be substantial must consider both the resource itself and how that resource fits into a regional or local context. The proposed project's regional setting includes the western San Gabriel Valley and San Gabriel Mountains foothills. Substantial impacts would be (1) those that would substantially diminish, or result in the loss of, an important biological resource or (2) those that would obviously conflict with local, State or federal resource conservation plans, goals, or regulations. Impacts are sometimes locally adverse but not significant because, although they would result in an adverse alteration of existing conditions, they would not substantially diminish or result in the permanent loss of an important resource on a population- or region-wide basis.

Section 15380 of the State CEQA Guidelines indicates that a lead agency can consider a non-listed species to be Rare or Endangered for the purposes of CEQA if the species can be shown to meet the criteria in the definition of Rare or Endangered. For the purposes of this discussion, the current scientific knowledge on the population size and distribution for each special status species was considered according to the definitions for Rare and Endangered listed in Section 15380 of the State CEQA Guidelines.

The actual and potential occurrence of these resources within the project vicinity was correlated with the significance criteria to determine whether the impacts of the proposed project on these resources would be significant.

Potential impacts are grouped below according to topic. The numbered mitigation measures (MM) directly correspond to those impacts found to be potentially significant in the following analysis.

4.3 DIRECT IMPACTS

4.3.1 Vegetation Type Impacts

Vegetation types and other areas that will be impacted are listed in Table 5 and illustrated on Exhibit 9. As shown, a total of 0.57 acre of native vegetation types, 0.06 acre of non-native vegetation types, and 0.17 acre of other (i.e., disturbed and developed) areas would be impacted by project construction.

TABLE 5
VEGETATION TYPES AND OTHER AREAS IMPACTED BY THE PROPOSED PROJECT

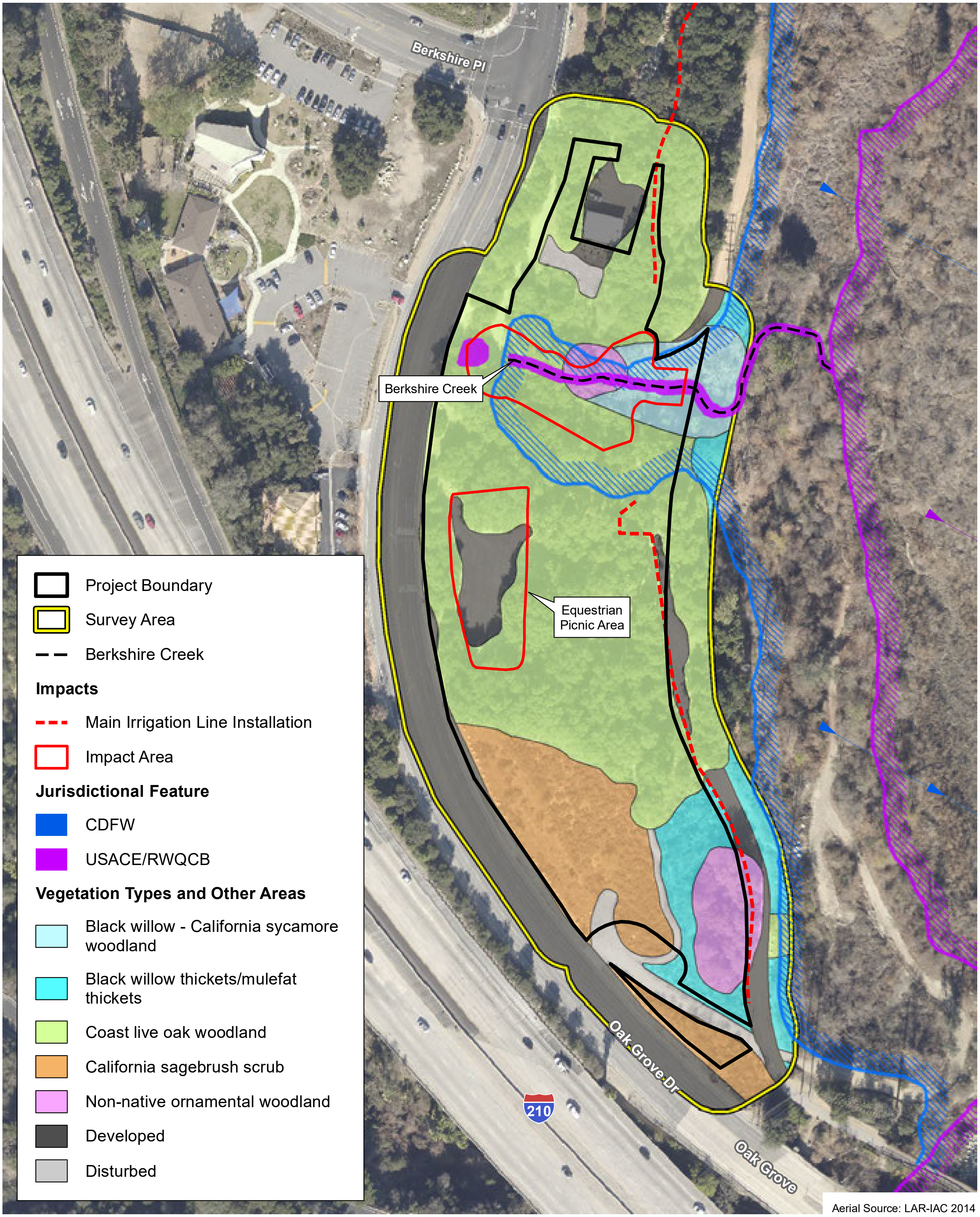
Vegetation Type/Other Area	Impacted (acres)	No Impact (acres)	Total (acres)
Native Vegetation Types			
black willow – California sycamore woodland	0.09	0.08	0.17
black willow thickets/mulefat thickets	-	0.21	0.21
coast live oak woodland	0.48	2.57	3.05
California sagebrush scrub	-	0.72	0.72
Subtotal Native Vegetation Types	**0.57**	**3.58**	**4.15**
Non-Native Vegetation Types			
non-native ornamental woodland	0.06	0.23	0.28
Subtotal Non-Native Vegetation Types	**0.06**	**0.23**	**0.28**
Other Areas			
developed	0.17	0.06	0.23
disturbed	-	0.10	0.10
Subtotal Other Areas	**0.17**	**0.16**	**0.33**
Total	**0.80**	**3.97**	**4.79**
Note: Additional impact acreage for coast live oak woodland will occur during restoration activities and is listed in the oak woodland vegetation description below.			

Black Willow – California Sycamore Woodland

0.09 acres of black willow – California sycamore woodland are subject to project impacts. The proposed project is expected to result in only minor temporary impacts. Implementation of the project is not expected to result in any measurable negative effect on this vegetation type and no mitigation would be considered necessary. Long term effects of the project are expected to substantially benefit vegetation as a result of increased habitat health and resulting functions and values.

Coast Live Oak Woodland

0.48 acres of coast live oak woodland are subject to project impacts. An additional approximately 1.69 acres of coast live oak woodland will be impacted with the installation of coast live oak trees for restoration purposes. The proposed project is expected to result in only minor temporary impacts. Implementation of the project is not expected to result in any measurable negative effect on this vegetation type and no mitigation would be considered necessary. Long term effects of the project are expected to substantially benefit vegetation as a result of increased habitat health and resulting functions and values.



Biological Resources Impacts

Exhibit 9

Berkshire Creek Area Improvements Project

N W E S

150 75 0 150 Feet

PSOMAS

(Rev: 05/22/2019 MMD) R:\Projects\PAS_Pasaden\3PAS010801\Graphics\Berkshire_Creek\Biotech\ex_Bio_Impacts.pdf

Non-Native Ornamental Woodland

0.05 acres non-native ornamental woodland are subject to project impacts. Impacts on these areas would be considered less than significant because these areas are considered to have a low biological value; therefore, no mitigation would be necessary.

Developed

0.17 acres of developed areas would be impacted by project implementation. Impacts on these areas would be considered less than significant because these areas are considered to have a low biological value; therefore, no mitigation would be necessary.

4.3.2 Jurisdictional Resources

Within riparian areas, the project would impact a total of 0.09 acre of non-wetland "Waters of the U.S." under the jurisdiction of the USACE and the RWQCB. (Exhibit 9). No wetland "waters of the United States were detected on-site. The project would impact a total of 0.36 acre of waters under the jurisdiction of the CDFW. Jurisdictional resources are protected by Sections 401 and 404 of the CWA and by the *California Fish and Game Code* (Sections 1600 through 1616). Impacts to jurisdictional features would be considered significant before mitigation. Compliance with Clean Water Act and *California Fish and Game Code* regulations would require the City to obtain permits from the USACE, RWQCB, and CDFW. Additionally, MM BIO-1 requires a minimum level of equal, or greater, replacement of permanently lost jurisdictional resources. Through compliance with regulatory requirements and implementation of MM BIO-1, impacts to jurisdictional resources would be reduced to a less than significant level.

Although implementation of the project is expected to result in a minor permanent loss of jurisdictional stream bed, the long term effects of the project are expected to substantially benefit jurisdictional resources as a result of increased habitat health and resulting functions and values.

4.3.3 Jurisdictional Trees

The only local ordinance protecting biological resources in the City of Pasadena is Ordinance No. 6896 "City Trees and Tree Protection Ordinance" (codified in Chapter 8.52 of the Pasadena Municipal Code). This ordinance was set forth with the goal of protecting landmark, native, and specimen trees so that the tree canopy cover in the City is preserved and expanded. The proposed project would result in the displacement of Public Trees, including the removal of 4 native and 81 non-native trees as part of habitat restoration efforts and vegetation removal to accommodate the proposed improvements (see Appendix B-2). The project is required to comply with the City Trees and Tree Protection Ordinance. Moreover, the project is intended to increase the number of native trees throughout the project area and includes approximately 90 new tree planting locations. Therefore, the project would not conflict with the applicable local ordinance. There would be a less than significant impact and no mitigation is required in this regard. Some tree may also be regulated as riparian trees associated with Water of the State. Impacts to these trees include the four native trees impacted within the Berkshire Creek Component (see Appendix B-2) may be considered potentially significant. Through compliance with regulatory requirements and implementation of MM BIO-1 as described in section 4.2.2 above, impacts to jurisdictional riparian trees would be reduced to a less than significant level.

4.3.4 Wildlife Impacts

To assess impacts on wildlife, the total impact on vegetation types that provide potential habitat for that wildlife species was evaluated. A summary of impacts on vegetation types (i.e., wildlife habitat) that would be impacted as a result of project construction is shown in Table 4, Section 4.3.1. The distribution of these vegetation types and relation to the project impact boundary is shown in Exhibit 9. The following discussion of wildlife impacts focuses on the common species occurring on the project site. Impacts on special status wildlife species are discussed separately in Section 4.3.3 of this report.

General Habitat and Wildlife Loss

The proposed project would result in very minimal loss of native habitat, which provides limited nesting, foraging, roosting, and denning opportunities for wildlife species. In addition, implementation of the proposed project would result in the loss of non-native habitats that provide lower quality wildlife habitat. However, these non-native habitats do provide limited nesting, foraging, roosting, and denning opportunities for some species. Removing or altering habitats on the project site would result in the loss of small mammals, reptiles, amphibians, and other animals of slow mobility that live in the proposed project's direct impact area. More mobile wildlife species now using the project site would be forced to move into remaining areas of open space, consequently increasing competition for available resources in those areas. Although unlikely due to the project's small footprint, this situation may result in the loss of individuals that cannot successfully compete. The proposed project would impact some native habitat; however, it would overall enhance native habitat and increase biological value of all habitats on the project site. Project implementation would not substantially reduce wildlife populations in the region due to the extremely small percentage of regional habitat effected, nor would it reduce any specific wildlife population in the region to below self-sustaining numbers. Therefore, project impacts on wildlife would be considered adverse but less than significant and no mitigation is required.

Wildlife Movement and Habitat Fragmentation

Construction activities would create very minimal dust and noise within and adjacent to the work areas. During active construction, wildlife movement may be deterred by noise and human activity; however, most wildlife movement would occur at night while construction activities would occur during the day. In addition, construction activities would be temporary in nature and are not expected to impact wildlife movement patterns in the area to any measurable degree.

Although regional wildlife movement does occur within the general area through open-spaces and native vegetation of the Arroyo Seco and adjacent lands, as previously described, the ability of the project site specifically to support regional wildlife movement has been compromised by surrounding development. As a result, the project site supports the movement of almost exclusively local wildlife, that also readily use surrounding areas. As such, the project site has very little potential to support critical regional wildlife movement. Moreover, given the limited geographic footprint of the project (approximately 4.7 acres) within the larger Hahamongna Watershed Park (approximately 1,300 acres), any regional wildlife movement occurring on the project site would continue to occur in the land surrounding the project footprint with limited, if any, disruption during project construction. Upon completion of project construction, the project would have no adverse impact on regional wildlife movement.

Direct and indirect impacts, such as increased light, noise pollution and human activity are considered adverse but less than significant since the loss of local movement areas would not have a substantial effect on regional wildlife populations. In addition, greater opportunities for regional movement would still be available in the general region. Therefore, these impacts would be considered adverse but less than significant, and no mitigation is required.

4.3.5 Special Status Biological Resource Impacts

Special Status Plants

No special status species are expected to occur within the project site. Although one special status species, Nevin's barberry, was initially determined to have limited potential to occur as a result of the literature review, a focused survey determined the species to be absent from the project site. The project would have no adverse impact on special status plant species, and no mitigation would be required.

Wildlife

The proposed project would result in the loss of potential habitat for 14 special status wildlife species. The following discussion evaluates impacts on those wildlife species observed and those that may occur on the project site. For those species with potential to occur, potential impacts were evaluated for the habitat which the species is expected to occupy.

Reptiles

Three special status reptile species potentially occur on the site: the coastal whiptail, two-striped garter snake, and silvery legless lizard. Although the proposed project would impact potential habitat for these species, they are not listed as Threatened or Endangered by State or federal resource agencies. The temporary loss of a small amount of native habitat may be considered an adverse impact on these species, but only a very small number of individuals would be affected relative to the much greater number of individuals that constitute the regional populations. As a result, the relatively minor temporary loss of habitat would not be expected to substantially reduce regional populations of these species. There would be no permanent adverse impacts on these species or their habitat. Additionally, implementation of the project would benefit these native habitats in the long term. Therefore, potential project impacts on these special status reptile species would be considered adverse but less than significant, and no mitigation is required.

Birds

Eight federally and/or State-listed Threatened or Endangered (or Candidate State-listed Endangered) bird species occur in the project region: California condor, western yellow-billed cuckoo, Swainson's hawk, southwestern willow flycatcher, least Bell's vireo, bank swallow, coastal California gnatcatcher, and tricolored blackbird.

The western yellow-billed cuckoo and southwestern willow flycatcher are not expected to occur because the riparian habitat on the project site is not expansive enough for the breeding needs of these species. Therefore, project implementation would not result in any impacts on these species, and no mitigation would be required.

The California sagebrush scrub on the project site is too limited in size and isolated to support the coastal California gnatcatcher. No impact to this species are expected and no mitigation would be required.

The California condor, Swainson's hawk, bank swallow, and tricolored blackbird are not expected to occur due to a lack of suitable habitat. No impact to these species are expected and no mitigation would be required.

The riparian vegetation on the project site is potentially suitable for least Bell's vireo. Although the extent of such habitat on the site is extremely limited, impacts to this species may be potentially significant. The project schedule of Fall 2019 has been designed in part to avoid any potential impact on least Bell's vireo by entirely avoiding the period when this species is potentially present in the region. The balance of the year, this species returns to non-breeding grounds in central and south America. Furthermore, implementation of MM BIO-2, requiring that work activities avoid impacts to nesting birds, would ensure avoidance and reduce this impact to a less than significant level.

One additional passerine bird species that is a California Species of Special Concern but is not listed as Threatened or Endangered by State or federal resources agencies potentially occurs on the project site: yellow warbler. If present, the proposed project would temporarily impact potential foraging and nesting habitat for this species. The temporary loss of foraging and nesting habitat would be considered an adverse impact but only a very small number of individuals would be affected relative to the much greater number of individuals comprising the regional population. As a result, the relatively minor temporary loss of habitat would not be expected to substantially reduce regional populations of this species. There would be no permanent adverse impacts on this species or its habitat. Therefore, project impacts on this special status bird species would be considered adverse but less than significant, and no mitigation is required.

One common raptor species, the red-tailed hawk, has the potential to nest on the project site. Should an active raptor nest be found on the project site, the loss of the nest would be considered a violation of *California's Fish and Game Code* (Sections 3503, 3503.5, and 3513). The loss of any active raptor nest occurring on the project site would be considered potentially significant. However, the project schedule of Fall 2019 has been designed in part to avoid the nesting season of local breeding raptors such as red-tailed hawk. Additionally, there would be no permanent adverse impacts on this species or its habitat. Implementation of MM BIO-2, requiring that work activities avoid impacts to nesting birds, would ensure avoidance and reduce this impact to a less than significant level.

<u>Mammals</u>

Special status mammal species potentially present on the project site include the ringtail cat, San Diego desert woodrat, southern grasshopper mouse, pallid bat, Townsend's big-eared bat, western red bat, western yellow bat, western mastiff bat, and San Diego black-tailed jackrabbit. Potential roosting habitat is present for the western red bat and pallid bat.

Temporary loss of habitat for the San Diego desert woodrat, southern grasshopper mouse, and San Diego black-tailed jackrabbit would be considered an adverse impact. However, only a very small number of individuals would be affected relative to the much greater numbers of individuals that constitute these regional populations. As a result, the relatively minor temporary loss of habitat would not be expected to substantially reduce regional populations of these species. In addition, there would be no permanent adverse impacts on these species or their habitat. Therefore, project impacts on these special status mammal species would be considered adverse but less than significant, and no mitigation is required.

The western red bat and pallid bat may also have potential to roost in or adjacent to the project area. Project implementation would result in the loss of some potential roosting habitat for these species. Direct impacts to roosting bats would be considered potentially significant. However, the project schedule of Fall 2019 has been designed in part to avoid potential impacts on bats by avoiding the period when these species may potentially breed or hibernate in colonies in the region. Implementation of MM BIO-3 would ensure avoidance and would reduce adverse impacts to a less than significant level by minimizing disturbance to roosting bats during construction through seasonal avoidance and a two-step habitat removal process. In conclusion, there would be no impacts to special status plant species and less than significant impacts on special status wildlife species with implementation of MMs BIO-2 through BIO-3.

4.4 INDIRECT IMPACTS

Indirect impacts are those related to disturbance by construction (such as noise, dust, and urban pollutants), long-term use of the project site, and the project's operational effect on the adjacent habitat areas. The indirect impact discussion below includes a general assessment of the potential indirect effects (noise, increased dust and urban pollutants, night lighting, and human activity) of the construction and operation of the proposed project.

4.4.1 Construction-Related Noise Impacts

Noise levels on the project site would increase over present levels during construction of the proposed project. During construction, temporary noise impacts have the potential to disrupt foraging, nesting, roosting, and denning activities for a variety of wildlife species. Because species on or adjacent to the project site are listed as Threatened or Endangered by State or federal resource agencies (least Bell's vireo), these impacts would be considered potentially significant. MM BIO-2 would reduce these potential impacts to a level of less than significant.

4.4.2 Increased Dust and Urban Pollutants

Ground disturbance activities would disturb soils and result in the accumulation of dust on the surface of the leaves of trees, shrubs, and herbs; excessive dust accumulation can impair plant respiratory function. This indirect effect from proposed construction on native vegetation and associated wildlife would be considered adverse but less than significant, since the level of disturbance is extremely small and it would not reduce the project site's plant or wildlife populations to below self-sustaining levels. Therefore, no mitigation would be required.

4.4.3 Night Lighting

Lighting of constructions sites or open space areas can result in an indirect impact on the behavioral patterns of nocturnal and crepuscular (i.e., active at dawn and dusk) wildlife adjacent to the lighted areas. Of greatest concern is the effect on small, ground-dwelling animals that use the darkness to hide from predators and on owls, which are specialized night foragers. Due to the daytime-only construction activity planned for the project and absence of proposed permanent lighting, no night lighting shall be used and no associated impacts on wildlife are expected..

4.4.4 Human Activity

The increase in human activity during construction could potentially increase the disturbance of oak woodland open space on the proposed project. Human disturbance could disrupt normal foraging and breeding behavior of wildlife that remain in the area adjacent to construction activity which would, in turn, diminish the value of the habitat. Wildlife stressed by noise may be extirpated from the natural open space on the site, leaving only wildlife tolerant of human activity. This impact would not be considered significant due to the limited size of the habitat and the existing conditions; therefore, mitigation would not be required. Implementation of the project would not increase visitation at the park or otherwise change the human activity in the park in the long term.

4.4.5 Non-Native Species

Dependent on design and management approach of undeveloped areas, they can become concentrated locations for non-native species invasion and infestation. These invasions are typically heightened in areas of excess irrigation runoff and an additional suite of non-native species may be introduced with creation of open water features such lakes, ponds, or creeks.

The indirect impacts associated with potential increased non-native species is expected to be minimal. Due to the presence of non-native plant species throughout the site, implementation of the project is expected to reduce the quantity and variety of non-native invasive plant species. Non-native invasive wildlife are not expected to increase post-project. Therefore, potential impacts of increased non-native species would be considered less than significant and no mitigation would be required.

5.0 MITIGATION MEASURES

This section focuses on the development of mitigation measures (MMs) for those proposed project impacts that are found to be significant or potentially significant. Strategies to mitigate each impact to a level of less than significant are identified and described.

5.1 JURISDICTIONAL

5.1.1 MM BIO-1 – Jurisdictional Resources Replacement

Mitigation for the loss of jurisdictional resources shall be negotiated with the resource agencies during the regulatory permitting process and shall ensure that mitigation to compensate for permanent impacts on jurisdictional resources is equivalent or superior to biological functions and values impacted by the project. Potential mitigation options may include: (1) removal of exotic species from within the project site or Hahamongna Watershed Park or elsewhere within the Arroyo Seco or adjacent watersheds (e.g., invasive plant or wildlife species removal); (2) payment to a mitigation bank or regional riparian enhancement program; and/or (3) restoration of riparian habitat including qualifying vegetation and trees, either on site or off site at a ratio of no less than 1:1, determined through consultation with the USACE, the RWQCB, and the CDFW. The restoration plan shall detail the methodology and performance standards, which shall be prepared in accordance with requirements specified in permits/agreements issued by the USACE, the RWQCB, and the CDFW.

In addition, prior to initiation of any project activities affecting identified jurisdictional features, areas all work areas will be clearly demarcated with construction stakes and flagging. These areas will be verified by a qualified biologist familiar with the project to ensure no only permitted and approved impacts areas are disturbed.

5.2 SPECIAL STATUS WILDLIFE SPECIES

The proposed project would result in potential impacts on special status wildlife species with potential to occur on the project site. The following measures shall be implemented to reduce potential impacts to a less than significant level.

5.2.1 MM BIO-2 – Special Status/Nesting Birds Seasonal Avoidance

Project construction activities (including, but not limited to, staging and disturbances to native and non-native vegetation, structures, and substrates) shall occur outside of the avian breeding season, which generally runs from February 1–August 31 (as early as January 1 for some raptors) to avoid take of birds or their eggs. “Take” means to hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture or kill (California Fish and Game Code, Section 86), and includes take of eggs or young resulting from disturbances that cause abandonment of active nests.

A Biological Monitor shall be present on site during all grubbing and clearing of vegetation to ensure that these activities remain within the project footprint (i.e., the demarcated buffer); to ensure that the flagging/stakes/fencing that shall be installed by the Biologist prior to initiation of construction activity is being maintained; and to minimize the likelihood that active nests are abandoned or fail due to project activities.

5.2.2 MM BIO-3 – Pre-construction Bat Roost Habitat Assessment

Prior to the initiation of any grading and/or construction-related activity involving the disturbance and/or removal of potentially suitable bat roosting habitat—namely rocky outcrops or trees—a qualified Biologist shall conduct a pre-construction bat habitat assessment of the potential habitat marked for removal. Potential for roosting will be categorized by (1) potential for solitary roost sites and (2) potential for colonial roost sites (i.e., ten bats or more). If the potential for colonial roosting is determined, those rocky outcrops or trees shall not be removed during the bat maternity roost season (March 1 to July 31). Trees potentially supporting colonial roosts outside the maternity roost season and trees potentially supporting solitary roosts may be removed via a two-step removal process whereby, at the direction of the Biologist, some level of disturbance (such as trimming of lower branches of trees) is applied to the habitat on the day prior to removal to allow bats to escape during the darker hours. In the case of a tree, it shall be removed the following day (i.e., there shall be no less or more than one night between initial disturbance and the grading or tree removal). Rock outcrops potentially supporting colonial roosts outside the maternity roost season and rock outcrops potentially supporting solitary roosts shall be fitted with a bat exclusionary device at the entry location, whereby bats are allowed to leave the structure but unable to return. The structure can be demolished the following day.

6.0 LEVEL OF SIGNIFICANCE AFTER MITIGATION

Implementation of the mitigation measures listed above will mitigate biological resource impacts to a level that is considered less than significant.

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APPENDIX A

WILDLIFE COMPENDIUM

WILDLIFE SPECIES OBSERVED DURING SURVEYS

Species	
Scientific Name	**Common Name**
LIZARDS	
PHRYNOSOMATIDAE - SPINY LIZARD FAMILY	
Sceloporus occidentalis	western fence lizard
Uta stansburiana	common side-blotched lizard
BIRDS	
ANATIDAE - SWAN, GOOSE, AND DUCK FAMILY	
Branta canadensis	Canada goose
Anas platyrhynchos	mallard
Aythya collaris	ring-necked duck
Lophodytes cucullatus	hooded merganser
COLUMBIDAE - PIGEON AND DOVE FAMILY	
*Columba livia**	rock pigeon*
*Streptopelia decaocto**	Eurasian collared-dove
Zenaida macroura	mourning dove
TROCHILIDAE - HUMMINGBIRD FAMILY	
Calypte anna	Anna's hummingbird
LARIDAE - GULL AND TERN FAMILY	
Larus occidentalis	western gull
Larus californicus	California gull
ACCIPITRIDAE - HAWK FAMILY	
Accipiter striatus	sharp-shinned hawk
Buteo lineatus	red-shouldered hawk
Buteo jamaicensis	red-tailed hawk
PICIDAE - WOODPECKER FAMILY	
Melanerpes lewis	Lewis’ woodpecker
Melanerpes formicivorus	acorn woodpecker
Picoides nuttallii	Nuttall's woodpecker
Picoides pubescens	downy woodpecker
Colaptes auratus	northern flicker
FALCONIDAE - FALCON FAMILY	
Falco sparverius	American kestrel
TYRANNIDAE - TYRANT FLYCATCHER FAMILY	
Sayornis nigricans	black phoebe
CORVIDAE - JAY AND CROW FAMILY	
Aphelocoma californica	California scrub-jay
Corvus brachyrhynchos	American crow
Corvus corax	common raven
PARIDAE - TITMOUSE FAMILY	
Baeolophus inornatus	oak titmouse
AEGITHALIDAE - BUSHTIT FAMILY	
Psaltriparus minimus	bushtit
SITTIDAE - NUTHATCH FAMILY	
Sitta carolinensis	white-breasted nuthatch

WILDLIFE SPECIES OBSERVED DURING SURVEYS

Species	
Scientific Name	**Common Name**
TROGLODYTIDAE - WREN FAMILY	
Thryomanes bewickii	Bewick's wren
REGULIDAE - KINGLET FAMILY	
Regulus calendula	ruby-crowned kinglet
TURDIDAE - THRUSH FAMILY	
Sialia mexicana	western bluebird
Catharus guttatus	hermit thrush
Turdus migratorius	American robin
MIMIDAE - MOCKINGBIRD AND THRASHER FAMILY	
Toxostoma redivivum	California thrasher
STURNIDAE - STARLING FAMILY	
*Sturnus vulgaris**	European starling*
FRINGILLIDAE - FINCH FAMILY	
Haemorhous mexicanus	house finch
Haemorhous purpureus	purple finch
Spinus psaltria	lesser goldfinch
PASSERELLIDAE - NEW WORLD SPARROW FAMILY	
Pipilo maculatus	spotted towhee
Melozone crissalis	California towhee
Melospiza melodia	song sparrow
Zonotrichia leucophrys	white-crowned sparrow
Junco hyemalis	dark-eyed junco
Junco hyemalis caniceps	gray-headed junco
PARULIDAE - WOOD-WARBLER FAMILY	
Setophaga coronata	yellow-rumped warbler
MAMMALS	
SCIURIDAE - SQUIRREL FAMILY	
Otospermophilus beecheyi	California ground squirrel
GEOMYIDAE - POCKET GOPHER FAMILY	
Thomomys bottae	Botta's pocket gopher
* Non-native species	

APPENDIX B

JURISDICTIONAL DELINEATION REPORT

Jurisdictional Delineation Report

Berkshire Creek Restoration Project
Oak Grove Park
Pasadena, California

Prepared for | City of Pasadena
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Pasadena, California 91109
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May 2019

TABLE OF CONTENTS

TABLES

EXHIBITS

ATTACHMENTS

EXECUTIVE SUMMARY

The purpose of this report is to provide baseline data concerning the type and extent of jurisdictional resources for the Berkshire Creek Restoration Project located in the City of Pasadena in Los Angeles, California. Jurisdictional resources considered for this report include wetlands and non-wetland "waters of the U.S." regulated by the U.S. Army Corps of Engineers (USACE); "waters of the State" regulated by the Regional Water Quality Control Board (RWQCB); and the bed, bank, and channel of all lakes, rivers, and/or streams (and associated riparian vegetation), as regulated by the California Department of Fish and Wildlife (CDFW).

The limits of non-wetland "waters of the U.S." and "waters of the State" were identified by the presence of an ordinary high water mark (OHWM). Wetland features were identified based on the USACE's three-parameter approach in which wetlands are defined by the presence of hydrophytic vegetation, hydric soils, and presence of wetland hydrology indicators. The limits of CDFW jurisdictional waters were identified as either the top of bank or the outer drip line of riparian vegetation.

The jurisdictional delineation work was performed by Psomas Regulatory Specialist David Hughes on May 25 and July 24, 2018. Based on the results of the jurisdictional delineation field work, it was determined that the total amount of jurisdictional resources in the survey area and expected impacts to these resources are as follows:

- **USACE Jurisdiction:** 0.11 acre of non -wetland "waters of the U.S." (0.09 acre of expected permanent impacts).
- **RWQCB Jurisdiction:** 0.11 acre of non-wetland "waters of the State" (0.09 acre of expected permanent impacts).
- **CDFW Jurisdiction:** 0.76 acre of jurisdictional streambed and riparian habitat (0.36 acre of permanent impacts). Up to five trees under the jurisdiction of the CDFW may be impacted as well: one coast live oak (*Quercus agrifolia*), measuring 28.1 inches in trunk diameter at breast height (dbh); three willow trees (*Salix* spp.), measuring 25.7 inches, 18.7 inches, and 7.9 inches in dbh; and one holly-leaf cherry tree (*Prunus ilicifolia*), measuring 6.0 inches dbh.

1.0 INTRODUCTION

This Jurisdictional Delineation Report (report) was prepared for the Public Works Department of the City of Pasadena to provide baseline data concerning the type and extent of resources under the jurisdiction of the U.S. Army Corps of Engineers (USACE), the Regional Water Quality Control Board (RWQCB), and the California Department of Fish and Wildlife (CDFW) for the Berkshire Creek Restoration Project.

1.1 PROJECT LOCATION

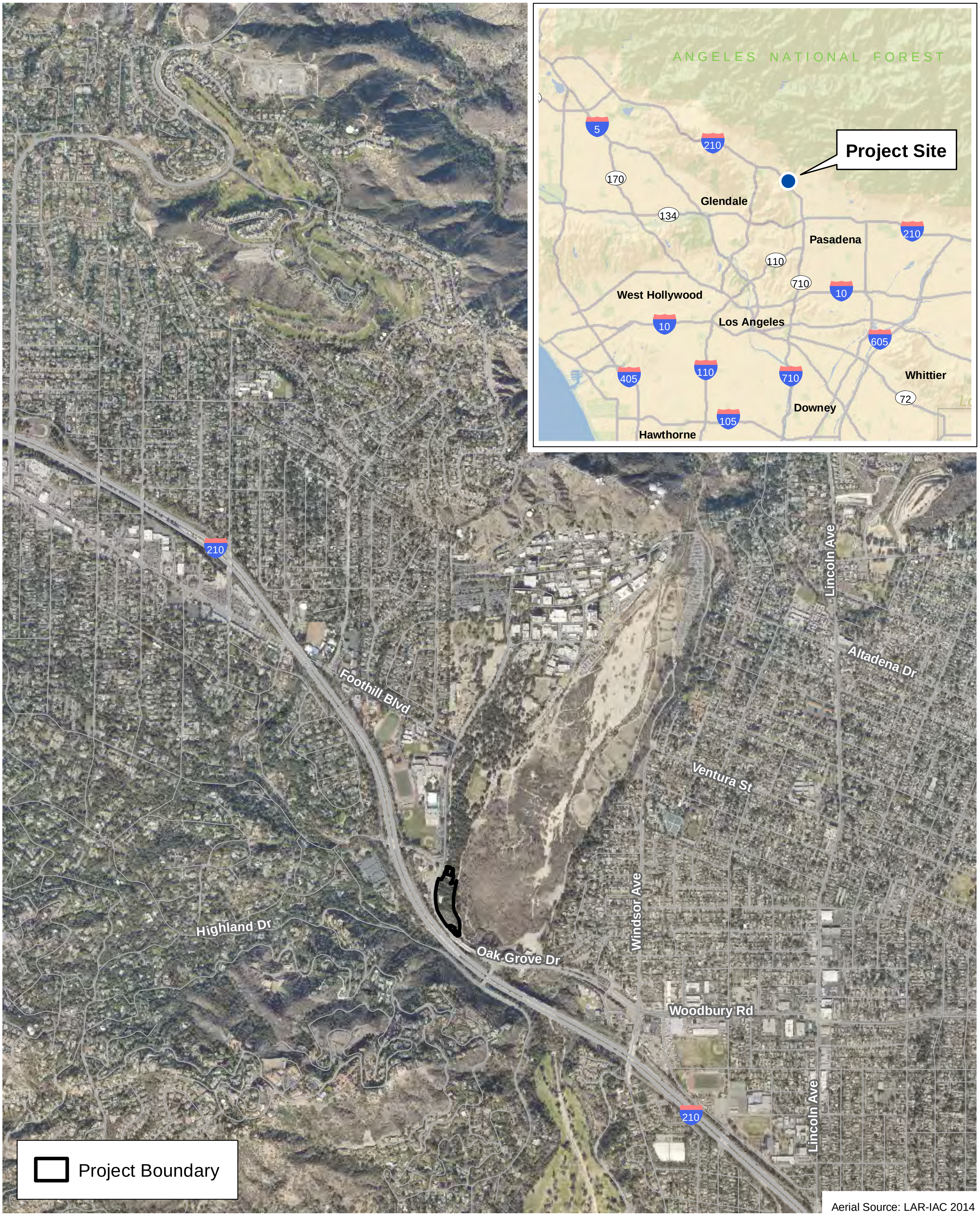
The Berkshire Creek Restoration Project Area is located in Hahamongna Watershed Park (previously Oak Grove Park), along the western boundary of Devil's Gate Reservoir in the City of Pasadena, in Los Angeles County, California (Exhibit 1). It is located immediately north of Interstate 210 and immediately east of Oak Grove Drive. The survey area for this study is approximately 4.7 acres in the southern portion of Oak Grove Park (Exhibit 2). The survey area is shown on the U.S. Geological Survey's (USGS') Pasadena 7.5-minute topographic quadrangle of the San Bernardino Meridian in Township 1 North, Range 12 West, Section 7 (Exhibit 3). It is within the Arroyo Seco Watershed (Hydrologic Unit Code 180701050209).

1.2 PROJECT DESCRIPTION

The Berkshire Creek Restoration Project consists of several components including localized trail improvements, replacing asphalt with a permeable surface at the equestrian picnic area parking lot, installing interpretive signage, and restoring/enhancing riparian, coastal sage scrub, and oak woodland habitats. The only component of the proposed project that involves work in jurisdictional waters is to repair erosion damage to Berkshire Creek and to stabilize the creek bed and banks. Berkshire Creek is a short stream on the western edge of Oak Grove Park that conveys water from the outfall of the Berkshire Drain (a 60-inch diameter concrete storm drain) in an easterly direction to Devil's Gate Reservoir. Work to repair and stabilize Berkshire Creek is the only aspect of the overall project that is discussed in this report and hereinafter is referred to as the "proposed project".

Increased runoff volume over the past several years via Berkshire Drain has resulted in excessive damage to the existing conditions downstream of the outfall in Berkshire Creek. The damage includes flooding on the adjacent service road, and severe erosion and water pollution in Berkshire Creek. To repair the severe erosion in Berkshire Creek, the proposed engineering concept would replace the existing drain pipe with two separate drain pipes, with different sizes, lengths, angles, and outfall locations, one for low flows and one for high flows. The low flow drain would consist of approximately 49 linear feet (lf) of 24-inch-diameter reinforced concrete pipe (RCP) at a shallow grade that would outlet immediately downstream of the service road. The high flow drain would consist of approximately 45 feet of 36-inch diameter RCP at a steeper grade connecting to a two-foot-wide by five-foot-high transition structure, situated near the low flow outfall, which then connects to approximately 110 lf of five-foot-high by two-feet-high concrete box culvert. The box culvert would follow the existing drainage path of Berkshire Creek, and outlet approximately 25 feet downstream of the proposed multi-use bridge crossing. The box culvert is anticipated to be situated on the existing creek bed, with limited earthmoving only where necessary to accommodate the size and shape of the culvert. This high flow outlet represents extending the outlet location downstream and consequently allowing for habitat restoration to repair the damage within the incised creek bed. Reinforced, embedded riprap would be installed at the high-flow outlet to reduce runoff velocity. The service road would be reconstructed once the new drainage infrastructure beneath the road is installed.

After installation of the high-flow box culvert, the creek bed would be raised through placement of approximately 370 cubic yards of earth material to repair the incised condition and provide slope



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Local Vicinity

Exhibit 1

Jurisdictional Delineation Report for the Berkshire Creek Restoration Project

N W E S

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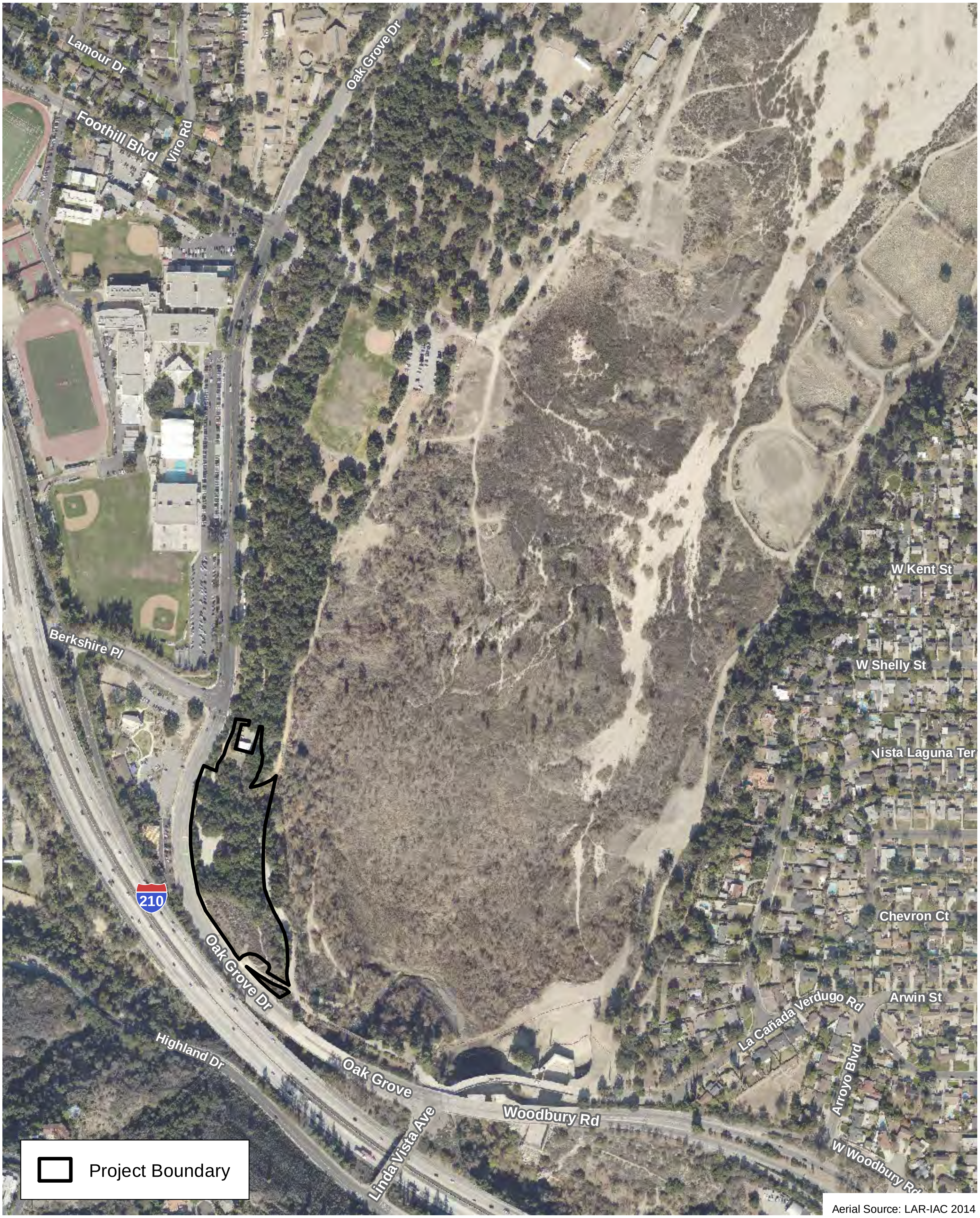

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Project Location

Exhibit 2

Jurisdictional Delineation Report for the Berkshire Creek Restoration Project

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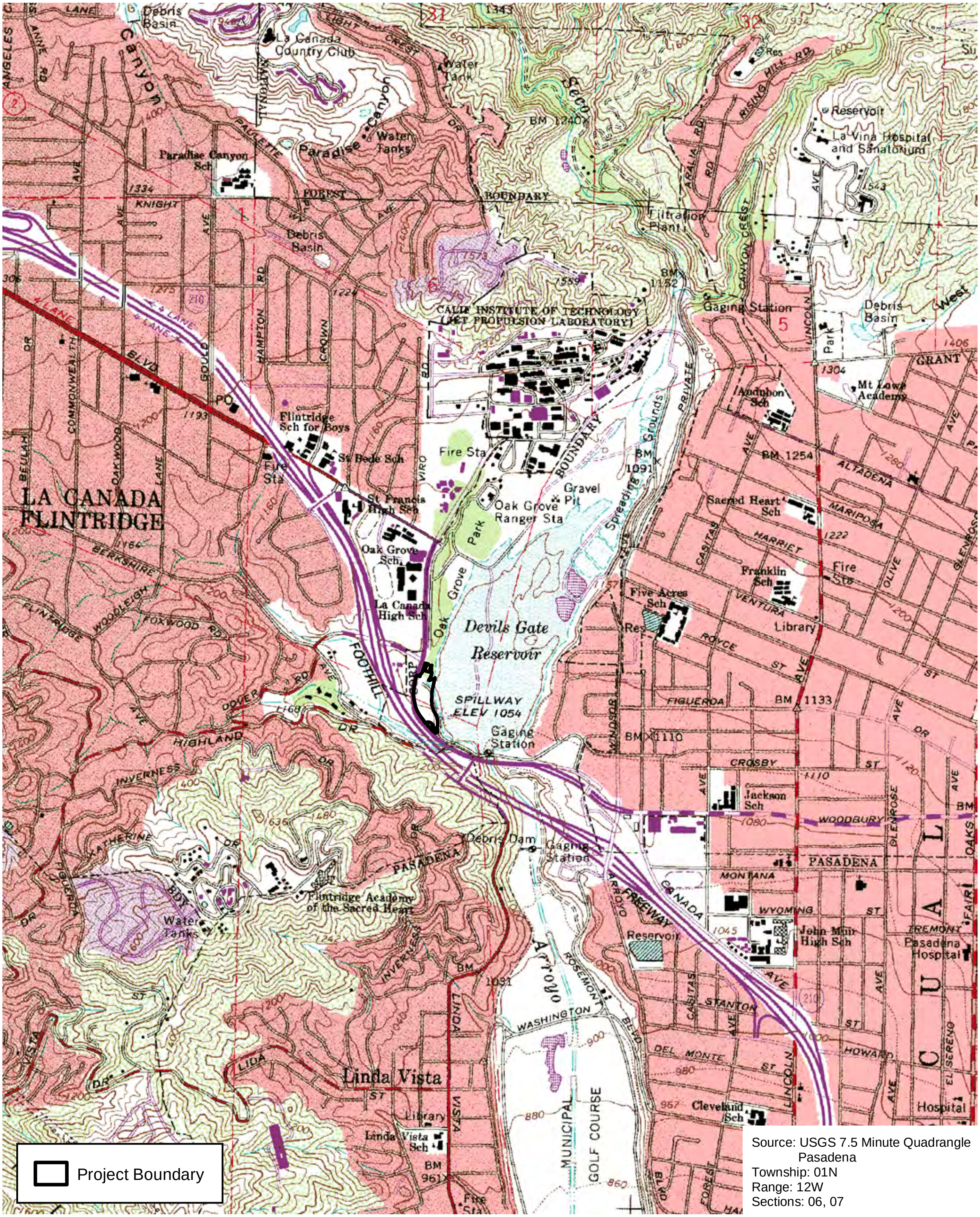

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USGS 7.5-Minute Digital Quadrangle

Exhibit 3

Jurisdictional Delineation Report for the Berkshire Creek Restoration Project

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(Rev: 05/02/2019 CJS) R:\Projects\PAS_Pasaden\3PAS010800\Graphics\JD\ex_USGS.pdf stabilization in preparation for habitat restoration. A grade control structure, or check dam, with an approximate two-foot step height would be installed at the surface approximately every 40 feet from the low flow outlet to the end of the Berkshire Creek drainage within City jurisdiction to help reduce surface water runoff velocity that could result in erosion of restored habitat. The check dams would be constructed of Arroyo Stone from an existing stockpile collected by the City of Pasadena. Finally, the engineering concept proposes installation of an approximate 6-foot-diameter and 50-foot-deep dry well immediately to the south and east of the Berkshire Drain that would collect and treat, prior to infiltrating, the so-called “first flush” of storm water runoff. The first flush is comprised of the first approximately ¾-inch of runoff that contains the highest concentrations of pollutants, such as hydrocarbons, lead (from vehicle brake dust), pesticides, pet/animal waste, and other constituents typical of a dense urban land use pattern.

This engineering concept would stabilize Berkshire Creek, improve water quality, allow for native habitat restoration, and eliminate flooding on the adjacent service road and Berkshire Creek trail crossing. This latter improvement also increases accessibility and safety for park users.

The creek restoration concept, including use of materials, is intended to present a naturalized visual condition at the surface while adequately managing the high runoff volumes and velocities that occur at the Berkshire Creek Outlet.

1.3 REGULATORY AUTHORITY

This section summarizes the federal and State agencies’ regulatory jurisdiction over activities that have a potential to impact jurisdictional resources. A detailed explanation of each agency’s regulatory authority is provided in Attachment A.

1.3.1 <u>U.S. Army Corps of Engineers</u>

The USACE Regulatory Branch regulates activities that discharge dredged or fill materials into “waters of the U.S.” under Section 404 of the Federal Clean Water Act (CWA) and Section 10 of the Rivers and Harbors Act. Its authority applies to all “waters of the U.S.” where the material (1) replaces any portion of a “waters of the U.S.” with dry land or (2) changes the bottom elevation of any portion of any “waters of the U.S.”. Activities that result in fill or dredge of “waters of the U.S.” require a permit from the USACE.

1.3.2 <u>Regional Water Quality Control Board</u>

The State Water Resources Control Board (SWRCB), in conjunction with the nine RWQCBs, is the primary agency responsible for protecting water quality in California through the regulation of discharges to surface waters under the CWA and the California Porter-Cologne Water Quality Control Act (Porter-Cologne Act). The SWRCB’s and RWQCBs’ jurisdictions extend to all “waters of the State” and to all “waters of the U.S.”, including wetlands (isolated and non-isolated).

1.3.3 <u>California Department of Fish and Wildlife</u>

The CDFW regulates activities that may affect rivers, streams, and lakes pursuant to the *California Fish and Game Code* (§§1600–1616). According to Section 1602 of the *California Fish and Game Code,* the CDFW has jurisdictional authority over any work that will (1) substantially divert or obstruct the natural flow of any river, stream, or lake; (2) substantially change or use any material from the bed, channel, or bank of any river, stream, or lake; or (3) deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake.

2.0 METHODS

2.1 LITERATURE REVIEW

Prior to conducting the delineation and during the course of report preparation, Psomas reviewed the following documents to identify areas that may fall under agency jurisdiction: the USGS' Pasadena 7.5-minute quadrangle map; color aerial photography provided by Google Earth; soil data provided by the U.S. Department of Agriculture's Natural Resources Conservation Service (USDA NRCS); the National Hydric Soils List (USDA NRCS 2018); the National Wetlands Inventory's Wetland Mapper (USFWS 2018); and the Water Quality Control Plan for the Los Angeles Region (Los Angeles RWQCB 1994).

2.2 JURISDICTIONAL DELINEATION

Non-wetland "waters of the U.S." are delineated based on the limits of the Ordinary High Water Mark (OHWM), which can be determined by a number of factors, including the presence of a clear, natural line impressed on the bank; shelving; changes in the character of the soil; destruction of terrestrial vegetation; and the presence of litter and debris. The OHWM limits (i.e., active floodplain) occurring in the survey area were further verified using methods contained in *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States*, *A Delineation Manual* (Lichvar and McColley 2008) and the *Updated Datasheet for the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States* (Curtis and Lichvar 2010).

In September 2008, the USACE issued the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region.* This regional supplement is designed for use with the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987). Both the 1987 Wetlands Manual and the Arid West Supplement to the manual provide technical methods and guidelines for determining the presence of "waters of the U.S." and wetland resources. A three-parameter approach is used to identify wetlands and requires evidence of wetland hydrology, hydrophytic vegetation, and hydric soils. Wetlands generally include swamps, marshes, bogs, and similar areas. In order to be considered a wetland, an area must exhibit at least minimal hydric characteristics within the three parameters. However, problem areas may periodically or permanently lack certain indicators due to seasonal or annual variability or the nature of the soils or plant species on site. Atypical wetlands lack certain indicators due to recent human activities or natural events. Guidance for determining the presence of wetlands in these situations is presented in the Regional Supplement.

It should be noted that the RWQCB shares USACE jurisdiction unless isolated conditions are present. If isolated waters are present, the RWQCB takes jurisdiction using the USACE's definition of the OHWM and/or the three-parameter wetlands method pursuant to the 1987 Wetlands Manual. The CDFW's jurisdiction is defined as the top of the bank to the top of the bank of the stream, channel, or basin or to the outer limit of riparian vegetation located within or immediately adjacent to the river, stream, creek, pond, lake, or other impoundment.

The analysis contained in this report uses the results of a field survey conducted by Psomas Regulatory Specialist David Hughes on May 25 and July 24, 2018. Jurisdictional features were delineated using a 1 inch equals 130 feet (1″ = 130′) scale aerial photograph. Jurisdictional features were delineated as a drainage polygon with corresponding width measurements. A preliminary assessment of the presence of wetland "waters of the U.S." was made based on vegetation and hydrology; if potential wetlands were observed, test pits were dug to analyze soil and to confirm the presence or absence of wetlands. Information on the OHWM was recorded on the Arid West Ephemeral and Intermittent Streams OHWM Datasheet (Attachment B). The field survey included the collection of vegetation, soils, and hydrologic data from two sampling points in the survey area; this information was recorded on Wetland Determination Data Forms (Attachment C). Representative photographs of the survey area are included in Attachment D.

2.2.1 Vegetation

Hydrophytic vegetation (or hydrophytes) is defined as any macrophytic plant that "grows in water or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content; plants typically found in wet habitats" (Environmental Laboratory 1987). Specifically, these plant species have specialized morphological, physiological, or other adaptations for surviving in permanently saturated to periodically saturated soils where oxygen levels are very low or the soils are anaerobic. Lichvar and Gillrich (2011) provide the following technical definitions of wetland plant indicator status categories:

- **Obligate Wetland (OBL):** These wetland-dependent plants (herbaceous or woody) require standing water or seasonally saturated soils (14 or more consecutive days) near the surface to ensure adequate growth, development, and reproduction and to maintain healthy populations. These plants consist of four types:
    - *submerged:* plants that conduct virtually all of their growth and reproductive activity under water.
    - *floating:* plants that grow with leaves and most often their vegetative and reproductive organs floating on the water surface.
    - *floating-leaved:* plants that are rooted in sediment but also have leaves that float on the water surface.
    - *emergent:* herbaceous and woody plants that grow with their bases submerged and rooted in inundated sediment or seasonally saturated soil and their upper portions, including most of the vegetative and reproductive organs, growing above the water level.
- **Facultative Wetlands (FACW):** These plants depend on and predominantly occur with hydric soils, standing water, or seasonally high water tables in wet habitats for ensuring optimal growth, development, and reproduction and for maintaining healthy populations. These plants often grow in geomorphic locations where water saturates soils or floods the soil surface at least seasonally.
- **Facultative (FAC):** These plants can occur in wetlands or non-wetlands. They can grow in hydric, mesic, or xeric habitats. The occurrence of these plants in different habitats represents responses to a variety of environmental variables other than just hydrology (e.g., shade tolerance, soil hydrogen potential [pH], and elevation) and they have a wide tolerance of soil moisture conditions.
- **Facultative Upland (FACU):** These plants are not wetland dependent. They can grow on hydric and seasonally saturated soils, but they develop optimal growth and healthy populations on predominantly drier or more mesic sites. Unlike FAC plants, these plants are non-wetland plants by habitat preference.
- **Obligate Upland (UPL):** These plants occupy mesic to xeric non-wetland habitats. They almost never occur in standing water or saturated soils. Typical growth forms include herbaceous, shrubs, woody vines, and trees.

The USACE—as part of an interagency effort with the U.S. Environmental Protection Agency (USEPA), the U.S. Fish and Wildlife Service (USFWS), and the USDA NRCS—has approved a

National Wetland Plant List (NWPL), which provides the current indicator status for plant species. The NWPL is used to determine whether the hydrophytic vegetation parameter is met when conducting wetland determinations under the CWA and the Wetland Conservation Provisions of the Food Security Act. The NWPL is also intended to be used for wetland restoration, establishment, and enhancement projects. This report utilizes the indicator statuses for the Arid West Supplement portion of the NWPL.

The following are three procedures for determining whether the hydrophytic vegetation criterion is met: Indicator 1, “Dominance Test”, using the “50/20 Rule”; Indicator 2, “Prevalence Index”; or Indicator 3, “Morphological Adaptation”, as identified in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (USACE 2008). The hydrophytic vegetation criterion is met if any indicator is satisfied. If none of the indicators are satisfied, then hydrophytic vegetation is absent unless (1) indicators of hydric soil and wetland hydrology are present and (2) the site meets the requirements for a problematic wetland situation.

- **Dominance Test:** Vegetative cover is estimated and is ranked according to its dominance. Dominant species are the most abundant species for each stratum of the community (i.e., tree, sapling/shrub, herb, or woody vine) that individually or collectively amount to 50 percent of the total coverage of vegetation plus any other species that, by itself, accounts for 20 percent of the total vegetation cover (also known as the “50/20 Rule”). These species are recorded on the “Wetland Determination Data Form – Arid West Region”. The wetlands indicator status of each species is also recorded on the data forms based on the NWPL (Lichvar and Kartesz 2009). If greater than 50 percent of the dominant species across all strata are OBL, FACW, or FAC species, the criterion for wetland vegetation is considered to be met.
- **Prevalence Index:** The prevalence index considers all plant species in a community, not just the dominant ones. The prevalence index is the average of the wetland indicator status of all plant species in a sampling plot. Each indicator status category is given a numeric code (OBL = 1, FACW = 2, FAC = 3, FACU = 4, and UPL = 5) and is weighted by the species’ abundance (percent cover). Hydrophytic vegetation is present if the prevalence index is 3.0 or less.
- **Morphological Adaptation:** Morphological adaptations, such as adventitious roots (i.e., roots that take advantage of the wet conditions) and shallow root systems, must be observed on more than 50 percent of the individuals of a FACU species for the hydrophytic vegetation wetland criterion to be met.

2.2.2 Soils

The National Technical Committee for Hydric Soils (NTCHS) defines a hydric soil as a soil that is formed under conditions of saturation, flooding, or ponding that occurs long enough during the growing season to develop anaerobic conditions (or conditions of limited oxygen) at or near the soil surface and that favor the establishment of hydrophytic vegetation (USDA NRCS 2016). It should be noted that hydric soils created under artificial conditions of flooding and inundation sufficient for the establishment of hydrophytic vegetation would also meet this hydric soils indicator.

The soil conditions are verified by digging test pits along each transect to a depth of at least 20 inches (except where a restrictive layer occurs in areas containing hard pan, cobble, or solid rock). It should be noted that, at some sites, it may be necessary to make exploratory soil test pits up to 40 inches deep to more accurately document and understand the variability in soil properties and hydrologic relationships on the site. Soil test pit locations are usually dug in the drainage invert or at the edge of a waterbody/drainage course in vegetated areas. Soil extracted from each soil test pit is then examined for texture and color using the standard plates on the Munsell Soil Color Chart (1994) and recorded on the Data Form. The Munsell Soil Color Chart aids in designating soils by color labels based on gradations of three simple variables: hue, value, and chroma. Any indicators of hydric soils, such as the following, are also recorded on the Data Form: redoximorphic features (i.e., areas where iron is reduced under anaerobic conditions and oxidized following a return to aerobic conditions); buried organic matter; organic streaking; reduced soil conditions; gleyed (i.e., soils having a characteristic bluish-gray or greenish-gray color) or low-chroma soils; or sulfuric odor. If hydric soils are found, progressive pits are dug along the transect moving laterally away from the active channel area until hydric soil features are no longer present in the top 20 inches of the soil.

2.2.3 Hydrology

Wetland hydrology indicators provide evidence that a site has a continuing wetland hydrologic regime. Wetlands hydrology is represented by either (1) all of the hydrological elements or characteristics of areas permanently or periodically inundated or (2) areas containing soils that are saturated for a sufficient duration of time to create hydric soils suitable for the establishment of plant species that are typically adapted to anaerobic soil conditions. The presence of wetland hydrology is evaluated at each intersect by recording the extent of observed surface flows; the depth of inundation; the depth to saturated soils; and the depth to free water in soil test pits. In instances where stream flow is divided into multiple channels with intervening sandbars, the entire area between the channels is considered to be within the “Active Floodplain” and within the OHWM. Therefore, an area containing these features would meet the indicator requirements for wetland hydrology.

3.0 RESULTS

A description of the literature review results is provided in Section 3.1, and a detailed analysis of each regulatory agency's jurisdiction is provided in Section 3.2.

3.1 LITERATURE REVIEW

USGS Topographic Quadrangle. The USGS quadrangle maps show geological formations and their characteristics; they describe the physical settings of an area through topographic contour lines and other major surface features. These features include lakes, streams, rivers, buildings, roadways, landmarks, and other features that may fall under the jurisdiction of one or more regulatory agencies. In addition, the USGS maps provide topographic information that is useful in determining elevations, latitude and longitude, and Universal Transverse Mercator (UTM) Grid coordinates for a survey area.

Devil's Gate Reservoir appears as an open water feature on the USGS Pasadena 7.5-minute quadrangle. No streambed features are shown passing through the Oak Grove Park area on the USGS map. Elevations in the survey area range from approximately 1,030 to 1,080 feet above mean sea level.

Color Aerial Photography. Psomas reviewed an existing color aerial photograph prior to conducting the field delineation to identify the extent of any drainages/waterbodies and riparian vegetation occurring in the survey area.

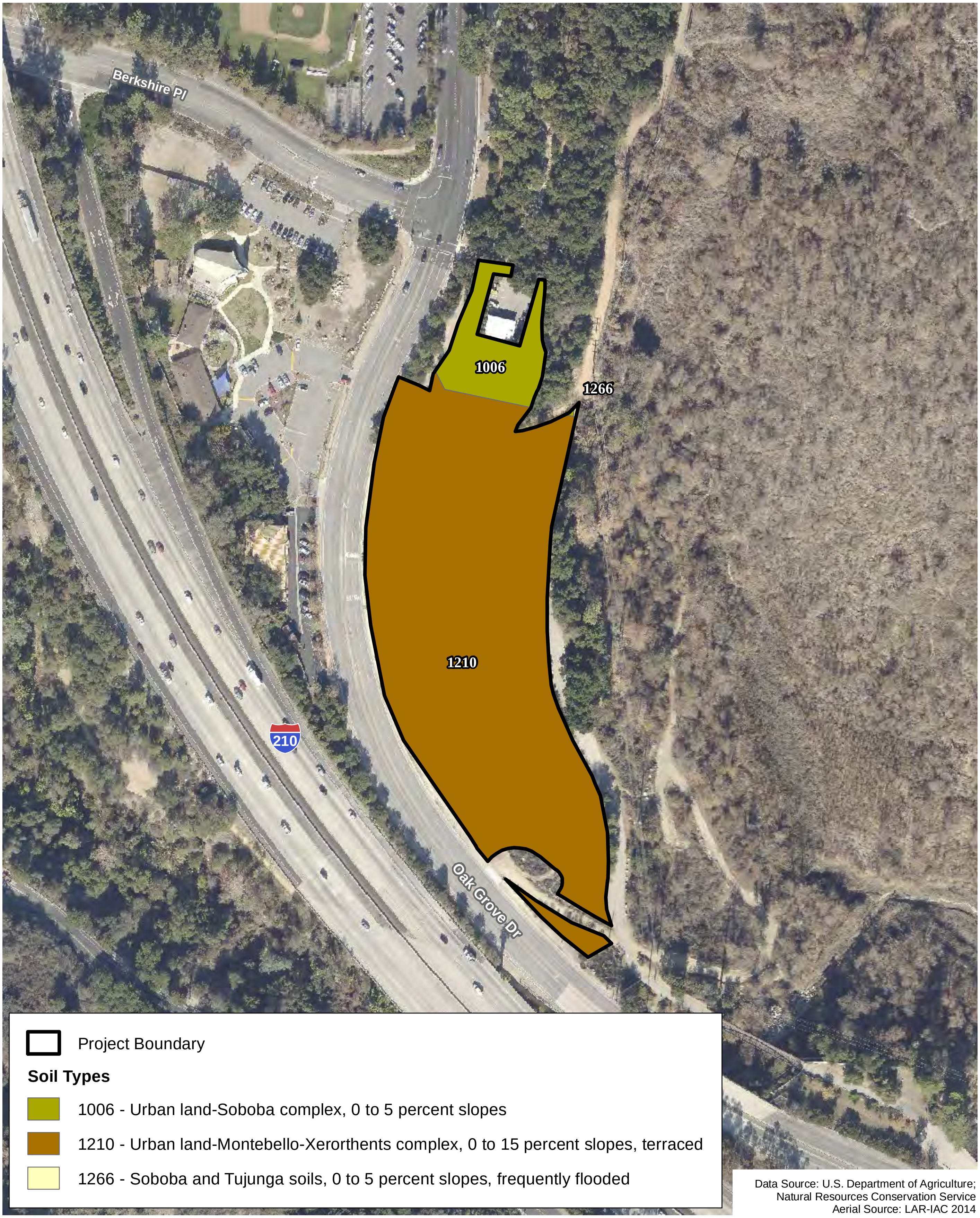
The Arroyo Seco, Devil's Gate Reservoir, and the associated vegetation is visible on aerial imagery. Berkshire Creek is located beneath dense overstory growth and cannot be seen on aerial imagery.

Vegetation Map. Berkshire Creek flows beneath a dense canopy of coast live oaks (*Quercus agrifolia*), along with several red willows (*Salix laevigata*), arroyo willows (*Salix lasiolepis*), shamel ash (*Fraxinus uhdei*), and blue gums (*Eucalyptus globulus*). Project implementation will require the removal of several non-native trees, but the oak trees occur on the upper banks of the creek and are not expected to be impacted by the proposed activities. Minimal understory vegetation is present within and adjacent to Berkshire Creek due to dense shade provided by the trees and because the creek bed is heavily scoured and thus provides little soil for understory establishment.

U.S. Department of Agriculture, Natural Resources Conservation Service. The presence of hydric soils is one of the chief indicators of jurisdictional wetlands. Psomas reviewed the USDA's soil data for the survey area (Exhibit 4). Three soil types have been mapped in the survey area: Urban land-Soboba complex, 0 to 5 percent slopes; Urban land-Montebello-Xerorthents complex, 0 to 15 percent slopes terraced; and Soboba and Tujunga soils, 0 to 5 percent slopes, frequently flooded.

The NRCS has delineated the boundaries of 'soil map units', which often contain components of multiple soil types that may be classified as hydric or non-hydric. The National Hydric Soils List identifies a soil map unit as "hydric" if it contains either a major or minor component that is at least in part hydric (USDA NRCS 2015). The survey area occurs in the Los Angeles County Southeastern Part soil survey area. None of the above-listed soil map units are listed as hydric on the National List for the soil survey area. A brief description of the soils mapped in the survey area is provided in Attachment E of this report.

U.S. Fish and Wildlife Service, National Wetlands Inventory. The Wetland Mapper shows wetland resources available from the Wetlands Spatial Data Layer of the National Spatial Data



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Soil Map

Exhibit 4

Jurisdictional Delineation Report for the Berkshire Creek Restoration Project

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Infrastructure. This resource provides the classification of known wetlands following the Classification of Wetlands and Deepwater Habitats of the United States (FGDC 2013). This classification system is arranged in a hierarchy of (1) Systems that share the influence of similar hydrologic, geomorphologic, chemical, or biological factors (i.e., Marine Estuarine, Riverine, Lacustrine, and Palustrine); (2) Subsystems (i.e., Subtidal and Intertidal; Tidal, Lower Perennial, Upper Perennial, and Intermittent; or Littoral and Limnetic); (3) Classes, which are based on substrate material and flooding regime or on vegetative life forms; (4) Subclasses; and (5) Dominance Types, which are named for the dominant plant or wildlife forms. In addition, there are modifying terms applied to Classes or Subclasses.

Berkshire Creek is not mapped as a wetland resource in the Wetland Mapper. Berkshire Creek flows into the southern portion of Devil's Gate Reservoir, which is mapped as PSSCh, PEM1/USCh, and PEM1Fh (Exhibit 5). Descriptions for these wetland resources are provided in Attachment E of this report.

Regional Water Quality Control Plans. There are nine RWQCBs in California. The survey area is located in RWQCB Region 4, the Los Angeles Region. The Los Angeles RWQCB has adopted a Water Quality Control Plan (or "Basin Plan") for the coastal watersheds of Los Angeles and Ventura Counties. The Basin Plan contains goals and policies, descriptions of conditions, and proposed solutions to surface and groundwater issues. The Basin Plan also establishes water quality standards for surface and groundwater resources and includes beneficial uses and levels of water quality that must be met and maintained to protect these uses. These water quality standards are implemented through various regulatory permits pursuant to the CWA, specifically Section 401 for Water Quality Certifications and Section 402 for Report of Waste Discharge (ROWD) permits.

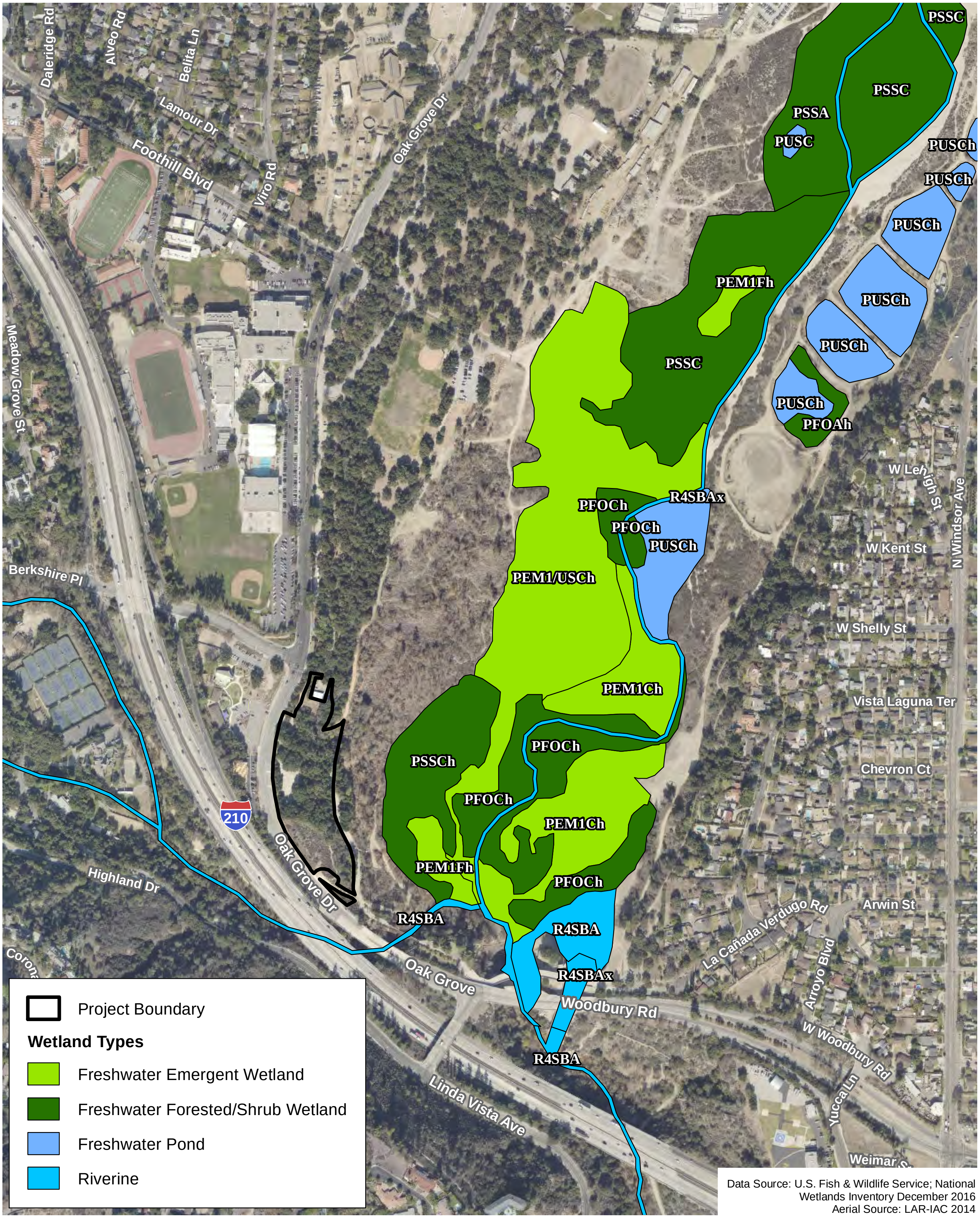
The Los Angeles Basin Plan does not provide water quality objectives for the lower Devil's Gate Reservoir area. The closest area for which water quality objectives are provided is the Upper Arroyo Seco. These water quality objectives are summarized in Table 1.

TABLE 1
WATER QUALITY OBJECTIVES FOR THE ARROYO SECO

Water Quality Objectives (mg/L)					
Total Dissolved Solids	**Sulfate**	**Chloride**	**Boron**	**Nitrogen**	**Sodium Adsorption Ratio**
300	400	15	*	*	*

mg/L: milligrams per liter; * site-specific objectives have not been determined.
Source: RWQCB 1994.

Beneficial uses are defined in the Porter-Cologne Act as those uses of water that are necessary for tangible and intangible economic, social, and environmental benefits. The Basin Plan identifies a number of existing, intermittent, or potential beneficial uses for the Lower Devil's Gate portion of the Arroyo Seco. These beneficial uses include: Municipal and Domestic Water Supply (MUN) waters; Groundwater Recharge (GWR) waters; Warm Fresh Water Habitat (WARM) waters; Wildlife Habitat (WILD) waters; and Water Contact Recreation (REC1). The proposed project involves the conversion of non-native vegetation to establish native habitat. This may have a short-term effect on the WILD beneficial use, but is not expected to affect any other beneficial uses. Descriptions of the beneficial uses applicable to waters in the survey area are provided in Attachment E of this report.



National Wetland Inventory

Exhibit 5

Jurisdictional Delineation Report for the Berkshire Creek Restoration Project

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3.1.1 <u>"Waters of the U.S." Determination</u>

Connectivity to a Traditional Navigable Water

Waters in the survey area flow through Devil's Gate Dam and proceed approximately nine miles south until discharging into the Los Angeles River, a Traditional Navigable Water (TNW)[1]. Berkshire Creek flows directly into Devil's Gate Reservoir (a portion of the Arroyo Seco, see Exhibit 6) and is therefore under the jurisdictional authority of the USACE.

Limits of "Waters of the U.S."

The limits of "waters of the U.S." associated with Devil's Gate Reservoir were approximated on Exhibit 6 by identifying the elevational limit of expected inundation and following that topographic contour to determine the expected inundation limits. The limits of non-wetland "waters of the U.S." in Berkshire Creek were defined by the presence of an OHWM, exhibited by the break in bank slope. The hardened basin that is found at the outlet of the Berkshire Drain pipe is included as "waters of the U.S;". In all, a total of 0.11 acre of "waters of the U.S." occur in Berkshire Creek (Exhibit 7).

Wetlands Determination

Two sampling points were assessed for the presence of hydrophytic vegetation, hydric soils, and wetland hydrology (Table 2), The locations of the sampling points are shown on Exhibit 7 and the Wetland Data Forms are provided in Attachment C. No wetland conditions were encountered at either of the sampling locations.

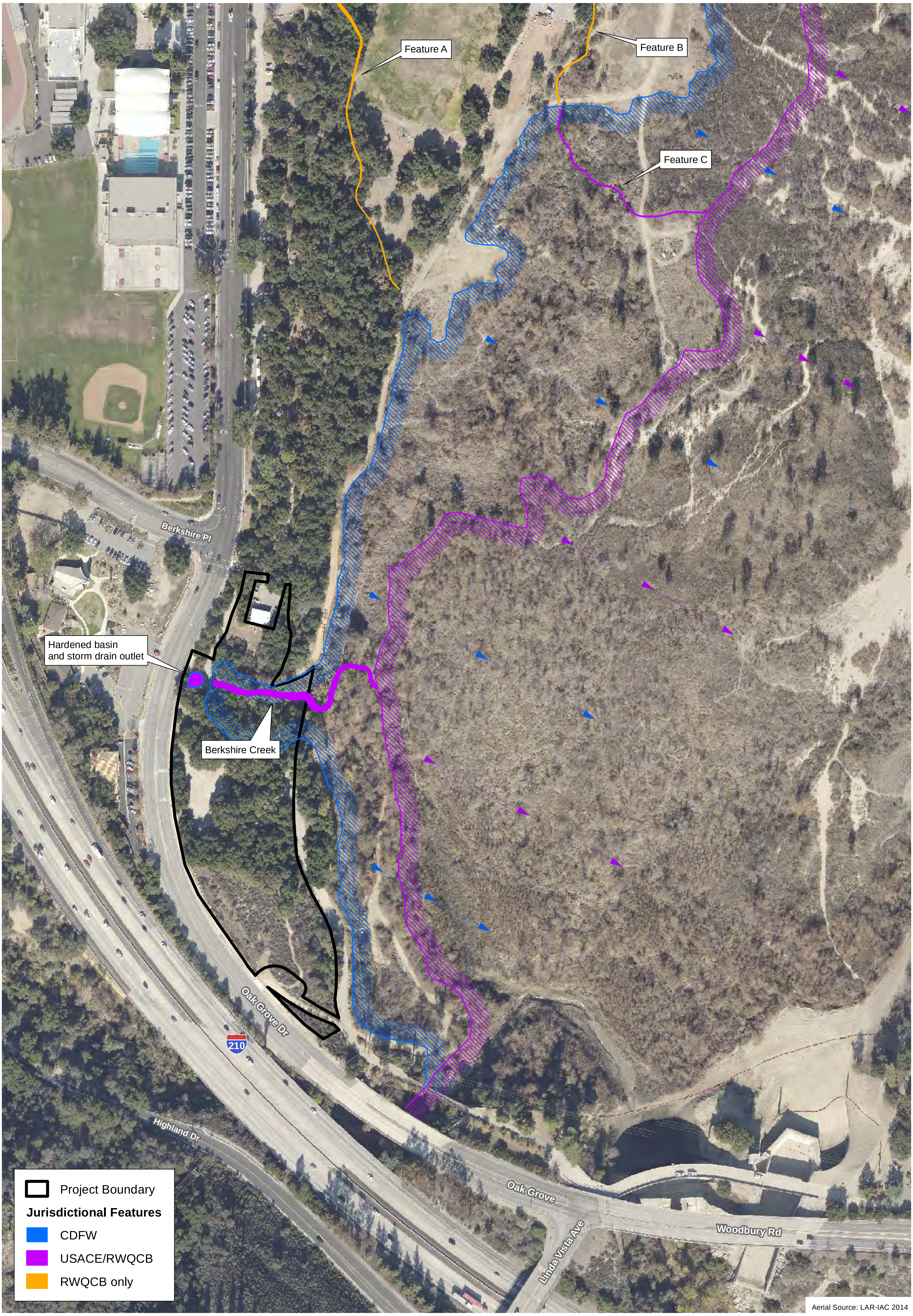
TABLE 2
SUMMARY OF SAMPLING POINT DATA

Sampling Point	Vegetated	Dominance Test Result*	Prevalence Index Result	Hydric Soil Indicators	Wetland Hydrology Indicators	Wetland?
1	Yes	50%	4.8	None	B1, B10	No
2	Yes	100%	2.7	None	B1, B10	No
* Percent of dominant species that are OBL, FACW, or FAC.						
Wetland Hydrology Indicators B1 Water Marks (Riverine) B10 Drainage Patterns						

<u>Vegetation</u>

Vegetation was assessed in representative areas at or below the OHWM. Areas with less than five percent vegetation were considered unvegetated and so did not meet the hydrophytic vegetation criterion. Vegetation at the two sampling points consisted of moderately dense tree cover, with shamel ash, coast live oak, red willow, and arroyo willow being the most common species. Vegetation at sampling point 2 met the hydrophytic vegetation criterion as conditions passed the dominance test and the prevalence index, while vegetation at sampling point 1 did not pass either criterion. Therefore, the hydrophytic vegetation is present only at sampling point 2.

1 Traditional Navigable Waters are "all waters that are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide" (33 CFR 328.3).



Jurisdictional Resources

Exhibit 6

Jurisdictional Delineation Report for the Berkshire Creek Restoration Project

N W E S

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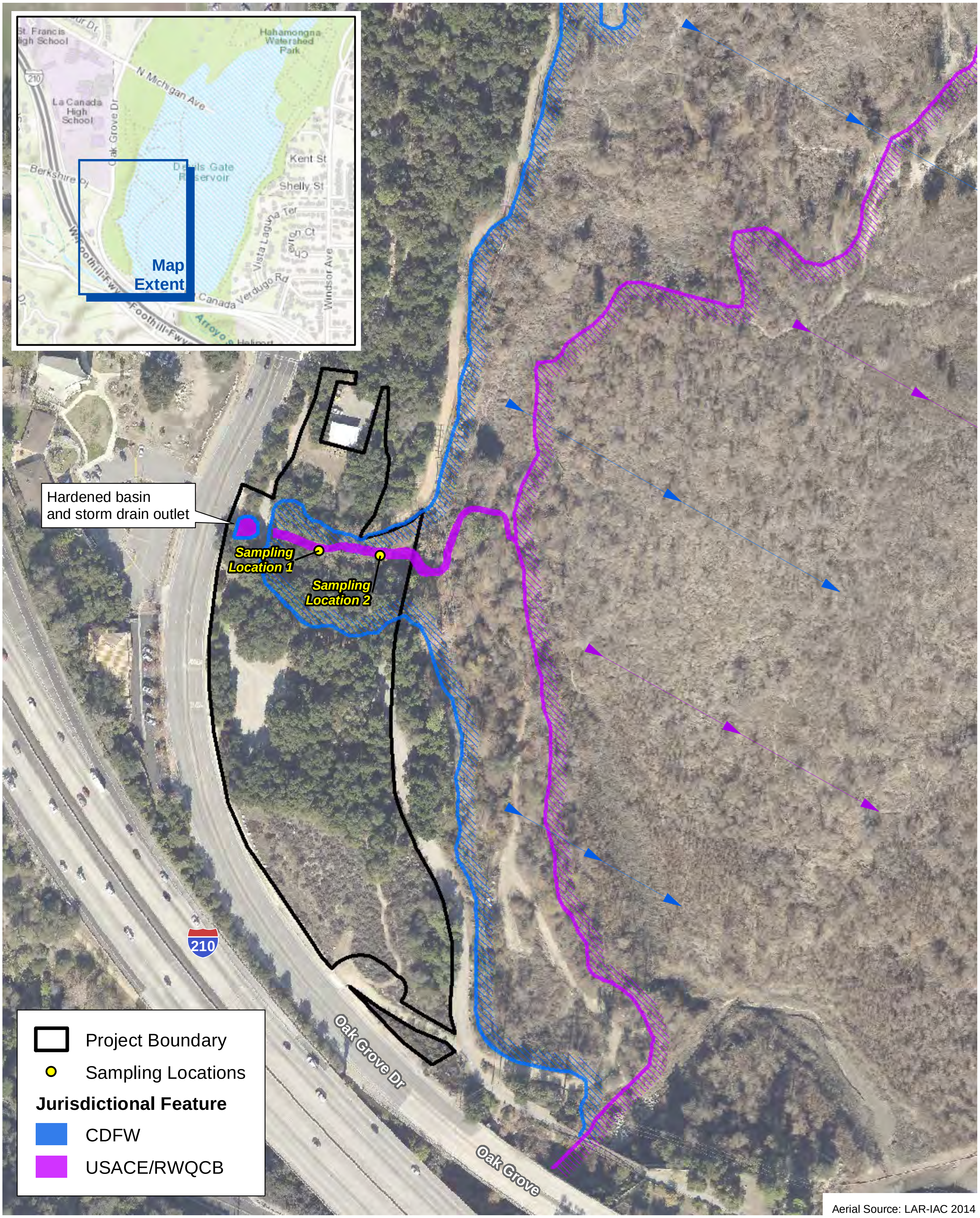

Jurisdictional Resources - Berkshire Creek

Exhibit 7

Jurisdictional Delineation Report for the Berkshire Creek Restoration Project

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Soils

Soil test pits were excavated in representative areas containing at least five percent vegetation at or below the OHWM. Soils encountered in the survey area were generally sandy. No hydric soil indicators were present at either sampling point.

Hydrology

Both sampling locations exhibit multiple indicators of wetland hydrology (e.g., water marks and drainage patterns). Therefore, the wetland hydrology criterion was met at all sampling locations.

Results

No wetland conditions were encountered in the survey area.

3.1.2 California Regional Water Quality Control Board Jurisdiction

There are no "isolated waters" present in the survey area. Therefore, the RWQCB's jurisdictional limits are equal to those of the USACE.

3.1.3 California Department of Fish and Wildlife Jurisdiction

The limits of CDFW jurisdiction in the survey area were mapped to the outer canopy of native tree species that overhang Berkshire Creek. CDFW limits were mapped to the top of the Berkshire Creek banks in areas that contain only non-native species. The hardened basin that is found at the outlet of the Berkshire Drain pipe is included as CDFW jurisdiction. In all, the survey area contains 0.76 acre of CDFW jurisdictional areas.

4.0 IMPACT ANALYSIS

Based on the current proposed project limits of disturbance, approximate 0.09 acre of non-wetland "waters of the U.S.", 0.09 acre of "waters of the State", and 0.36 acre of waters under the regulatory authority of the CDFW would be impacted by the proposed project (Table 3; Exhibit 8).

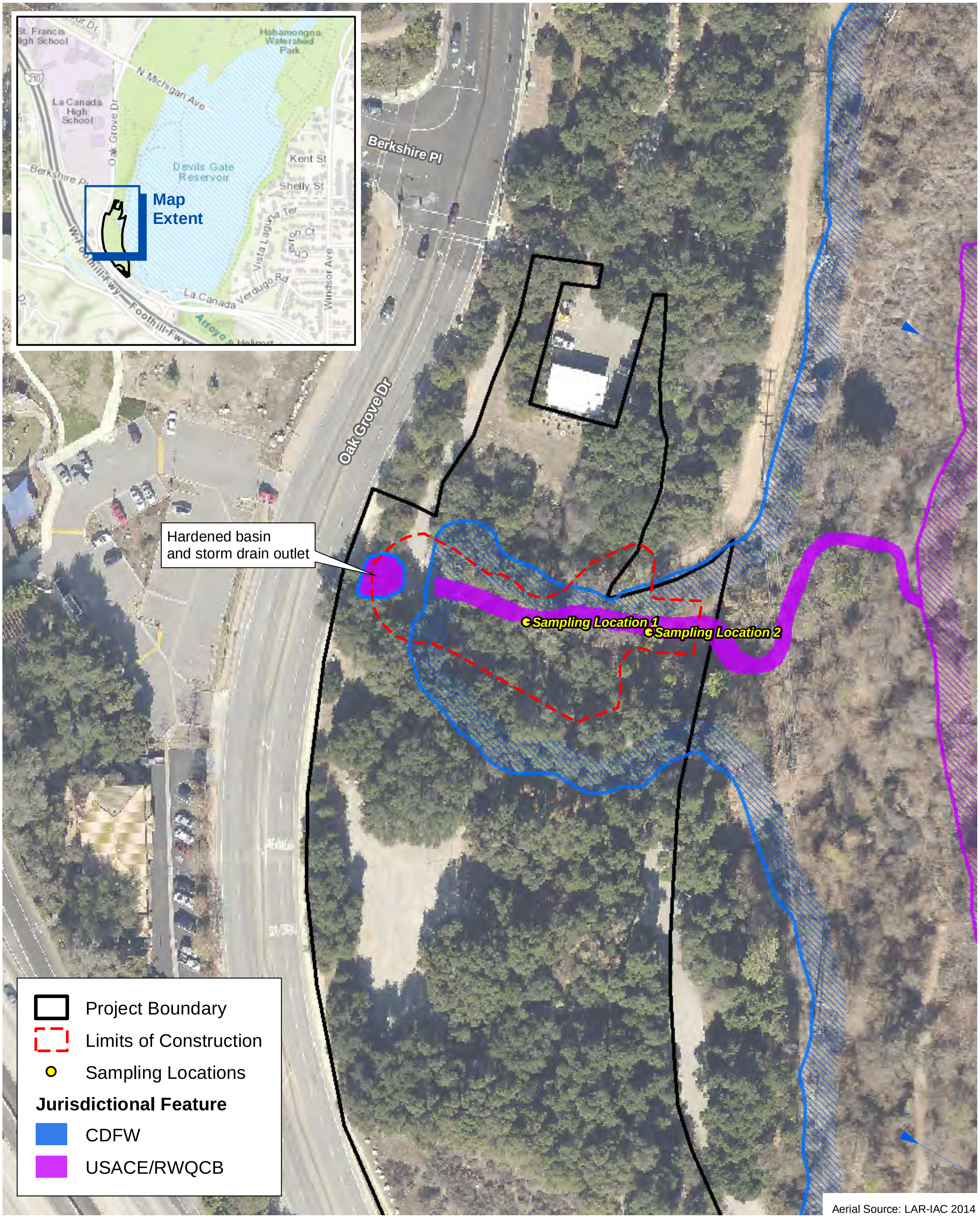
The proposed project involves placement of two reinforced concrete pipes, a dry well, reinforced rip rap, river rock, and 370 cubic yards of earth material to improve stream conditions and return the stream cross-profile to a more natural condition. All impacts are considered permanent, though the project will result in an overall improved streambed condition.

As described in Section 3.1, Berkshire Creek flows beneath a dense canopy of native and non-native tree species. Project implementation will prioritize the protection of mature native trees to the extent practicable, but up to five native trees may be removed during construction activities. This includes one coast live oak, measuring 28.1 inches in trunk diameter at breast height (dbh); three willow trees measuring 25.7 inches, 18.7 inches, and 7.9 inches in dbh; and one holly-leaf cherry tree (*Prunus ilicifolia*), measuring 6.0 inches dbh. All five of these trees are riparian trees over which the CDFW would assert jurisdiction and likely require mitigation if impacted.

Construction equipment will be able to access the project site from existing roads and trails that cross the project site or are adjacent. All ingress and egress of construction equipment will occur within the boundaries of the permanent impact boundary. Therefore, no additional temporary impacts will result from construction activities.

TABLE 3
IMPACTS ON JURISDICTIONAL RESOURCES IN THE SURVEY AREA

Jurisdiction	Existing Resources (Acres)	Permanent Impact (Acres)	Temporary Impact (Acres)	Total Impact (Acres)
Wetlands	0.00	0.00	0.00	0.00
Non-Wetland Waters	0.11	0.09	0.00	0.09
Total USACE "waters of the U.S." and RWQCB "waters of the State"	**0.11**	**0.09**	**0.00**	**0.11**
CDFW Jurisdictional Resources	**0.76**	**0.36**	**0.00**	**0.36**
USACE: U.S. Army Corps of Engineers; RWQCB: Regional Water Quality Control Board; CDFW: California Department of Fish and Wildlife				



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Impacts to Jurisdictional Resources - Berkshire Creek

Exhibit 8

Jurisdictional Delineation Report for the Berkshire Creek Restoration Project

N W E S

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5.0 REGULATORY APPROVAL PROCESS

5.1 REGULATORY PERMIT REQUIREMENTS

This section summarizes the various permits, agreements, and certifications that are expected to be required prior to initiation of proposed project activities that involve impacts to jurisdictional waters.

- USACE Section 404 Permit
- RWQCB Section 401 Water Quality Certification
- CDFW Section 1602 Notification of Lake or Streambed Alteration

It should be noted that all regulatory permit applications can be processed concurrently. The USACE permit would be issued subject to the receipt of the RWQCB's Section 401 Water Quality Certification.

5.1.1 U.S. Army Corps of Engineers

Prior to construction in "waters of the U.S.", a Section 404 permit from the USACE is required. Regulatory authorization in the form of a Nationwide Permit (NWP) or regional permit is provided for certain categories of activities. If the NWP conditions cannot be met, an Individual Permit (IP) will be required.

The proposed project would likely fall under NWP 13 (Bank Stabilization) or NWP 43 (Stormwater Management Facilities). NWP 13 authorizes impacts to up to 500 linear feet of streambed and discharges of no more than one cubic yard per linear foot (the USACE District Engineer may waive these limits for intermittent or ephemeral streams). NWP 43 authorizes impacts of up to ½ acre of "waters of the U.S." and 300 linear feet of streambed. The most applicable NWP for the project will be determined through consultation with USACE staff. Both NWPs would require submittal of a preconstruction notification to authorize the proposed activities. Descriptions of NWP 13 and 43 are included as Attachment F.

Issuance of the USACE Section 404 permit would be contingent upon the approval of a Section 401 Water Quality Certification from the Los Angeles RWQCB. The RWQCB requires certification of the proposed project's California Environmental Quality Act (CEQA) documentation before it will approve the Section 401 Water Quality Certification or ROWD. The RWQCB, as a responsible agency, will use the proposed project's CEQA document to satisfy its own CEQA-compliance requirements.

5.1.2 Regional Water Quality Control Board

As noted above, issuance of the USACE Section 404 permit would be contingent upon the approval of a Section 401 Water Quality Certification from the Los Angeles RWQCB. The RWQCB requires the Applicant to address urban storm water runoff during and after construction in the form of Best Management Practices (BMPs). These BMPs are intended to address the treatment of pollutants carried by storm water runoff and are required in all complete applications. The notification/application for a CWA Section 401 Water Quality Certification must also address compliance with the Basin Plan. Please note that the application would also require the payment of an application fee, which would be based on project impacts.

5.1.3 California Department of Fish and Wildlife

Prior to construction, Notification of a Lake or Streambed Alteration (LSA) must be submitted to the CDFW that describes any proposed streambed alteration contemplated by the proposed project. If an LSA Agreement is required, the CDFW may want to conduct an on-site inspection.

In addition to the formal application materials and the fee, a copy of the appropriate environmental document (e.g., Mitigated Negative Declaration) should be included in the submittal, consistent with CEQA requirements. The CDFW will not deem the application to be complete until the application fees have been paid and the agency is provided with a certified CEQA document and a signed copy of the receipt of County Clerk filing fees for the Notice of Determination (NOD).

5.2 RECOMMENDATIONS

Based on the conclusions of this Jurisdictional Delineation Report, the following recommendations are identified:

1. A pre-application meeting should be scheduled with USACE, CDFW, and RWQCB staff to discuss site conditions; the proposed project; biological and jurisdictional resources and impacts to these resources resulting from the proposed project; proposed minimization measures and the mitigation program to offset these impacts; and the regulatory permit process, including the decision to prepare and submit an Approved Jurisdictional Determination or a Preliminary Jurisdictional Determination. The USACE is expected to approve a Preliminary Jurisdictional Determination as the appropriate jurisdictional determination given the extent of proposed project impacts and the length of project construction.
2. Construction activities should be designed to avoid contact with flowing water. Therefore, a streambed diversion plan should be developed and provided to USACE, CDFW, and RWQCB staff for review and approval.
3. The following should be prepared and processed: a USACE Section 404 Permit; an RWQCB Section 401 Water Quality Certification; a CDFW Section 1602 Notification of LSA; and the appropriate jurisdictional determination form approved by the USACE.

6.0 REFERENCES

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ATTACHMENT A

SUMMARY OF REGULATORY AUTHORITY

REGULATORY AUTHORITY

This attachment summarizes the regulatory authority of the U.S. Army Corps of Engineers (USACE), the Regional Water Quality Control Board (RWQCB), and the California Department of Fish and Wildlife (CDFW) over activities that have potential to impact jurisdictional resources.

U.S. Army Corps of Engineers

The USACE Regulatory Branch regulates activities that discharge dredged or fill materials into "waters of the U.S." under Section 404 of the Federal Clean Water Act (CWA) and Section 10 of the Rivers and Harbors Act. This permitting authority applies to all "waters of the U.S." where the material (1) replaces any portion of "waters of the U.S." with dry land or (2) changes the bottom elevation of any portion of any "waters of the U.S.". These fill materials would include sand, rock, clay, construction debris, wood chips, and materials used to create any structure or infrastructure in these waters.

Waters of the United States

"Waters of the U.S." can be divided into three categories: territorial seas, tidal waters, or non-tidal waters. The term "waters of the U.S." is defined by the *Code of Federal Regulations*[1] (CFR) and includes:

1. All waters that have, are, or may be used in interstate or foreign commerce (including sightseeing or hunting), including all waters subject to the ebb and flow of the tide (i.e., Traditional Navigable Waters [TNWs]).
2. All interstate waters including interstate wetlands.
3. All other waters such as intrastate lakes, rivers, or streams (including intermittent streams), mudflats, sand flats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds where the use, degradation, or destruction of which could affect interstate or foreign commerce.
4. All impoundments of waters otherwise defined as "waters of the U.S." under the definition.
5. All tributaries of waters identified above.
6. The territorial seas.
7. All wetlands adjacent to waters (other than waters that are themselves wetlands) identified above.

The U.S. Supreme Court has issued three decisions that provide context and guidance in determining the appropriate scope of "waters of the U.S.". In *United States v. Riverside Bayview Homes*, the Court upheld the inclusion of adjacent wetlands in the regulatory definition of "waters of the U.S.". In *Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers* (SWANCC), the Court held that the use of "isolated" non-navigable intrastate ponds by migratory birds was not, by itself, sufficient basis for the exercise of federal regulatory authority under the CWA. In *Rapanos v. United States* (Rapanos)[2], a majority of the U.S. Supreme Court overturned two Sixth Circuit Court of Appeals decisions, finding that certain wetlands constituted "waters of the U.S." under the CWA. In his plurality opinion, Justice Scalia argued that "waters of the U.S."

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[1] Specifically, Title 33, Navigation and Navigable Waters; Part 328, Definition of waters of the United States; §328.3, Definitions.

[2] Consolidated cases: *Rapanos v. United States* and *Carabell v. United States* refer to the U.S. Supreme Court's decision concerning USACE jurisdiction over "waters of the U.S." under the CWA.

should not include channels through which water flows intermittently or ephemerally or channels that periodically provide drainage for rainfall. He also stated that a wetland may not be considered "adjacent to" remote "waters of the U.S." based on a mere hydrologic connection. Justice Kennedy authored a separate concurring opinion concluding that wetlands are "waters of the U.S." if they, either alone or in combination with similarly situated lands in the region, significantly affect the chemical, physical, and biological integrity of other covered waters more readily understood as "navigable". Lacking a majority opinion, regulatory jurisdiction under the CWA exists over a water body if either the plurality's or Justice Kennedy's "significant nexus" standard is satisfied.

In summary, the USACE and the U.S. Environmental Protection Agency (USEPA) will assert jurisdiction over the following waters: (1) TNWs; (2) wetlands adjacent to a TNW; (3) relatively permanent, non-navigable tributaries of a TNW that typically flow year-round or have continuous flow at least seasonally (e.g., typically three months); and (4) wetlands that directly abut such tributaries.

The USACE and the USEPA will decide jurisdiction over the following waters based on a fact-specific analysis to determine whether they have a significant nexus with a TNW: (1) non-navigable tributaries that are not relatively permanent; (2) wetlands adjacent to non-navigable tributaries that are not relatively permanent; and (3) wetlands adjacent to, but that do not directly abut, a relatively permanent, non-navigable tributary.

The USACE and the USEPA will apply the significant nexus standard defined as follows:

1. A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by all wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of downstream TNWs.
2. A significant nexus includes consideration of hydrologic and ecological factors.

The USACE and the USEPA generally will not assert jurisdiction over the following features: (1) swales or erosional features (e.g., gullies or small washes characterized by low volume, infrequent, or short duration flow) and (2) ditches (including roadside ditches) excavated wholly within and draining only uplands and that do not carry a relatively permanent flow of water.

Ordinary High Water Mark

The landward limit of tidal "waters of the U.S." is the high-tide line. In non-tidal waters where adjacent wetlands are absent, the lateral limits of USACE jurisdiction extend to the ordinary high water mark (OHWM).[3] The OHWM is defined as "that line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of the soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas".[4] When wetlands are present, the lateral limits of USACE jurisdiction extend beyond the OHWM to the limits of the adjacent wetlands.[5]

Wetlands

A wetland is a subset of jurisdictional waters and is defined by the USACE and the USEPA as "those areas that are inundated or saturated by surface or groundwater at a frequency and

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[3] U.S. Army Corps of Engineers (USACE). 2005 (December 7). Regulatory Guidance Letter. Ordinary High Water Mark Identification. Washington, D.C.: USACE.

[4] *Code of Federal Regulations* (CFR), Title 33, §328.3(e)

[5] USACE 2005

duration sufficient to support, and under normal circumstances, do support a prevalence of vegetation typically adapted for life in saturated soil conditions".[6] Wetlands generally include swamps, marshes, bogs, and areas containing similar features.

The definition and methods for identifying wetland resources can be found in the USACE's *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region*,[7] a supplement to the 1987 *Corps of Engineers Wetlands Delineation Manual*.[8] Both the 1987 Wetlands Manual and the 2008 Arid West Supplement to the manual provide technical methods and guidelines for determining the presence of wetland "waters of the U.S.". Pursuant to these manuals, a three-parameter approach is used to identify wetlands and requires evidence of wetland hydrology, hydrophytic vegetation, and hydric soils. In order to be considered a wetland, an area must exhibit one or more indicators of all three of these parameters. However, problem areas may periodically or permanently lack certain indicators for reasons such as seasonal or annual variability of rainfall, vegetation, and other factors. Atypical wetlands lack certain indicators due to recent human activities or natural events. Guidance for determining the presence of wetlands in these situations is presented in the regional supplement.

Section 404 Permit

Except as specified in Section 323.4 of the CFR, impacts to "waters of the U.S." require a Section 404 Permit. Permit authorization may be in the form of (1) a "general permit" authorizing a category of activities in a specific geographical region or nationwide or (2) an "individual permit" (IP) following a review of an individual application form (to be obtained from the district office having jurisdiction over the waters in which the activity is proposed to be located).

Regulatory authorization in the form of a Nationwide Permit (NWP) is provided for certain categories of activities such as repair, rehabilitation, or replacement of a structure or fill which was previously authorized; utility line placement; or bank stabilization. The current set of NWPs became effective on March 19, 2017 and will expire in on March 18, 2022. NWPs authorize only those activities with minimal adverse effects on the aquatic environment and are valid only if the conditions applicable to the permits are met or waivers to these conditions are provided in writing from the USACE. Please note that waivers may require consultation with affected federal and State agencies, which can be a lengthy process with no mandated processing time frames. Certain activities do not require submission of an application form, but may require a separate notification. If the NWP conditions cannot be met, an IP will be required. "Waters of the U.S." temporarily filled, flooded, excavated, or drained but restored to pre-construction contours and elevations after construction are not included in the measurement of loss of "waters of the U.S.". The appropriate permit authorization will be based on the amount of impacts to "waters of the U.S.", as determined by the USACE. There is no filing fee for the Section 404 Permit.

Approximately three or four months are typically required to process a routine permit application; large or complex activities may take longer to process. When a permit application is received, it will be assigned an identification number and reviewed for completeness by the District Engineer. If an application is incomplete, additional information will be requested within 15 days of receipt of the application. If an application is complete, the District Engineer will issue a public notice within 15 days unless specifically exempted by provisions of the CFR. Public comments will be accepted no more than 30 days but not less than 15 days from the date of public notice; these will become part of the administrative record of the application. Generally, the District Engineer

[6] 33 CFR §328.3(b)

[7] USACE. 2008a. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)*. (J.S. Wakeley, R.W. Lichvar, and C.V. Noble, Eds.). Vicksburg, MS: U.S. Army Engineer Research and Development Center.

[8] Environmental Laboratory. 1987. Cor*ps of Engineers Wetlands Delineation Manual (Technical Report Y-87-1)*. Vicksburg, MS: U.S. Army Engineer Waterways Experiment Station.

will decide on the application no later than 60 days after receipt of the completed application. Additional permit situations may increase the permit processing time (e.g., projects involving a Section 401 Water Quality Certification, a coastal zone management consistency analysis, historic properties, a federal agency, and/or Endangered species). The Project Applicant will be given time, not to exceed 30 days, to respond to requests of the District Engineer.

On January 31, 2007, the USACE published a memorandum clarifying the Interim Guidance for Amendments to the National Historic Preservation Act and the Advisory Council on Historic Preservation (ACHP) implementing regulations.[9] The Interim Guidance applies to all Department of the Army requests for authorization/verification, including Individual Permits (IPs, i.e., standard permits and letters of permission) and all Regional General Permits (RGPs) and Nationwide Permits (NWPs). The State or Tribal Historic Preservation Officer (SHPO/THPO) has 30 days to respond to a determination that a proposed activity, which otherwise qualifies for an NWP or an RGP, has no effect or no adverse effect on a historic property. If the SHPO/THPO does not respond within 30 days of notification, the Los Angeles District may proceed with verification. If the SHPO/THPO disagrees with the District's determination, the District may work with the SHPO/THPO to resolve the disagreement or request an opinion from the ACHP. The USACE will submit the Draft Jurisdictional Delineation Report to the SHPO/THPO for review prior to initiating the actual regulatory process.

Please note that, if the USACE determines that the drainages/waterbodies are jurisdictional and would be impacted by project implementation, the Applicant will be required to obtain a CWA Section 401 Water Quality Certification from the RWQCB before the USACE will issue the Section 404 Permit. If the USACE determines that the impacted drainage/waterbody is not jurisdictional, the Applicant will be required to obtain RWQCB authorization under the provisions of a Report of Waste Discharge (ROWD).

Jurisdictional Determinations

Pursuant to USACE Regulatory Guidance Letter (RGL) 08-02 (dated June 26, 2008), the USACE can issue two types of jurisdictional determinations to implement Section 404 of the CWA: Approved Jurisdictional Determinations and Preliminary Jurisdictional Determinations.[10] An Approved Jurisdictional Determination is an official USACE determination that jurisdictional "waters of the U.S.", "Navigable Waters of the U.S.", or both are either present or absent on a site. An Approved Jurisdictional Determination also identifies the precise limits of jurisdictional waters on a project site.

The USACE will provide an Approved Jurisdictional Determination when (1) an Applicant requests an official jurisdictional determination; (2) an Applicant contests jurisdiction over a particular water body or wetland; or (3) when the USACE determines that jurisdiction does not exist over a particular water body or wetland. The Approved Jurisdictional Determination then becomes the USACE's official determination that can then be relied upon over a five-year period to request regulatory authorization as part of the permit application.

In addition, an Applicant may decline to request an Approved Jurisdictional Determination and instead obtain a USACE IP or General Permit Authorization based on a Preliminary Jurisdictional Determination or, in certain circumstances (e.g., authorizations by non-reporting nationwide general permits), with no Jurisdictional Determination.

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9 USACE. 2007 (January 31). Memorandum: Interim Guidance for Amendments to the National Historic Preservation Act and the Advisory Council on Historic Preservation (ACHP) Implementing Regulations. Washington, D.C.: USACE.

10 USACE. 2008b (June 26). Regulatory Guidance Letter. Jurisdictional Determinations. Washington, D.C.: USACE.

Preliminary Jurisdictional Determinations are non-binding, advisory in nature, and may not be appealed. They indicate that there may be “waters of the U.S.” on a project site. An Applicant may elect to use a Preliminary Jurisdictional Determination to voluntarily waive or set aside questions regarding CWA jurisdiction over a site, usually in the interest of expediting the permitting process. The USACE will determine what form of Jurisdictional Determination is appropriate for a particular project site.

The USACE Regulatory Branch Offices will coordinate with the USEPA Regional Office and USACE Headquarters (HQ), as outlined in its January 28, 2008, memorandum entitled “Process for Coordinating Jurisdictional Determinations Conducted Pursuant to Section 404 of the Clean Water Act in Light of the *Rapanos* and *SWANCC* Supreme Court Decisions”.[11] The guidance provided in this memorandum is quoted as follows:

1. Effective immediately, unless and until paragraph 5(b) of the June 5, 2007, Rapanos guidance coordination memorandum is modified by a joint memorandum from Army and EPA, we will follow these procedures:
    a. For jurisdictional determinations involving significant nexus determinations, USACE districts will send copies of draft jurisdictional delineations via e-mail to appropriate EPA regional offices. The EPA regional office will have 15 calendar days to decide whether to take the draft jurisdictional delineation as a special case under the January 19, 1989, “Memorandum of Agreement Between the Department of the Army and the USEPA Concerning the Determination of the Section 404 Program and the Application of the Exceptions under Section 404(f) of the Clean Water Act.” If the EPA regional office does not respond to the district within 15 days, the district will finalize the jurisdictional determination.
    b. For jurisdictional determinations involving isolated waters determinations, the agencies will continue to follow the procedure in paragraph 5(b) of June 5, 2007, coordination memorandum, until a new coordination memorandum is signed by USACE and EPA. (In accordance with paragraph 6 of the June 5, 2007, coordination memorandum, this is a 21-day timeline that can only be changed through a joint memorandum between agencies).
2. Approved JDs are not required for non-reporting NWPs, unless the project proponent specifically requests an approved JD. For proposed activities that may qualify for authorization under a State Programmatic General Permit (SPGP) or RGP, an approved JD is not required unless requested by the project proponent.
3. The USACE will continue to work with EPA to resolve the JDs involving significant nexus and isolated waters determinations that are currently in the elevation process.
4. USACE districts will continue posting completed Approved JD Forms on their web pages.

[11] USACE. 2008c (January 28). *Memorandum for Commander, Major Subordinate Commands and District Commands. Process for Coordinating Jurisdictional Determinations Conducted Pursuant to Section 404 of the Clean Water Act in Light of the Rapanos and SWANCC Supreme Court Decisions.* Washington, D.C.: USACE.

Regional Water Quality Control Board

The RWQCB is the primary agency responsible for protecting water quality in California through the regulation of discharges to surface waters under the CWA and the California Porter-Cologne Water Quality Control Act (Porter-Cologne Act). The RWQCB's jurisdiction extends to all "waters of the State" and to all "waters of the U.S.", including wetlands (isolated and non-isolated).

Section 401 of the CWA provides the RWQCB with the authority to regulate, through a Water Quality Certification, any proposed, federally permitted activity that may affect water quality. Among such activities are discharges of dredged or fill material permitted by the USACE pursuant to Section 404 of the CWA. Section 401 requires the RWQCB to provide certification that there is reasonable assurance that an activity which may result in discharge to navigable waters will not violate water quality standards. Water Quality Certification must be based on a finding that the proposed discharge will comply with water quality standards, which contain numeric and narrative objectives that can be found in each of the nine RWQCBs' Basin Plans.

The Porter-Cologne Act provides the State with very broad authority to regulate "waters of the State" (which are defined as any surface water or groundwater, including saline waters). The Porter-Cologne Act has become an important tool in the post-SWANCC (Solid Waste Agency of Northern Cook Counties vs. Unites States Army Corps of Engineers) and Rapanos era with respect to the State's authority over isolated waters. Generally, any person proposing to discharge waste into a water body that could affect its water quality must file an ROWD when there is no federal nexus, such as under Section 404(b)(1) of the CWA. Although "waste" is partially defined as any waste substance associated with human habitation, the RWQCB interprets this to include fill discharge into water bodies.

Section 401 Water Quality Certification

Issuance of the USACE Section 404 Permit would be contingent upon the approval of a Section 401 Water Quality Certification from the RWQCB. Also, the RWQCB requires certification of the project's California Environmental Quality Act (CEQA) documentation before it will approve the Section 401 Water Quality Certification or ROWD. The RWQCB, as a responsible agency, will use the project's CEQA document to satisfy its own CEQA-compliance requirements.

Upon acceptance of a complete permit application, the RWQCB has between 60 days and 1 year to make a decision regarding the permit request. This is compliant with USACE regulations, which indicate that the RWQCB has 60 days from the date of receipt of a completed application that requests water quality certification to make a decision.[12] The RWQCB has the option of issuing a "Denial Without Prejudice", which does not mean that the request is denied, but that it requires more information in order to make a decision. This effectively stops the processing clock until this information is provided.

The RWQCB is required under the *California Code of Regulations* (CCR) to have a "minimum 21 day public comment period" before any action can be taken on the Section 401 application.[13] This period closes when the RWQCB acts on the application. Since projects often change or are revised during the Section 401 permit process, the comment period can remain open. The public comment period starts as soon as an application has been received. Generally, the RWQCB Section 401, USACE Section 404, and CDFW Section 1602 permit applications are submitted at the same time. However, the RWQCB Section 401 Water Quality Certification may take longer to process than the other two applications.

[12] 33 CFR §325.2(b)(1)(ii)
[13] 23 CCR §3858(a)

The RWQCB requires the Applicant to address urban storm water runoff during and after construction in the form of Best Management Practices (BMPs). These BMPs are intended to address the treatment of pollutants carried by storm water runoff and are required in all complete applications. The notification/application for a CWA Section 401 Water Quality Certification must also address compliance with the Basin Plan. Please note that filing an application would also require the payment of an application fee which would be based on project impacts. The fee schedule calculator is available at http://www.waterboards.ca.gov/santaana/water_issues/programs/401_certification/index.shtml.

California Department of Fish and Wildlife

The CDFW has jurisdictional authority over wetland resources associated with rivers, streams, and lakes pursuant to the *California Fish and Game Code*.[14] Activities of State and local agencies as well as public utilities that are project proponents are regulated by the CDFW under Section 1602 of the *California Fish and Game Code.* This section regulates any work that will (1) substantially divert or obstruct the natural flow of any river, stream, or lake; (2) substantially change or use any material from the bed, channel, or bank of any river, stream, or lake; or (3) deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake. Section 1602 of the *California Fish and Game Code* applies to all perennial, intermittent, and ephemeral rivers, streams, and lakes in the State.

The CDFW jurisdictional limits are not as clearly defined by regulation as those of the USACE. While they closely resemble the limits described by USACE regulations, they include riparian habitat supported by a river, stream, or lake regardless of the presence or absence of hydric and saturated soils conditions. In general, the CDFW takes jurisdiction from the top of a stream bank or to the outer limits of the adjacent riparian vegetation (outer drip line), whichever is greater. Notification is generally required for any project that will take place within or in the vicinity of a river, stream, lake or within or in the vicinity of tributaries to a river, stream, or lake. This includes rivers or streams that flow at least periodically or permanently through a bed or channel with banks that support fish and other aquatic plant and/or wildlife species. It also includes watercourses that have a surface or subsurface flow that support or have supported riparian vegetation.

Section 1602 Lake or Streambed Alteration Agreement

The CDFW enters into a Lake or Streambed Alteration (LSA) Agreement with a project proponent in order to ensure protection of wildlife and habitat values and acreages.

Prior to construction, a Notification of an LSA must be submitted to the CDFW that describes any proposed lake or streambed alteration that would occur with implementation of a project. The Notification of an LSA must address the initial construction and long-term operation and maintenance of any structures (such as a culvert or a desilting basin) included in the project design that are located within any river, stream, or lake and that may require periodic maintenance. In addition to the formal application materials and the fee, a copy of the appropriate environmental document (e.g., a Mitigated Negative Declaration) should be included in the submittal, consistent with CEQA requirements. The complete notification package must be submitted to the CDFW regional office that services the county where the activity will take place. This notification will serve as the basis for the CDFW's issuance of a Section 1602 LSA Agreement. Note that notification is not required before beginning emergency work, but the CDFW must be notified in writing within 14 days after beginning the work.

14 See §§1600–1616.

After receiving Notification of an LSA Agreement, the CDFW will determine whether an LSA Agreement will be required for the proposed activity. An LSA Agreement will be required if the activity could substantially adversely affect an existing fish and wildlife resource. If an LSA Agreement is required, the CDFW may want to conduct an on-site inspection.

If the CDFW does not respond in writing concerning the completeness of the Notification within 30 days of its submittal, the Notification automatically becomes complete. If the CDFW does not submit a draft LSA Agreement to the Applicant within 60 days of the determination of a completed Notification package, the CDFW will issue a letter that either (1) identifies the final date to transmit a draft LSA Agreement or (2) indicates that an LSA Agreement was not required. The CDFW will also indicate that it was unable to meet this mandated compliance date and that, by law, the Applicant is authorized to complete the project without an LSA Agreement as long as the Applicant constructs the project as proposed and complies with all avoidance, minimization, and mitigation measures described in the submitted Notification package. Please note that, if the project requires revisions to the design or project construction, the CDFW may require submittal of a new Notification/application with an additional 90-day permit process.

If determined to be necessary, the CDFW will prepare a draft LSA Agreement, which will include standard measures to protect fish and wildlife resources during project construction and during ongoing operation and maintenance of any project element that occurs within a CDFW jurisdictional area. The draft Agreement must be transmitted to the Applicant within 60 calendar days of the CDFW's determination that the notification is complete. It should be noted that the 60-day timeframe might not apply to long-range agreements.

Following receipt of a draft LSA Agreement from the CDFW, the Applicant has 30 calendar days to notify the CDFW concerning the acceptability of the proposed terms, conditions, and measures. If the Applicant agrees with these terms, conditions and measures, the Agreement must be signed and returned to the CDFW. The Agreement becomes final once the CDFW executes it and an LSA Agreement is issued. Please note that all application fees must be paid and the final certified CEQA documentation must be provided prior to the CDFW's execution of the Agreement.

ATTACHMENT B

ORDINARY HIGH WATER MARK DATASHEET

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: Berkshire Creek
Project Number: 3PAS010870
Stream:
Investigator(s): David Hughes

Date: 07/24/18
Town: Pasadena
Photo begin file#:

Time:
State: CA
Photo end file#:

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

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

Location Details: Oak Grove Park

Projection:
Datum:
Coordinates:

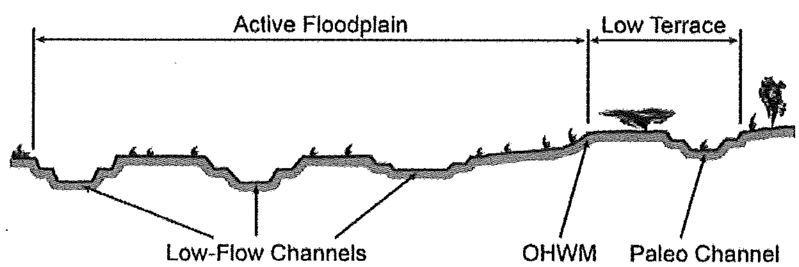
Potential anthropogenic influences on the channel system:
Severe erosion from storm drain pipe that discharges into creek, trail with culverts crosses stream mid-point

Brief site description:
Berkshire Creek is a highly disturbed creek with mature oaks on upper banks, conveys water to Devils Gate Res.

Checklist of resources (if available):

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

Hydrogeomorphic Floodplain Units

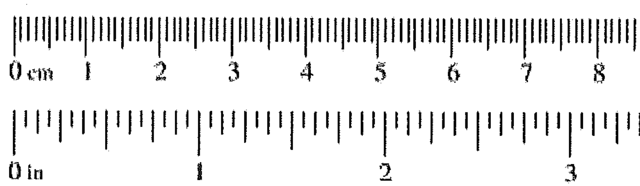


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

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

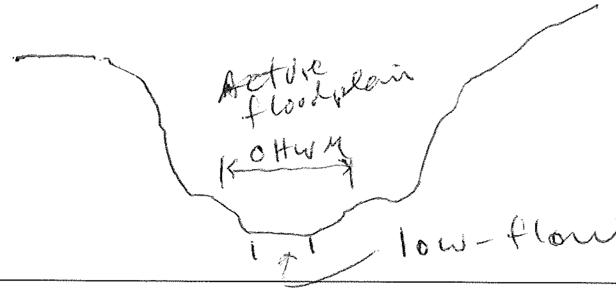
Wentworth Size Classes

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



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

Cross section drawing:



OHWM

GPS point: ______________________

Indicators:

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

Comments:
OHWM determined by change in slope, caused by water scour.

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

GPS point: ______________________

Characteristics of the floodplain unit:
Average sediment texture: rock
Total veg cover: ___ % Tree: 10 % Shrub: 6 % Herb: 0 %
Community successional stage:

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

Indicators:

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

Comments:
low-flow has been scoured so that it is very rocky with almost no understory

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

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

GPS point: ________________

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

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

Comments:
active floodplain limits determined by scour line caused by periodic inflows high volume.

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

GPS point: ________________

Characteristics of the floodplain unit:
Average sediment texture: loam
Total veg cover: 100 % Tree: 100 % Shrub: 20 % Herb: 10 %
Community successional stage:
☐ NA
☐ Early (herbaceous & seedlings)
☐ Mid (herbaceous, shrubs, saplings)
☒ Late (herbaceous, shrubs, mature trees)

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

Comments:
upper banks of creek dominated by dense oak woodland

ATTACHMENT C

WETLAND DATA FORMS

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Oak Grove Park City/County: Pasadena / Los Angeles Sampling Date: 5/25/2018

Applicant/Owner: City of Pasadena State: CA Sampling Point: 1

Investigator(s): David Hughes Section, Township, Range: Section 07, Township 1N, Range 12W

Landform (hillslope, terrace, etc.): canyon Local relief (concave, convex, none): concave Slope (%): 10

Subregion (LRR): Mediterranean California (LRR C) Lat: 34.188359° Long: -118.178234° Datum: WGS 84

Soil Map Unit Name: Urban land-Montebello-Xerothents Complex 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.

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

Remarks:

The streambed in which this sampling point is found is a highly eroded ephemeral channel that receives storm water discharge.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Quercus agrifolia	80	Y	UPL
2. Eucalyptus globulus	10	N	UPL
3.			
4.			
	90 = Total Cover		
Sapling/Shrub Stratum (Plot size: 5')			
1. Fraxinus uhdei	10	Y	FAC
2.			
3.			
4.			
5.			
	10 = Total Cover		
Herb Stratum (Plot size: 5')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 100 % Cover of Biotic Crust 0

Dominance Test worksheet:

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

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species	10	x 3 =	30
FACU species		x 4 =	
UPL species	90	x 5 =	450
Column Totals:	100 (A)		480 (B)

Prevalence Index = B/A = 4.8

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:

Fraxinus uhdei does not appear on the wetland vegetation list for the Arid West region. This species has been assigned the same indicator status as Fraxinus velutina for this worksheet

SOIL

Sampling Point: 1

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-1	10YR 3/1	100					sandy	

[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: rocks/roots

Depth (inches): 1'

Hydric Soil Present? Yes ___ No ✓

Remarks:

Scoured stream bottom contains minor sediments that have eroded from adjacent upland areas, on top of tree roots and rock

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 Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

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

Field Observations:

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

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:

soil damp from urban runoff and dense shade, but not saturated

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Oak Grove Park City/County: Pasadena / Los Angeles Sampling Date: 5/25/2018

Applicant/Owner: City of Pasadena State: CA Sampling Point: 2

Investigator(s): David Hughes Section, Township, Range: Section 07, Township 1N, Range 12W

Landform (hillslope, terrace, etc.): canyon Local relief (concave, convex, none): concave Slope (%): 5

Subregion (LRR): Mediterranean California (LRR C) Lat: 34.188281° Long: -118.178079° Datum: WGS 84

Soil Map Unit Name: Urban land-Montebello-Xerothents Complex 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 streambed in which this sampling point is found is a highly eroded ephemeral channel that receives storm water discharge.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Fraxinus uhdei	40	Y	FAC
2. Salix gooddingii	20	Y	FACW
3.			
4.			
	60 = Total Cover		
Sapling/Shrub Stratum (Plot size: 5')			
1. Fraxinus uhdei	10	Y	FAC
2.			
3.			
4.			
5.			
	10 = Total Cover		
Herb Stratum (Plot size: 5')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 100 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species	20	x 2 =	40
FAC species	50	x 3 =	150
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	70 (A)		190 (B)

Prevalence Index = B/A = 2.7

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:

Fraxinus uhdei does not appear on the wetland vegetation list for the Arid West region. This species has been assigned the same indicator status as Fraxinus velutina for this worksheet

SOIL

Sampling Point: 2

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
0-6	10YR 3/2	100					sandy	

[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: rocks

Depth (inches): 6'

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 Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

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

Field Observations:

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

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

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

Wetland Hydrology Present? Yes ✓ No ___

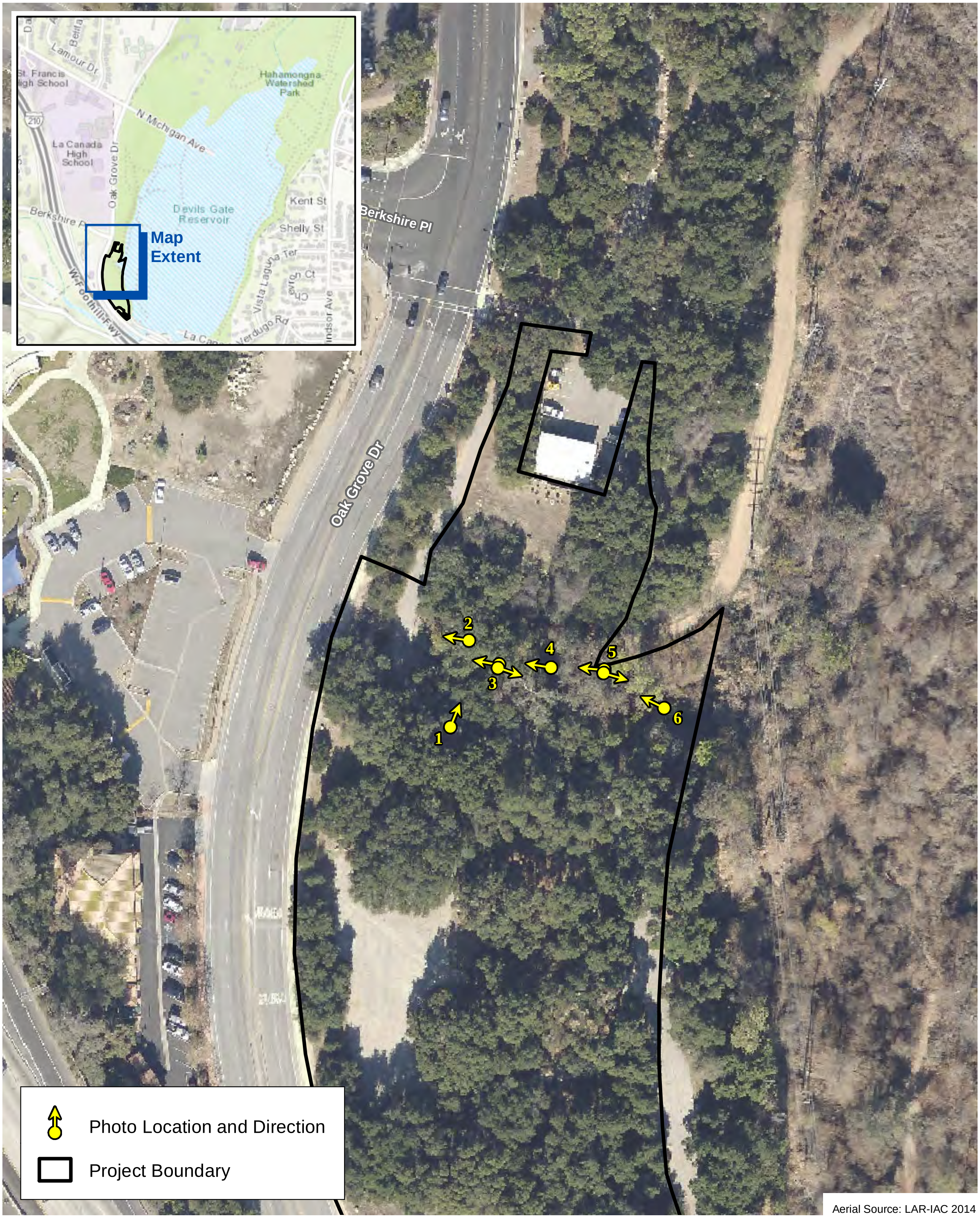
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

soil damp from urban runoff and dense shade, but not saturated

ATTACHMENT D

SITE PHOTOGRAPHS



D:\Projects\3PAS\010800\MXD\JD\ex_Photo_Locations_20190227.mxd

Photo Locations

Exhibit D-1

Jurisdictional Delineation Report for the Berkshire Creek Restoration Project

PSOMAS

(Rev: 05/02/2019 CJS) R:\Projects\PAS_Pasaden\3PAS010800\Graphics\JD\ex_Photo_Locations.pdf

Photo Location 1. May 25, 2018. Overview of upper Berkshire Creek.

Photo Location 2. May 25, 2018. View of dramatic elevation change as water enters Berkshire Creek.

D:\Projects\3PAS\010800\GRAPHICS\JD\ex_SP1_20190227.ai

Site Photos

Exhibit D-2

Jurisdictional Delineation Report for the Berkshire Creek Restoration Project

PSOMAS

(2/27/2019 CJS) R:\Projects\PAS_Pasaden\3PAS010800\Graphics\JD\ex_SP.pdf

Photo Location 3, facing upstream. May 25, 2018. View of heavily eroded left bank of upper Berkshire Creek.

Photo Location 3, facing downstream. May 25, 2018. View of eroded right bank of Berkshire Creek and exposed metal drain pipe.

D:\Projects\3PAS\010800\GRAPHICS\JD\ex_SP2_20190227.ai

Site Photos

Exhibit D-3

Jurisdictional Delineation Report for the Berkshire Creek Restoration Project

PSOMAS

(2/27/2019 CJS) R:\Projects\PAS_Pasaden\3PAS010800\Graphics\JD\ex_SP.pdf

Photo Location 4. May 25, 2018. View of Berkshire Creek from trail that crosses the creek.

Photo Location 5, facing upstream. May 25, 2018. View of eroded streambed in lower portion of Berkshire Creek.

D:\Projects\3PAS\010800\GRAPHICS\JD\ex_SP3_20190227ai

Photo Location 5, facing downstream. May 25, 2018. View of streambed conditions in lower portion of Berkshire Creek. Drain pipe in center of photo is disconnected to any other pipes.

Photo Location 6, facing upstream. May 25, 2018. View of metal drain pipes that are debris in Berkshire Creek.

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Site Photos

Exhibit D-5

Jurisdictional Delineation Report for the Berkshire Creek Restoration Project

PSOMAS

ATTACHMENT E

LITERATURE REVIEW DETAILS

This attachment provides detailed results of the literature review.

SOIL SERIES

The description identified below was obtained from the U.S. Department of Agriculture, Natural Resources Conservation Service.[16]

Urban land-Soboba complex, 0 to 5 percent slopes

Map Unit Setting

- *National map unit symbol:* 2pt3v
- *Elevation:* 310 to 2,080 feet
- *Mean annual precipitation:* 16 to 30 inches
- *Mean annual air temperature:* 63 to 66 degrees F
- *Frost-free period:* 350 to 365 days
- *Farmland classification:* Not prime farmland

Map Unit Composition

- *Urban land:* 45 percent
- *Soboba and similar soils:* 40 percent
- *Minor components:* 15 percent
- *Estimates are based on observations, descriptions, and transects of the mapunit.*

Description of Urban Land

Setting

- *Landform:* Alluvial fans
- *Landform position (three-dimensional):* Tread

Properties and qualities

- *Slope:* 0 to 5 percent
- *Depth to restrictive feature:* 0 inches to manufactured layer
- *Runoff class:* Very high
- *Frequency of flooding:* Rare

Interpretive groups

- *Land capability classification (irrigated):* None specified
- *Land capability classification (nonirrigated):* 8
- *Hydric soil rating:* No

Description of Soboba

Setting

- *Landform:* Alluvial fans
- *Landform position (three-dimensional):* Tread
- *Down-slope shape:* Linear
- *Across-slope shape:* Linear
- *Parent material:* Discontinuous human-transported material over alluvium derived from granite

16 U.S. Department of Agriculture, Natural Resources Conservation Service (USDA NRCS). 2016 (Accessed August). Official Soil Series Descriptions (OSDs) [View OSD by Series Name (with best-match feature)] Lincoln, NE: USDA NRCS. http://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/soils/ survey/class/data/?cid=nrcs142p2_053587.

Typical profile

- *A - 0 to 4 inches:* gravelly sand
- *C1 - 4 to 47 inches:* very cobbly sand
- *C2 - 47 to 79 inches:* extremely cobbly sand

Properties and qualities

- *Slope:* 0 to 5 percent
- *Depth to restrictive feature:* More than 80 inches
- *Natural drainage class:* Somewhat excessively drained
- *Runoff class:* Very low
- *Capacity of the most limiting layer to transmit water (Ksat):* High to very high (5.95 to 19.98 in/hr)
- *Depth to water table:* More than 80 inches
- *Frequency of flooding:* Rare
- *Frequency of ponding:* None
- *Available water storage in profile:* Very low (about 1.9 inches)

Interpretive groups

- *Land capability classification (irrigated):* None specified
- *Land capability classification (nonirrigated):* 6s
- *Hydrologic Soil Group:* A
- *Hydric soil rating:* No

Minor Components

Tujunga

- *Percent of map unit:* 5 percent
- *Landform:* Alluvial fans
- *Landform position (three-dimensional):* Tread
- *Down-slope shape:* Linear
- *Across-slope shape:* Linear
- *Hydric soil rating:* No

Typic xerorthents, very cobbly

- *Percent of map unit:* 5 percent
- *Landform:* Alluvial fans
- *Landform position (three-dimensional):* Tread
- *Down-slope shape:* Linear
- *Across-slope shape:* Linear
- *Hydric soil rating:* No

Palmview

- *Percent of map unit:* 5 percent
- *Landform:* Alluvial fans
- *Landform position (three-dimensional):* Tread
- *Down-slope shape:* Linear
- *Across-slope shape:* Linear
- *Hydric soil rating:* No

Urban land-Montebello-Xerorthents complex, 0 to 15 percent slopes, terraced

Map Unit Setting

- *National map unit symbol:* 2qdsh
- *Elevation:* 200 to 2,040 feet
- *Mean annual precipitation:* 15 to 26 inches
- *Mean annual air temperature:* 63 to 66 degrees F
- *Frost-free period:* 300 to 365 days
- *Farmland classification:* Not prime farmland

Map Unit Composition

- *Urban land:* 40 percent
- *Montebello and similar soils:* 25 percent
- *Xerorthents, coarse fill, and similar soils:* 20 percent
- *Minor components:* 15 percent
- *Estimates are based on observations, descriptions, and transects of the mapunit.*

Description of Urban Land

Setting

- *Landform:* Fan remnants

Properties and qualities

- *Slope:* 0 to 15 percent
- *Depth to restrictive feature:* 0 inches to manufactured layer
- *Runoff class:* Very high

Interpretive groups

- *Land capability classification (irrigated):* None specified
- *Land capability classification (nonirrigated):* 8
- *Hydric soil rating:* No

Description of Montebello

Setting

- *Landform:* Fan remnants
- *Landform position (three-dimensional):* Tread, riser
- *Down-slope shape:* Linear
- *Across-slope shape:* Linear
- *Parent material:* Human-transported material consisting mostly of alluvium derived from granite

Typical profile

- *^C1 - 0 to 41 inches:* sandy clay loam
- *^C1 - 41 to 55 inches:* sandy loam
- *^C2 - 55 to 79 inches:* sandy clay loam

Properties and qualities

- *Slope:* 0 to 15 percent
- *Depth to restrictive feature:* More than 80 inches
- *Natural drainage class:* Well drained
- *Runoff class:* Low
- *Capacity of the most limiting layer to transmit water (Ksat):*Moderately high to high (0.60 to 2.00 in/hr)
- *Depth to water table:* More than 80 inches

- *Frequency of flooding:* None
- *Frequency of ponding:* None
- *Salinity, maximum in profile:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
- *Sodium adsorption ratio, maximum in profile:* 5.0
- *Available water storage in profile:* Moderate (about 8.1 inches)

Interpretive groups

- *Land capability classification (irrigated):* None specified
- *Land capability classification (nonirrigated):* 3e
- *Hydrologic Soil Group:* B
- *Hydric soil rating:* No

Description of Xerorthents, Coarse Fill

Setting

- *Landform:* Fan remnants
- *Landform position (three-dimensional):* Tread, riser
- *Down-slope shape:* Linear
- *Across-slope shape:* Linear
- *Parent material:* Human-transported material over alluvium derived from granite

Typical profile

- *^A - 0 to 7 inches:* loam
- *^C1 - 7 to 13 inches:* sandy clay loam
- *^C2 - 13 to 24 inches:* sandy loam
- *^C3 - 24 to 33 inches:* sandy loam
- *^C4 - 33 to 41 inches:* sandy loam
- *^C5 - 41 to 54 inches:* sandy clay loam
- *2Bt - 54 to 79 inches:* sandy clay loam

Properties and qualities

- *Slope:* 0 to 15 percent
- *Depth to restrictive feature:* More than 80 inches
- *Natural drainage class:* Well drained
- *Runoff class:* Low
- *Capacity of the most limiting layer to transmit water (Ksat):*Moderately high (0.20 to 0.60 in/hr)
- *Depth to water table:* More than 80 inches
- *Frequency of flooding:* None
- *Frequency of ponding:* None
- *Salinity, maximum in profile:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
- *Available water storage in profile:* Moderate (about 9.0 inches)

Interpretive groups

- *Land capability classification (irrigated):* None specified
- *Land capability classification (nonirrigated):* 3e
- *Hydrologic Soil Group:* B
- *Hydric soil rating:* No

Minor Components

Azuvina

- *Percent of map unit:* 10 percent
- *Landform:* Fan remnants
- *Landform position (three-dimensional):* Tread

- *Down-slope shape:* Linear
- *Across-slope shape:* Linear
- *Hydric soil rating:* No

Palmview

- *Percent of map unit:* 5 percent
- *Landform:* Fan remnants
- *Landform position (three-dimensional):* Tread
- *Down-slope shape:* Linear
- *Across-slope shape:* Linear
- *Hydric soil rating:* No

Soboba and Tujunga soils, 0 to 5 percent slopes, frequently flooded

Map Unit Setting

- *National map unit symbol:* 2rshk
- *Elevation:* 400 to 2,350 feet
- *Mean annual precipitation:* 17 to 29 inches
- *Mean annual air temperature:* 64 to 66 degrees F
- *Frost-free period:* 300 to 365 days
- *Farmland classification:* Not prime farmland

Map Unit Composition

- *Soboba and similar soils:* 60 percent
- *Tujunga and similar soils:* 25 percent
- *Minor components:* 15 percent
- *Estimates are based on observations, descriptions, and transects of the mapunit.*

Description of Soboba

Setting

- *Landform:* Debris flows, stream terraces, washes
- *Landform position (three-dimensional):* Tread
- *Down-slope shape:* Linear
- *Across-slope shape:* Linear
- *Parent material:* Alluvium derived from granite

Typical profile

- *A - 0 to 3 inches:* very gravelly sand
- *C1 - 3 to 15 inches:* very gravelly sand
- *C2 - 15 to 61 inches:* extremely gravelly sand
- *C3 - 61 to 79 inches:* extremely cobbly sand

Properties and qualities

- *Slope:* 0 to 2 percent
- *Percent of area covered with surface fragments:* 0.8 percent
- *Depth to restrictive feature:* More than 80 inches
- *Natural drainage class:* Excessively drained
- *Runoff class:* Negligible
- *Capacity of the most limiting layer to transmit water (Ksat):* Very high (19.98 to 59.94 in/hr)
- *Depth to water table:* More than 80 inches
- *Frequency of flooding:* Frequent
- *Frequency of ponding:* None
- *Available water storage in profile:* Very low (about 1.9 inches)

Interpretive groups

- *Land capability classification (irrigated):* None specified
- *Land capability classification (nonirrigated):* 6s
- *Hydrologic Soil Group:* A
- *Hydric soil rating:* No

Description of Tujunga

Setting

- *Landform:* Inset fans, stream terraces, washes
- *Landform position (three-dimensional):* Tread
- *Down-slope shape:* Linear

- *Across-slope shape:* Linear
- *Parent material:* Alluvium derived from granite

Typical profile

- *^A - 0 to 9 inches:* loam
- *2C1 - 9 to 14 inches:* sand
- *2C2 - 14 to 17 inches:* gravelly sand
- *2C3 - 17 to 79 inches:* stratified sand

Properties and qualities

- *Slope:* 0 to 2 percent
- *Depth to restrictive feature:* More than 80 inches
- *Natural drainage class:* Somewhat excessively drained
- *Runoff class:* Low
- *Capacity of the most limiting layer to transmit water (Ksat):*Moderately high to high (0.60 to 2.00 in/hr)
- *Depth to water table:* More than 80 inches
- *Frequency of flooding:* Frequent
- *Frequency of ponding:* None
- *Salinity, maximum in profile:* Nonsaline (0.0 to 1.0 mmhos/cm)
- *Available water storage in profile:* Low (about 4.2 inches)

Interpretive groups

- *Land capability classification (irrigated):* None specified
- *Land capability classification (nonirrigated):* 4e
- *Hydrologic Soil Group:* B
- *Hydric soil rating:* No

Minor Components

Typic psammaquents

- *Percent of map unit:* 5 percent
- *Landform:* Flood plains, washes
- *Landform position (three-dimensional):* Rise
- *Down-slope shape:* Linear
- *Across-slope shape:* Linear
- *Hydric soil rating:* No

Aquic xerofluvents

- *Percent of map unit:* 5 percent
- *Landform:* Stream terraces
- *Landform position (three-dimensional):* Tread
- *Down-slope shape:* Linear
- *Across-slope shape:* Linear
- *Hydric soil rating:* No

Dams

- *Percent of map unit:* 3 percent
- *Hydric soil rating:* No

Urban land

- *Percent of map unit:* 2 percent
- *Landform:* Washes
- *Hydric soil rating:* No

NATIONAL WETLANDS INVENTORY

The following resources are downstream of the survey area in Devil's Gate Reservoir: PSSCh, PEM1Fh, and PEM1/USCh (Exhibit 5).

The following description pertains to the PSSCh wetland type:

- **P: System PALUSTRINE.** The Palustrine System includes all nontidal wetlands dominated by trees, shrubs, emergents, mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean-derived salts is below 0.5 part per trillion (ppt). Wetlands lacking such vegetation are also included if they exhibit all of the following characteristics: (1) are less than 8 hectares (20 acres); (2) do not have an active wave-formed or bedrock shoreline feature; (3) have at low water a depth of less than 6.6 feet in the deepest part of the basin; and (4) have salinity due to ocean-derived salts of less than 0.5 ppt.
    - **SS: Class SCRUB-SHRUB.** This class includes areas dominated by woody vegetation less than 6 m (20 feet) tall. The species include true shrubs, young trees (saplings), and trees or shrubs that are small or stunted because of environmental conditions.
        - **C: Water Regime SEASONALLY FLOODED.** Surface water is present for extended periods especially early in the growing season, but is absent by the end of the growing season in most years. The water table after flooding ceases is variable, extending from saturated to the surface to a water table well below the ground surface.
            - **h: Special Modifier DIKED/IMPOUNDED.** These wetlands have been created or modified by a man-made barrier or dam that obstructs the inflow or outflow of water.

The following description pertains to the PEM1Fh wetland type:

- **P: System PALUSTRINE.** The Palustrine System includes all nontidal wetlands dominated by trees, shrubs, emergents, mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean-derived salts is below 0.5 part per trillion (ppt). Wetlands lacking such vegetation are also included if they exhibit all of the following characteristics: (1) are less than 8 hectares (20 acres); (2) do not have an active wave-formed or bedrock shoreline feature; (3) have at low water a depth of less than 6.6 feet in the deepest part of the basin; and (4) have salinity due to ocean-derived salts of less than 0.5 ppt.
    - **EM: Class EMERGENT.** Characterized by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. These wetlands are usually dominated by perennial plants.
        - **1**: **Subclass PERSISTENT**. Dominated by species that normally remain standing at least until the beginning of the next growing season. This subclass is found only in the Estuarine and Palustrine systems.
            - **F: Water Regime SEMIPERMANENTLY FLOODED.** Surface water persists throughout the growing season in most years. When surface water is absent, the water table is usually at or very near the land surface.
                - **h: Special Modifier DIKED/IMPOUNDED.** These wetlands have been created or modified by a man-made barrier or dam that obstructs the inflow or outflow of water.

The following description pertains to the PEM1/USCh wetland type:

- **P: System PALUSTRINE.** The Palustrine System includes all nontidal wetlands dominated by trees, shrubs, emergents, mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean-derived salts is below 0.5 part per trillion (ppt). Wetlands lacking such vegetation are also included if they exhibit all of the following characteristics: (1) are less than 8 hectares (20 acres); (2) do not have an active wave-formed or bedrock shoreline feature; (3) have at low water a depth of less than 6.6 feet in the deepest part of the basin; and (4) have salinity due to ocean-derived salts of less than 0.5 ppt.
  - **EM: Split-Class EMERGENT.** Characterized by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. These wetlands are usually dominated by perennial plants.
    - **1**: **Subclass PERSISTENT**. Dominated by species that normally remain standing at least until the beginning of the next growing season. This subclass is found only in the Estuarine and Palustrine systems.
  - **US: Split-Class UNCONSOLIDATED SHORE.** Includes all wetland habitats having two characteristics: (1) unconsolidated substrates with less than 75 percent areal cover of stones, boulders or bedrock and; (2) less than 30 percent areal cover of vegetation. Landforms such as beaches, bars, and flats are included in the Unconsolidated Shore class.
    - **C: Water Regime SEASONALLY FLOODED.** Surface water is present for extended periods especially early in the growing season, but is absent by the end of the growing season in most years. The water table after flooding ceases is variable, extending from saturated to the surface to a water table well below the ground surface.
      - **h: Special Modifier DIKED/IMPOUNDED.** These wetlands have been created or modified by a man-made barrier or dam that obstructs the inflow or outflow of water.

BASIN PLAN BENEFICIAL USES

The *Water Quality Control Plan: Los Angeles Region* (Basin Plan) identifies a number of beneficial uses, some or all of which may apply to a specific hydrologic subarea (HSA), including: Municipal and Domestic Water Supply (MUN) waters; Agricultural Supply (AGR) waters; Industrial Process Supply (PROC) waters; Industrial Service Supply waters (IND); Groundwater Recharge (GWR) waters; Freshwater Replenishment (FRSH); Navigation (NAV) waters; Hydropower Generation (POW) waters; Water Contact Recreation (REC1) waters; Non-Contact Water Recreation (REC2) waters; Commercial and Sport Fishing (COMM) waters; Aquaculture (AQUA) waters; Warm Fresh Water Habitat (WARM) waters; Cold Fresh Water Habitat (COLD) waters; Inland Saline Water Habitat (SAL) waters; Estuarine Habitat (EST) waters; Wetland Habitat (WET) waters; Marine Habitat (MAR) waters; Wildlife Habitat (WILD) waters; Preservation of Biological Habitats of Special Significance (BIOL) waters; Rare, Threatened or Endangered Species (RARE) waters; Migration of Aquatic Organisms (MIGR) waters; Spawning, Reproduction and Development (SPWN) waters; and Shellfish Harvesting (SHELL) waters. Beneficial uses associated with the Arroyo Seco are described in detail below; beneficial uses not described below do not apply to the Arroyo Seco.

- MUN waters support community, military, or individual water supply systems including, but not limited to, drinking water supply.
- GWR waters are used for natural or artificial recharge of groundwater for purposes that may include, but are not limited to, future extraction, maintaining water quality, or halting saltwater intrusion into freshwater aquifers.
- WARM waters support warm water ecosystems that may include, but are not limited to, preservation and enhancement of aquatic habitats, vegetation, fish, and wildlife (including invertebrates).
- WILD waters support wildlife habitats that may include, but are not limited to, the preservation and enhancement of vegetation and prey species used by waterfowl and other wildlife.
- REC 1 includes water for recreational activities involving bodily contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, water-skiing, skin and scuba diving, surfing, white water activities, fishing, or use of natural hot springs.

ATTACHMENT F

NATIONWIDE PERMIT SUMMARY

The following is a summary of Nationwide Permits 13 (Bank Stabilization) and 43 (Stormwater Management Facilities).

NATIONWIDE PERMIT 13: BANK STABILIZATION

Bank stabilization activities necessary for erosion control or prevention, such as vegetative stabilization, bioengineering, sills, rip rap, revetment, gabion baskets, stream barbs, and bulkheads, or combinations of bank stabilization techniques, provided the activity meets all of the following criteria:

(a) No material is placed in excess of the minimum needed for erosion protection;

(b) The activity is no more than 500 feet in length along the bank, unless the district engineer waives this criterion by making a written determination concluding that the discharge will result in no more than minimal adverse environmental effects (an exception is for bulkheads – the district engineer cannot issue a waiver for a bulkhead that is greater than 1,000 feet in length along the bank);

(c) The activity will not exceed an average of one cubic yard per running foot, as measured along the length of the treated bank, below the plane of the ordinary high water mark or the high tide line, unless the district engineer waives this criterion by making a written determination concluding that the discharge will result in no more than minimal adverse environmental effects;

(d) The activity does not involve discharges of dredged or fill material into special aquatic sites, unless the district engineer waives this criterion by making a written determination concluding that the discharge will result in no more than minimal adverse environmental effects;

(e) No material is of a type, or is placed in any location, or in any manner, that will impair surface water flow into or out of any waters of the United States;

(f) No material is placed in a manner that will be eroded by normal or expected high flows (properly anchored native trees and treetops may be used in low energy areas);

(g) Native plants appropriate for current site conditions, including salinity, must be used for bioengineering or vegetative bank stabilization;

(h) The activity is not a stream channelization activity; and

(i) The activity must be properly maintained, which may require repairing it after severe storms or erosion events. This NWP authorizes those maintenance and repair activities if they require authorization.

This NWP also authorizes temporary structures, fills, and work, including the use of temporary mats, necessary to construct the bank stabilization activity. Appropriate measures must be taken to maintain normal downstream flows and minimize flooding to the maximum extent practicable, when temporary structures, work, and discharges, including cofferdams, are necessary for construction activities, access fills, or dewatering of construction sites. Temporary fills must consist of materials, and be placed in a manner, that will not be eroded by expected high flows. After construction, temporary fills must be removed in their entirety and the affected areas returned to preconstruction elevations. The areas affected by temporary fills must be revegetated, as appropriate.

Notification: The permittee must submit a pre-construction notification to the district engineer prior to commencing the activity if the bank stabilization activity: (1) involves discharges into special aquatic sites; or (2) is in excess of 500 feet in length; or (3) will involve the discharge of greater than an average of one cubic yard per running foot as measured along the length of the treated bank, below the plane of the ordinary high water mark or the high tide line. (See general condition 32.).

NATIONWIDE PERMIT 43: STORMWATER MANAGEMENT FACILITIES

Discharges of dredged or fill material into non-tidal waters of the United States for the construction of stormwater management facilities, including stormwater detention basins and retention basins and other stormwater management facilities; the construction of water control structures, outfall structures and emergency spillways; the construction of low impact development integrated management features such as bioretention facilities (e.g., rain gardens), vegetated filter strips, grassed swales, and infiltration trenches; and the construction of pollutant reduction green infrastructure features designed to reduce inputs of sediments, nutrients, and other pollutants into waters to meet reduction targets established under Total Daily Maximum Loads set under the Clean Water Act.

This NWP authorizes, to the extent that a section 404 permit is required, discharges of dredged or fill material into non-tidal waters of the United States for the maintenance of stormwater management facilities, low impact development integrated management features, and pollutant reduction green infrastructure features. The maintenance of stormwater management facilities, low impact development integrated management features, and pollutant reduction green infrastructure features that are not waters of the United States does not require a section 404 permit.

The discharge must not cause the loss of greater than 1/2-acre of non-tidal waters of the United States. The discharge must not cause the loss of more than 300 linear feet of stream bed, unless for intermittent and ephemeral stream beds the district engineer waives the 300 linear foot limit by making a written determination concluding that the discharge will result in no more than minimal adverse environmental effects. This NWP does not authorize discharges into non-tidal wetlands adjacent to tidal waters. The loss of stream bed plus any other losses of jurisdictional wetlands and waters caused by the NWP activity cannot exceed 1/2-acre. This NWP does not authorize discharges of dredged or fill material for the construction of new stormwater management facilities in perennial streams.

Notification: For discharges into non-tidal waters of the United States for the construction of new stormwater management facilities or pollutant reduction green infrastructure features, or the expansion of existing stormwater management facilities or pollutant reduction green infrastructure features, the permittee must submit a pre-construction notification to the district engineer prior to commencing the activity. (See general condition 32.) Maintenance activities do not require pre-construction notification if they are limited to restoring the original design capacities of the stormwater management facility or pollutant reduction green infrastructure feature.

GENERAL CONDITION 32: PRE-CONSTRUCTION NOTIFICATION

a. Timing. Where required by the terms of the NWP, the prospective permittee must notify the district engineer by submitting a pre-construction notification (PCN) as early as possible. The district engineer must determine if the PCN is complete within 30 calendar days of the date of receipt and, if the PCN is determined to be incomplete, notify the prospective permittee within that 30 day period to request the additional information necessary to make the PCN complete. The request must specify the information needed to make the PCN complete. As a general rule, district engineers will request additional information necessary to make the PCN complete only once. However, if the prospective permittee does not provide all of the requested information, then the district engineer will notify the prospective permittee that the PCN is still incomplete and the PCN review process will not commence until all of the requested information has been received by the district engineer. The prospective permittee shall not begin the activity until either:

1. He or she is notified in writing by the district engineer that the activity may proceed under the NWP with any special conditions imposed by the district or division engineer; or

2. 45 calendar days have passed from the district engineer's receipt of the complete PCN and the prospective permittee has not received written notice from the district or division engineer. However, if the permittee was required to notify the Corps pursuant to general condition 18 that listed species or critical habitat might be affected or in the vicinity of the project, or to notify the Corps pursuant to general condition 20 that the activity may have the potential to cause effects to historic properties, the permittee cannot begin the activity until receiving written notification from the Corps that there is "no effect" on listed species or "no potential to cause effects" on historic properties, or that any consultation required under Section 7 of the Endangered Species Act (see 33 CFR 330.4(f)) and/or Section 106 of the National Historic Preservation (see 33 CFR 330.4(g)) has been completed. Also, work cannot begin under NWPs 21, 49, or 50 until the permittee has received written approval from the Corps. If the proposed activity requires a written waiver to exceed specified limits of an NWP, the permittee may not begin the activity until the district engineer issues the waiver. If the district or division engineer notifies the permittee in writing that an individual permit is required within 45 calendar days of receipt of a complete PCN, the permittee cannot begin the activity until an individual permit has been obtained. Subsequently, the permittee's right to proceed under the NWP may be modified, suspended, or revoked only in accordance with the procedure set forth in 33 CFR 330.5(d)(2).

b. Contents of Pre-Construction Notification: The PCN must be in writing and include the following information:

   1. Name, address and telephone numbers of the prospective permittee;

   2. Location of the proposed project;

   3. A description of the proposed project; the project's purpose; direct and indirect adverse environmental effects the project would cause, including the anticipated amount of loss of water of the United States expected to result from the NWP activity, in acres, linear feet, or other appropriate unit of measure; any other NWP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity. The description should be sufficiently detailed to allow the district engineer to determine that the adverse effects of the project will be minimal and to determine the need for compensatory mitigation. Sketches should be provided when necessary to show that the activity complies with the terms of the NWP. (Sketches usually clarify the project and when provided results in a quicker decision. Sketches should contain sufficient detail to provide an illustrative description of the proposed activity (e.g., a conceptual plan), but do not need to be detailed engineering plans);

   4. The PCN must include a delineation of wetlands, other special aquatic sites, and other waters, such as lakes and ponds, and perennial, intermittent, and ephemeral streams, on the project site. Wetland delineations must be prepared in accordance with the current method required by the Corps. The permittee may ask the Corps to delineate the special aquatic sites and other waters on the project site, but there may be a delay

if the Corps does the delineation, especially if the project site is large or contains many waters of the United States. Furthermore, the 45 day period will not start until the delineation has been submitted to or completed by the Corps, as appropriate;

5. If the proposed activity will result in the loss of greater than 1/10-acre of wetlands and a PCN is required, the prospective permittee must submit a statement describing how the mitigation requirement will be satisfied, or explaining why the adverse effects are minimal and why compensatory mitigation should not be required. As an alternative, the prospective permittee may submit a conceptual or detailed mitigation plan.

6. If any listed species or designated critical habitat might be affected or is in the vicinity of the project, or if the project is located in designated critical habitat, for non-Federal applicants the PCN must include the name(s) of those endangered or threatened species that might be affected by the proposed work or utilize the designated critical habitat that may be affected by the proposed work. Federal applicants must provide documentation demonstrating compliance with the Endangered Species Act; and

7. For an activity that may affect a historic property listed on, determined to be eligible for listing on, or potentially eligible for listing on, the National Register of Historic Places, for non-Federal applicants the PCN must state which historic property may be affected by the proposed work or include a vicinity map indicating the location of the historic property. Federal applicants must provide documentation demonstrating compliance with Section 106 of the National Historic Preservation Act.

c. Form of Pre-Construction Notification: The standard individual permit application form (Form ENG 4345) may be used, but the completed application form must clearly indicate that it is a PCN and must include all of the information required in paragraphs (b)(1) through (7) of this general condition. A letter containing the required information may also be used.

d. Agency Coordination:

1. The district engineer will consider any comments from Federal and state agencies concerning the proposed activity's compliance with the terms and conditions of the NWPs and the need for mitigation to reduce the project's adverse environmental effects to a minimal level.

2. For all NWP activities that require pre-construction notification and result in the loss of greater than 1/2-acre of waters of the United States, for NWP 21, 29, 39, 40, 42, 43, 44, 50, 51, and 52 activities that require pre-construction notification and will result in the loss of greater than 300 linear feet of intermittent and ephemeral stream bed, and for all NWP 48 activities that require pre-construction notification, the district engineer will immediately provide (e.g., via e-mail, facsimile transmission, overnight mail, or other expeditious manner) a copy of the complete PCN to the appropriate Federal or state offices (U.S. FWS, state natural resource or water quality agency, EPA, State Historic Preservation Officer (SHPO) or Tribal Historic Preservation Office (THPO), and, if appropriate, the NMFS). With the exception of NWP 37, these agencies will have 10 calendar days from the date the material is transmitted to telephone or fax the district engineer notice that they intend to provide substantive, site-specific comments.

   The comments must explain why the agency believes the adverse effects will be more than minimal. If so contacted by an agency, the district engineer will wait an additional 15 calendar days before making a decision on the pre-construction notification. The district engineer will fully consider agency comments received within the specified time frame concerning the proposed activity's compliance with the terms and conditions of the NWPs, including the need for mitigation to ensure the net adverse environmental effects to the aquatic environment of the proposed activity are minimal. The district engineer will provide no response to the resource agency, except as provided below. The district engineer will indicate in the administrative record associated with each pre-construction notification that the resource agencies' concerns were considered. For NWP 37, the emergency watershed protection and rehabilitation activity may proceed immediately in cases where there is an unacceptable hazard to life or a significant loss of property or economic hardship will occur. The district engineer will consider any comments received to decide whether the NWP 37 authorization should be modified, suspended, or revoked in accordance with the procedures at 33 CFR 330.5.

3. In cases of where the prospective permittee is not a Federal agency, the district engineer will provide a response to NMFS within 30 calendar days of receipt of any Essential Fish Habitat conservation recommendations, as required by Section 305(b)(4)(B) of the Magnuson-Stevens Fishery Conservation and Management Act.

4. Applicants are encouraged to provide the Corps with either electronic files or multiple copies of pre-construction notifications to expedite agency coordination.

Appendix B-2

Impacted Trees Table

TABLE B-2
TREE/PLANT REMOVALS

Unique Tree ID	Point or Polygon	Count (number of individuals represented)	Species		Number of Trunks	DBH (diameter at breast height) (inches)	Canopy Width (ft)	ISA Condition	Health Rating	Removal		Notes
			Common Name	Scientific Name						Engineer Removal (Condition-Based	Biological Removal (Non-Condition Based)	
Removals Outside of Berkshire Creek Component												
1	Polygon	1	non-native cactus	*Opuntia sp., Agave sp.*	N/A	N/A	N/A	N/A	N/A		x	non-tee; cactus patch
2	Polygon	1	non-native cactus	*Opuntia sp., Agave sp., Aloe sp.*	N/A	N/A	N/A	N/A	N/A		x	non-tee; cactus patch
3	Point	1	non-native cactus	*Opuntia sp.*	N/A	N/A	N/A	N/A	N/A		x	non-tee; individual cactus
4	Point	1	carob	*Ceratonia siliqua*	2	2	8	4	4		x	
5	Point	1	common fig	*Ficus carica*	8	15	25	3	3		x	
6	Point	1	evergreen ash	*Fraxinus uhdei*	1	5	25	4	4		x	
7	Point	2	carob	*Ceratonia siliqua*	2	6	12	4	4		x	
8	Point	2	tree of heaven	*Ailanthus altissima*	3-5	1-2	4	4	4		x	
9	Point	2	tree tobacco	*Nicotiana glauca*	N/A	N/A	N/A	N/A	N/A		x	non-tree; shrub
10	Point	5	tree of heaven	*Ailanthus altissima*	3-5	1-2	5	4	4		x	
11	Point	8	tree of heaven	*Ailanthus altissima*	3-5	1-2	10	4	4		x	
12	Polygon	11	Bailey acacia	*Acacia baileyana*	1-4	7-12	25	4	4		x	
13	Polygon	12	French broom	*Genista monspessulana*	N/A	N/A	N/A	N/A	N/A		x	non-tree; shrub
14	Polygon	28	Spanish broom	*Spartium junceum*	N/A	N/A	N/A	N/A	N/A		x	non-tree; shrub
15	Polygon	35	French broom	*Genista monspessulana*	N/A	N/A	N/A	N/A	N/A		x	non-tree; shrub
Total		111										
Removals Within Berkshire Creek Component												
BC-5	Point	1	Acacia	*Acacia sp.*	8	3.8	25	3	4	x	x	
BC-8	Polygon	12	mixed	*mixed*	2	0.7	2.5	4	4	x	x	7 *Fraxinus uhdei* and 5 *Washingtonia robusta*
BC-12	Point	1	Shamel ash	*Fraxinus uhdei*	1	14.0	35	4	4	x	x	
BC-13	Point	1	Shamel ash	*Fraxinus uhdei*	2	16.0	35	4	4	x	x	
BC-16	Point	1	blue gum	*Eucalyptus globulus*	1	28.0	45	4	4	x	x	
BC-19	Point	1	Shamel ash	*Fraxinus uhdei*	1	10.6	30	4	4		x	
BC-22	Point	1	Shamel ash	*Fraxinus uhdei*	1	21.7	45	4	4	x	x	
BC-23	Point	1	Shamel ash	*Fraxinus uhdei*	4	1.0	4	4	4	x	x	
BC-28	Polygon	12	Shamel ash	*Fraxinus uhdei*	1	0.3	0.5	4	4		x	12 *Fraxinus uhdei*
BC-30	Point	1	blue gum	*Eucalyptus globulus*	3	47.7	90	3	4	x	x	
BC-31	Point	1	**willow**	***Salix sp.***	1	18.7	40	1	1	x		Poor condition, unable to determine species
BC-32	Point	1	Shamel ash	*Fraxinus uhdei*	1	10.6	20	4	4	x	x	
BC-33	Point	1	Shamel ash	*Fraxinus uhdei*	1	6.5	15	3	4	x	x	
BC-34	Point	1	Shamel ash	*Fraxinus uhdei*	1	6.8	15	3	4	x	x	
BC-35	Point	1	Shamel ash	*Fraxinus uhdei*	1	7.2	15	3	4	x	x	
BC-36	Point	1	blue gum	*Eucalyptus globulus*	2	17.8	40	3	3	x	x	
BC-37	Point	1	Shamel ash	*Fraxinus uhdei*	4	24.8	45	4	4	x	x	
BC-38	Point	1	Shamel ash	*Fraxinus uhdei*	1	12.1	40	2	4	x	x	
BC-39	Point	1	Shamel ash	*Fraxinus uhdei*	1	0.3	1	4	4	x	x	
BC-40	Point	1	**holly leaf cherry**	***Prunus ilicifolia***	9	6.0	20	3	3	x		suspended root ball (erosion)
BC-41	Point	1	Shamel ash	*Fraxinus uhdei*	1	19.5	30	4	4		x	

TABLE B-2
TREE/PLANT REMOVALS

Unique Tree ID	Point or Polygon	Count (number of individuals represented)	Species		Number of Trunks	DBH (diameter at breast height) (inches)	Canopy Width (ft)	ISA Condition	Health Rating	Removal		Notes
			Common Name	Scientific Name						Engineer Removal (Condition-Based	Biological Removal (Non-Condition Based)	
BC-42	Point	1	Shamel ash	*Fraxinus uhdei*	1	14.6	25	4	4		x	
BC-43	Point	1	**willow**	***Salix sp.***	3	25.7	35	1	1	x		Poor condition, unable to determine species
BC-44	Point	1	Shamel ash	*Fraxinus uhdei*	1	15.6	30	3	4		x	
BC-45	Point	1	Shamel ash	*Fraxinus uhdei*	1	3.5	15	4	4		x	
BC-46	Point	1	Shamel ash	*Fraxinus uhdei*	4	3.5	15	4	4		x	
BC-47	Point	1	Shamel ash	*Fraxinus uhdei*	1	8.9	25	4	4		x	
BC-48	Point	1	Shamel ash	*Fraxinus uhdei*	1	3.0	10	4	4		x	
BC-49	Point	1	Shamel ash	*Fraxinus uhdei*	1	1.0	5	4	4		x	
BC-50	Point	1	Shamel ash	*Fraxinus uhdei*	2	2.3	15	4	4		x	
BC-51	Point	1	**arroyo willow**	***Salix lasiolepis***	1	7.9	25	4	4	x		
BC-52	Point	1	Shamel ash	*Fraxinus uhdei*	1	13.2	35	4	4	x	x	
Total		54										
Bold = native												

Appendix C-1

Historic Resources Technical Memorandum

Architectural Resources Group
360 E. 2nd Street, Suite 225
Los Angeles, California 90012
arg-la.com

February 27, 2019

Historical Resources Technical Memorandum
Berkshire Creek Area Improvements Project

Introduction and Project Overview
At the request of the City of Pasadena and under contract to Psomas, Architectural Resources Group, Inc. (ARG) has prepared this technical memorandum containing an abbreviated Historical Resources Assessment (HRA) for the Berkshire Creek Area Improvements Project (Project(.

This memorandum draws heavily on ARG's previous HRA for the larger Oak Grove Area within Hahamongna Watershed Park (finalized November 19, 2018) and that document is incorporated by reference. The previous HRA contains a detailed property description, development history, historic context, and eligibility evaluations under national, state, and local eligibility criteria. It found that the Oak Grove area is not eligible for designation as an overall district or site, but that the Oak Grove Disc Golf Course is eligible for listing in the California Register of Historical Resources and as a City of Pasadena Historic Monument and Landmark, as the first permanent designed disc golf course in the world, and for its association with significant individual "Steady" Ed Headrick.

This study assesses the Berkshire Creek project area within Oak Grove Park for historical resources. As discussed below, the Project area does not contain any historical resources.

Project Description
The primary goal of the Project is to improve the ecological, hydrological, and recreational conditions throughout the lower third portion of Oak Grove Park. This would be achieved by addressing the degraded conditions at the Berkshire Place Storm Drain No. 12 storm drain outlet and downstream areas; implementing localized trail improvements; replacing asphalt with a permeable surface at the equestrian picnic area parking lot; installing interpretive signage; and restoring the riparian, coastal sage scrub, and oak woodland habitats throughout the Project site. The Berkshire Creek restoration component is the most complex undertaking, and would involve the removal of the existing stormwater management infrastructure ; addition of a new, replacement infrastructure; installation of a new pedestrian/equestrian/ bicyclist bridge over the creek; and riparian habitat restoration. Generally, habitat restoration would encompass replacement of non-native plant species with locally-appropriate species and planting and other erosion control measures in areas adversely

affected by human activity, such as volunteer trails that would be eliminated. Additionally, an estimated 3 to 4 interpretive signs and 6 to 7 trail signs would be installed in and around the newly restored habitat and improved trails throughout the Project site to provide park user educational information and foster stewardship of the restored areas.

Methodology

For preparation of this memo, ARG reviewed the previous HRA and re-compiled its information in accordance with the current Project area boundaries. Mary Ringhoff of ARG conducted a site visit on November 14, 2018 to examine the Project area and confirm the presence or absence of historic resources as noted in the previous HRA. Project area overview photos were taken at this time. Evaluations of eligibility using National Register, California Register, and City of Pasadena criteria drew on the historic context statement from the previous HRA and assessments of integrity per National Register guidelines.

This report was prepared by Mary Ringhoff, Associate, who meets the *Secretary of the Interior's Professional Qualifications Standards* in Architectural History, History, and Archaeology.

Sites and Features within Study Area

The Project area comprises flat and gently sloping areas around the Oak Grove maintenance office building/yard and the equestrian picnic area; west-facing slopes in the Sunrise Overlook area; and the steep east-trending drainage of Berkshire Creek itself. A number of architectural resources are present within the Project area, including a public restroom; picnic tables with integral benches; hitching posts; mortared stone features (horse troughs, small tables with separate stools); a utility structure near the equestrian picnic area; engineered trails; an engineered road; and culverts. All of the observed features post-date 1970; some were built during a 1971 improvement program by Los Angeles County, some in the equestrian picnic area date to 1977, and others (like picnic tables and horse troughs) were constructed by the City ca. 2008.

Newly Identified Structure: Concrete Utility Structure

One of the structures noted above was not identified in the previous HRA. This is a rectangular utility structure, essentially a box of board-formed concrete standing about 5' tall at the southeast corner of the equestrian picnic area. A steel exterior ladder accesses the top, which has three perforated steel pipe vents projecting from it. A metal utility box is affixed to one side. The exact age and function of this structure are not known, but its overall appearance and location indicate it post-dates 1970 and is not a vestige of earlier park activity.

Concrete utility structure (post-1970) near equestrian picnic area, view to southeast. ARG, 2018.

Summary of Historic Context

Oak Grove Park is located in the Upper Arroyo Seco, immediately west of Devil's Gate Dam. The Berkshire Creek Project encompasses approximately 4.7 acres in the southernmost portion of Oak Grove Park. The City of Pasadena began developing the area for recreation and as a flood control basin in 1919. Over time portions of the park were managed by Los Angeles County with input from various water companies, and federal entities like the California Conservation Corps and the U.S. Army used parts of the park on a short-term basis. Between the 1920s and the 1960s, Oak Grove Park's primary activities were picnicking, camping, and horseback riding. Development of the park appears to have been relatively minimal, allowing it to retain its natural feel and oak woodland character.

In 1968, Pasadena entered into a 25-year lease agreement that turned operation and maintenance of the 53-acre Oak Grove Park over to Los Angeles County, so it could be developed into a regional park.[1] The County embarked on a development project, removing most existing building and structures in 1969 and ending overnight camping except for regularly organized youth groups. In 1971, the County added improvements like new bathrooms, a maintenance shop, new trails and roads, and other amenities. These improvements paved the way for a new form of recreation in Oak Grove Park: disc golf.

In 1975, local disc golf enthusiasts led by "Steady" Ed Headrick convinced the County to let them install the world's first permanent disc golf course in Oak Grove Park. Headrick established the Disc Golf and Professional Disc Golf Associations in the 1970s to publicize and standardize rules of play on the national level, and as a result is widely considered to be the father of disc golf. Unlike a standard golf course, the Oak Grove Disc Golf Course was designed to integrate into the natural topography and oak woodland of the park; the course's oak trees served as course hazards as well as landscaping. It featured hexagonal concrete tee pads with wood bumpers, and basket-style metal "pole holes" set into the wooded flats and slopes of the park. The course was an instant and unexpected success. Over the decades, the course has seen minor alterations and a change in the direction of course play. However, the overall design and feel of the world's first disc golf course remain intact, embodying the birthplace of disc golf as a standardized sport.

[1] County of Los Angeles, "Oak Grove County Park" (summary of facilities), ca. 1971. On file at City of Pasadena Department of Public Works, Parks & Natural Resources Division. Oak Grove Park returned to City of Pasadena control in 1993.

Evaluation of Eligibility

The following built/architectural features are identified within the Project area and have been determined not to be eligible for listing in the National Register, California Register, or as a City of Pasadena Landmark/Historic Monument either as a group (site/district) or individually:

- Public restroom building (ca. 2008)
- Picnic tables with integral benches (ca. 2008)
- Hitching posts (ca. 2008)
- Mortared stone features (horse troughs, small tables with separate stools) (ca. 2008)
- Utility structure near equestrian picnic area (ca. 1977)
- Engineered trails (post-1971)
- Engineered road (post-1971)
- Culverts (dates unknown)

Oak Grove Park's known historical resource, the Oak Grove Disc Golf Course, is not located within the Berkshire Creek Area Improvements Project site boundary. At its closest point, it is approximately 750 feet from the north boundary of the Project site.

Conclusion

ARG's investigation of the Berkshire Creek Area Improvements Project area found that the Project area contains no historical resources, and it is located approximately 750 feet from the nearest identified historic resource (Oak Grove Disc Golf Course). As no resources are present, the proposed project would have no impact.

Regional Location and Local Vicinity

Exhibit 1

Berkshire Creek Area Improvements Project

N W E S

500 250 0 500 Feet

PSOMAS

(Rev: 02/25/2019 MMD) R:\Projects\PAS_Pasaden\3PAS010801\Graphics\Berkshire_Creek\MND\Ex_Project_Location.pdf

Appendix C-2

Cultural Resources Data

STATE OF CALIFORNIA **Edmund G. Brown, Jr., Governor**

NATIVE AMERICAN HERITAGE COMMISSION
Cultural and Environmental Department
1550 Harbor Blvd., Suite 100 West Sacramento, CA 95691 Phone: (916) 373-3710
Email: nahc@nahc.ca.gov
Website: http://www.nahc.ca.gov
Twitter: @CA_NAHC

December 19, 2018

Kassie Sugimoto
PSOMAS

VIA Email to: Kassie.Sugimoto@psomas.com

RE: Oak Grove 3PAS010801, Los Angeles County.

Dear Ms. Sugimoto:

A record search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was completed for the information you have submitted for the above referenced project. The results were negative. However, the absence of specific site information in the SLF does not indicate the absence of cultural resources in any project area. Other sources of cultural resources should also be contacted for information regarding known and recorded sites.

Attached is a list of Native American tribes who may also have knowledge of cultural resources in the project area. This list should provide a starting place in locating areas of potential adverse impact within the proposed project area. I suggest you contact all of those indicated; if they cannot supply information, they might recommend others with specific knowledge. By contacting all those listed, your organization will be better able to respond to claims of failure to consult with the appropriate tribe. If a response has not been received within two weeks of notification, the Commission requests that you follow-up with a telephone call or email to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from tribes, please notify me. With your assistance we are able to assure that our lists contain current information. If you have any questions or need additional information, please contact me at my email address: katy.sanchez@nahc.ca.gov.
Sincerely,

Katy Sanchez

KATY SANCHEZ
Associate Environmental Planner

Attachment

Native American Heritage Commission
Native American Contacts List
12/18/2018

Gabrieleno Band of Mission Indians - Kizh Nation
Andrew Salas, Chairperson
P.O. Box 393 — Gabrielino
Covina ,CA 91723
admin@gabrielenoindians.org
(626) 926-4131

Gabrielino-Tongva Tribe
Charles Alvarez, Councilmember
23454 Vanowen St. — Gabrielino
West Hills ,CA 91307
roadkingcharles@aol.com
(310) 403-6048

Gabrieleno/Tongva San Gabriel Band of Mission Indians
Anthony Morales, Chairperson
P.O. Box 693 — Gabrielino Tongva
San Gabriel ,CA 91778
GTTribalcouncil@aol.com
(626) 483-3564 Cell
(626) 286-1262 Fax

Gabrielino /Tongva Nation
Sandonne Goad, Chairperson
106 1/2 Judge John Aiso St., #231 — Gabrielino Tongva
Los Angeles ,CA 90012
sgoad@gabrielino-tongva.com
(951) 807-0479

Gabrielino Tongva Indians of California Tribal Council
Robert F. Dorame, Chairman
P.O. Box 490 — Gabrielino Tongva
Bellflower ,CA 90707
gtongva@gmail.com
(562) 761-6417 Voice/Fax

Gabrielino-Tongva Tribe
Linda Candelaria, Chairperson
80839 Camino Santa Juliana — Gabrielino
Indio ,CA 92203
lcandelaria1@gabrielinotribe.org

This list is current as of the date of this document and is based on the information available to the Commission on the date it was produced.

Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code,Section 5097.94 of the Public Resources Code, or Section 5097.98 of the Public Resources Code.

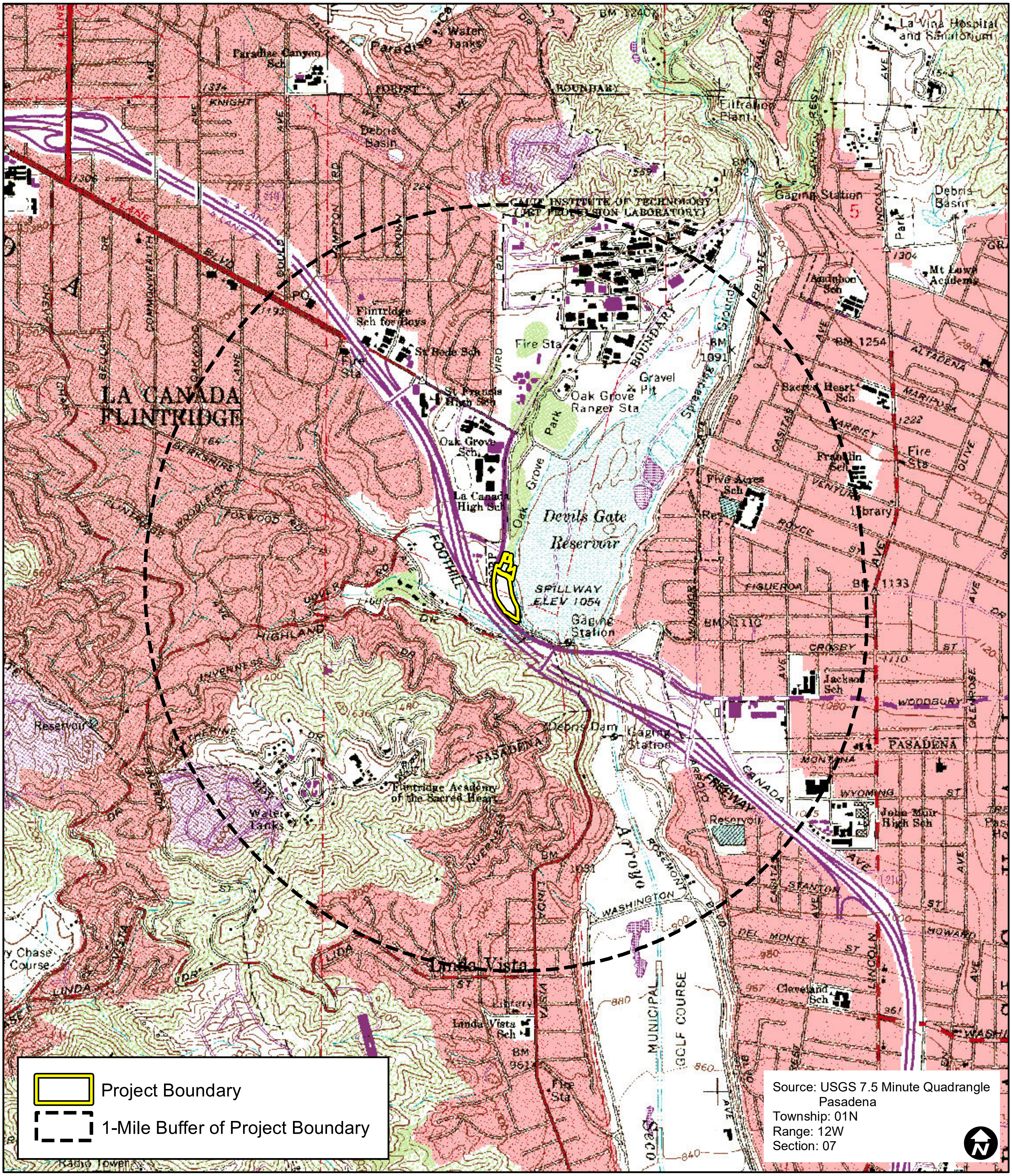
This list is only applicable for contacting local Native American Tribes for the proposed:
Oak Grove #PAS010801, Los Angeles County.

State of California -- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

Primary #
HRI #
Trinomial

*Resource Name or #: ______________

*Map Name: Pasadena *Scale: 1:24,000 *Date of Map: Digital 2014



Appendix D

Energy Data

Vehicle Fuels

Construction Phase (gallons/construction period	**Gasoline**	**Diesel**
Construction Vehicles		949
Worker Trips	956	1
Vendor Trips	0	0
Haul Trucks	5	474
Total	961	1,425

Fuel Use

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Horsepower Category	Load Factor	Num Days	Year	Fuel Consumption Rate (gal/hour)	Total Fuel Consumption (gal/construction period)
Demolition	Concrete/Industrial Saws	1	8	81	100	0.73	3	2019	4.7	83
Demolition	Excavators	2	8	158	175	0.38	3	2019	2.9	53
Demolition	Rubber Tired Dozers	0	8	247	300	0.4	3	2019	4.5	0
Demolition	Tractors/Loaders/Backhoes	0	8	97	100	0.37	3	2019	1.6	0
Trenching/Site Preparation	Cranes	0		231	300	0.29	2	2019	3.3	0
Trenching/Site Preparation	Forklifts	0		89	100	0.2	2	2019	2.0	0
Trenching/Site Preparation	Generator Sets	0		84	100	0.74	2	2019	5.2	0
Trenching/Site Preparation	Graders	0	8	187	175	0.41	2	2019	3.1	0
Trenching/Site Preparation	Rubber Tired Dozers	0	8	247	300	0.4	2	2019	4.5	0
Trenching/Site Preparation	Scrapers	0	8	367	300	0.48	2	2019	5.6	0
Trenching/Site Preparation	Tractors/Loaders/Backhoes	0	8	97	100	0.37	2	2019	1.6	0
Trenching/Site Preparation	Trenchers	1	8	78	75	0.5	2	2019	1.8	15
Trenching/Site Preparation	Welders	0		46	50	0.45	2	2019	2.4	0
Grading	Bore/Drill Rigs	1	8	221	100	0.5	20	2019	2.2	174
Grading	Excavators	2	8	158	175	0.38	20	2019	2.9	351
Grading	Graders	0	8	187	175	0.41	20	2019	3.1	0
Grading	Rubber Tired Dozers	0	8	247	300	0.4	20	2019	4.5	0
Grading	Tractors/Loaders/Backhoes	0	8	97	100	0.37	20	2019	1.6	0
Paving Bridge/Infrastructure	Cement and Mortar Mixers	0	6	9	25	0.56	30	2019	0.4	0
Paving Bridge/Infrastructure	Excavators	1	8	158	175	0.38	30	2019	2.9	263
Paving Bridge/Infrastructure	Pavers	0	8	130	100	0.42	30	2019	1.7	0
Paving Bridge/Infrastructure	Paving Equipment	0	6	132	100	0.36	30	2019	1.6	0
Paving Bridge/Infrastructure	Rollers	0	6	80	100	0.38	30	2019	1.7	0
Paving Bridge/Infrastructure	Tractors/Loaders/Backhoes	0	8	97	100	0.37	30	2019	1.6	0
Paving Road	Air Compressors	0	6	78	100	0.48	1	2019	1.3	0
Paving Road	Cement and Mortar Mixers	0	6	9	25	0.56	1	2019	0.4	0
Paving Road	Pavers	1	8	130	100	0.42	1	2019	1.7	6
Paving Road	Paving Equipment	0	6	132	100	0.36	1	2019	1.6	0
Paving Road	Rollers	1	8	80	100	0.38	1	2019	1.7	5
Paving Road	Tractors/Loaders/Backhoes	0	8	97	100	0.37	1	2019	1.6	0
Total										**949**

Construction

Phase Name	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length
Demolition	385	0	342	14.7	6.9	8
Trenching/Site Preparation	154	0	0	14.7	6.9	8
Grading	385	0	0	14.7	6.9	8
Paving Bridge/Infrastructure	154	0	0	14.7	6.9	8
Paving Road	231	0	0	14.7	6.9	8

Total Trips and VMT

Phase Name	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length
All Trips	1,309	0	342	15	7	8

	Fuel Consumption (Gasoline)			Fuel Consumption (Diesel)		
Phase Name	**Worker Trips**	**Vendor Trips**	**Hauling Trips**	**Worker Trips**	**Vendor Trips**	**Hauling Trips**
All Trips	956	0	5	1	0	474
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
Total	**956**	**0**	**5**	**1**	**0**	**474**

EMFAC2014 (v1.0.7) Emissions Inventory
Region Type: Air Basin
Region: South Coast
Calendar Year: 2019
Season: Annual
Vehicle Classification: EMFAC2007 Categories
Units: miles/day for VMT, trips/day for Trips, tons/day for Emissions, 1000 gallons/day for Fuel Consumption

Region	CalYr	VehClass	MdlYr	Speed	Fuel	Population	VMT	Trips	Fuel_Consumption (mpg)
South Coa	2019	HHDT	Aggregate	Aggregate	GAS	760.1068149	97093.24411	15208.21715	4.6
South Coa	2019	HHDT	Aggregate	Aggregate	DSL	82923.99003	11260491.75	0	5.7
South Coa	2019	LDA	Aggregate	Aggregate	GAS	5980840.202	208813623	37720472.98	26.9
South Coa	2019	LDA	Aggregate	Aggregate	DSL	52672.89405	1989324.277	326978.0645	36.0
South Coa	2019	LDA	Aggregate	Aggregate	ELEC	94014.36646	4447285.892	612658.2477	#DIV/0!
South Coa	2019	LDT1	Aggregate	Aggregate	GAS	511602.2596	17332147.22	3105638.035	22.6
South Coa	2019	LDT1	Aggregate	Aggregate	DSL	663.5524116	17789.40286	3429.3973	26.0
South Coa	2019	LDT1	Aggregate	Aggregate	ELEC	408.7296559	12775.93149	2471.379468	#DIV/0!
South Coa	2019	LDT2	Aggregate	Aggregate	GAS	2084013.156	78122888.55	13175061.38	20.1
South Coa	2019	LDT2	Aggregate	Aggregate	DSL	3286.082304	137297.708	21206.99925	27.7
South Coa	2019	LHDT1	Aggregate	Aggregate	GAS	125322.1636	3677883.76	1867113.507	10.9
South Coa	2019	LHDT1	Aggregate	Aggregate	DSL	87814.66959	3185947.117	1104598.073	20.2
South Coa	2019	LHDT2	Aggregate	Aggregate	GAS	24738.91967	860280.2339	368573.0421	10.1
South Coa	2019	LHDT2	Aggregate	Aggregate	DSL	36213.94114	1443309.659	455525.8224	18.5
South Coa	2019	MCY	Aggregate	Aggregate	GAS	272368.9084	1832494.707	544683.343	35.2
South Coa	2019	MDV	Aggregate	Aggregate	GAS	1430730.588	47981753.87	8907055.986	15.0
South Coa	2019	MDV	Aggregate	Aggregate	DSL	19777.72781	796290.6324	127083.6955	21.3
South Coa	2019	MH	Aggregate	Aggregate	GAS	37614.74032	306253.881	3762.978621	7.3
South Coa	2019	MH	Aggregate	Aggregate	DSL	9461.666118	81403.44168	946.1666118	10.2
South Coa	2019	MHDT	Aggregate	Aggregate	GAS	19037.42033	937806.8442	380900.706	6.9
South Coa	2019	MHDT	Aggregate	Aggregate	DSL	126666.8857	6973371.058	0	8.7
South Coa	2019	OBUS	Aggregate	Aggregate	GAS	7989.769365	370502.5846	159859.3054	7.1
South Coa	2019	OBUS	Aggregate	Aggregate	DSL	4914.333955	409995.1496	0	7.2
South Coa	2019	SBUS	Aggregate	Aggregate	GAS	2082.560611	79169.09813	8330.242442	11.3
South Coa	2019	SBUS	Aggregate	Aggregate	DSL	5135.229702	196273.7834	0	7.2
South Coa	2019	UBUS	Aggregate	Aggregate	GAS	2195.840662	251022.3672	8783.362647	5.0
South Coa	2019	UBUS	Aggregate	Aggregate	DSL	4691.488612	539067.0204	18765.95445	4.7

Appendix E

Geotechnical Investigation

GEOTECHNICAL INVESTIGATION

BERKSHIRE CREEK RESTORATION PROJECT PROPOSED PEDESTRIAN BRIDGE PASADENA, CALIFORNIA

APN: 5823-003-907

GEOCON WEST, INC.

GEOTECHNICAL
ENVIRONMENTAL
MATERIALS

PREPARED FOR

CITY OF PASADENA
PUBLIC WORKS DEPARTMENT
PASADENA, CALIFORNIA

PROJECT NO. A9175-06-20

APRIL 16, 2019

GEOCON
WEST, INC.
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS

Project No. A9175-06-20
April 16, 2019

City of Pasadena
Public Works Department
100 Garfield Avenue, Room N306
Pasadena, CA 91101

Attention: Mr. Brent Maue

Subject: GEOTECHNICAL INVESTIGATION
BERKSHIRE CREEK RESTORATION PROJECT
PROPOSED PEDESTRIAN BRIDGE
PASADENA, CALIFORNIA
APN: 5823-003-907

Dear Mr. Maue:

In accordance with your authorization of our proposal dated February 28, 2019, we have performed a geotechnical investigation for the Berkshire Creek Restoration Project in the City of Pasadena, California. The accompanying report presents the findings of our study and our conclusions and recommendations pertaining to the geotechnical aspects of proposed design and construction. Based on the results of our investigation, it is our opinion that the site can be developed as proposed, provided the recommendations of this report are followed and implemented during design and construction.

If you have any questions regarding this report, or if we may be of further service, please contact the undersigned.

Very truly yours,

GEOCON WEST, INC.

REGISTERED PROFESSIONAL ENGINEER PETRINA ZEN C87489 CIVIL STATE OF CALIFORNIA
Petrina Zen

REGISTERED PROFESSIONAL ENGINEER NEAL D. BERLINER 2576 GEOTECHNICAL STATE OF CALIFORNIA

PROFESSIONAL GEOLOGIST GERALD KASMAN NO. 2251 CERTIFIED ENGINEERING GEOLOGIST STATE OF CALIFORNIA

Petrina Zen
PE 87489

Neal Berliner
GE 2576

Gerald A. Kasman
CEG 2251

(EMAIL) Addressee

3303 N. San Fernando Blvd., Suite 100 ■ Burbank, California 91504 ■ Telephone (818) 841-8388 ■ Fax (818) 841-1704

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

GEOTECHNICAL INVESTIGATION

1. PURPOSE AND SCOPE

This report presents the results of a geotechnical investigation for the Berkshire Creek Restoration Project adjacent to the Devil's Gate Reservoir in the City of Pasadena, California (see Vicinity Map, Figure 1). The purpose of the investigation was to evaluate subsurface soil and geologic conditions underlying the area of proposed improvement and, based on conditions encountered, to provide conclusions and recommendations pertaining to the geotechnical aspects of design and construction.

The scope of this investigation included a review of a prior report prepared for the site, a site reconnaissance, field exploration, laboratory testing, engineering analysis, and the preparation of this report. The site was explored on March 8, 2019 by excavating three 4-inch-diameter borings to depths between 11 and 16 feet below the ground surface using hand auger equipment. The site was further explored on March 14, 2019 by excavating three 8-inch-diameter borings to depths between 25 and 45 feet below the ground surface using a truck-mounted hollow-stem auger drilling machine. The approximate locations of the exploratory borings are depicted on the Site Plans (see Figures 2A and 2B). A detailed discussion of the field investigation, including boring logs, is presented in Appendix A.

Laboratory tests were performed on selected soil samples obtained during the investigation to determine pertinent physical and chemical soil properties. Appendix B presents a summary of the laboratory test results.

The recommendations presented herein are based on analyses of the data obtained during our investigation, as well as the data obtained during the previous geotechnical investigation by Hushmand Associates, Inc., and our experience with similar soil and geologic conditions. The prior investigation is summarized in Section 3, Background Review. References reviewed to prepare this report are provided in the *List of References* section.

If project details vary significantly from those described herein, Geocon should be contacted to determine the necessity for review and possible revision of this report.

2. SITE AND PROJECT DESCRIPTION

The subject site is located in the City of Pasadena, California. The site is part of the Hahamonga Watershed Park and consists of a wooded area to the west of the Devil's Gate Reservoir. The site is bounded a wooded areas and maintenance building to the north, by Oak Grove Drive to the west and the south, and by Devil's Gate Reservoir to the east. Surface water drainage at the site appears to be by sheet flow along the existing ground contours into a drainage structure. Vegetation onsite consists of mature trees and bushes throughout.

Based on the information provided to us, it is our understanding that the proposed project will consist of the construction of a pedestrian/equestrian bridge spanning across Berkshire Creek as well as the installation of a dry well stormwater infiltration system. The existing site conditions are depicted on the Site Plans (see Figures 2A and 2B).

We understand that the existing slopes located along Berkshire Creek have been over-steepened due to erosion and sloughing. West of the proposed bridge, the slopes rise approximately 15 feet with near vertical gradients. East of the proposed bridge, the slope rises approximately 18 feet with an average gradient of 2:1 (H:V) and local slopes as steep as 3:1 (H:V). The existing slope configurations and topographic information used for the preparation of this report were provided to us by the client; Geocon does not practice in the field of land surveying and is not responsible for the accuracy of this information.

We also understand that an approximately 5-foot-wide by 2-foot-high box-culvert will be installed below the creek bed to handle overflow. The installation of the box-culvert will require excavations on the order of 10 feet below the existing creek bed. Subsequent to the installation of the box-culvert, soil backfill will be placed to reconstruct the channel bottom and side slopes. Additionally, check-dams will be installed at intervals of approximately 20 feet. We understand that it is desired to reconstruct the channel side slopes at a gradient of 1:1 (H:V). The existing slope conditions are depicted on Figures 2C through 2E, and an illustration of our understanding of the proposed channel configuration is provided on Figure 2B.

Based on the preliminary nature of the design at this time, loads were not available. It is anticipated that each abutment will support a load of up to 30 kips.

Once the design phase and foundation loading configuration proceeds to a more finalized plan, the recommendations within this report should be reviewed and revised, if necessary. Any changes in the design, location or elevation of any structure, as outlined in this report, should be reviewed by this office. Geocon should be contacted to determine the necessity for review and possible revision of this report.

3. BACKGROUND REVIEW

As a part of the preparation of this report, we reviewed a prior report provided by the City of Pasadena:

> *Geotechnical Engineering Investigation, Berkshire Drain and Foothill Drain Improvements Project, Hahamonga Watershed Park, Pasadena, Los Angeles County, California,* prepared by Hushmand Associates, Inc., dated January 29, 2016.

A prior geotechnical investigation of the subject site was performed in 2016 by Hushmand Associates, Inc. (Hushmand). This report was prepared for the Berkshire Drain and Foothill Drain, which includes the current area of proposed improvement. The investigation included the excavation and logging of seven borings to depths between 1¼ and 36½ feet at the Berkshire Drain site, and 6 borings to depths between 1½ and 5⅓ feet at the Foothill Drain site. Groundwater was not encountered in borings. Laboratory testing was performed on select soil samples. A copy of the report prepared by Hushmand is provided in Appendix C.

Geocon West, Inc. has reviewed the referenced report by Hushmand, and the recommendations presented herein are based on analysis of the subsurface data obtained from the prior investigation by Hushmand, as well as our own subsurface and laboratory data. Furthermore, we assume responsibility for the utilization of the exploration and laboratory data presented within the geotechnical report by Hushmand. Where differing, the recommendations presented herein supersede all previous recommendations.

4. GEOLOGIC SETTING

The site is located in the northwestern portion of the Raymond Basin, an alluvial filled structural basin bounded on the north by the Sierra Madre fault zone and on the south by the Raymond fault. Locally the site is located along the south flank of the San Gabriel Mountains adjacent to the Devil's Gate Reservoir along Arroyo Seco drainage (USGS, 1987). Regionally, the site is located in the Transverse Ranges geomorphic province, near the boundary with the Peninsular Ranges geomorphic province. The Transverse Ranges geomorphic province is characterized by east-west trending geologic structures in contrast to northwest-trending geologic structures in the Peninsular Ranges geomorphic province. The boundary between the Peninsular Ranges and the Transverse Ranges geomorphic provinces is the Raymond fault located approximately 4.7 miles south of the site.

5. SOIL AND GEOLOGIC CONDITIONS

Based on our field investigation and published geologic maps of the area, the site is underlain by artificial fill and Holocene-age alluvial deposits consisting primarily of sand and silt. Detailed stratigraphic profiles of the materials encountered at the site are provided on the boring logs in Appendix A.

5.1 Artificial Fill

Artificial fill was encountered in our explorations to a maximum depth of 6½ feet below existing ground surface. The artificial fill generally consists of yellow to olive brown clayey sand and silty sand and is characterized as slightly moist to moist and loose to medium dense, with trace gravel up to ¾ inch in diameter. The fill is likely the result of past grading or construction activities at the site. Deeper fill may exist between excavations and in other portions of the site that were not directly explored.

5.2 Alluvium

Holocene age alluvium was encountered beneath the fill. The alluvium generally consists of yellowish- to dark yellowish-brown poorly to well graded sand interbedded with silty sand and sandy silt. The alluvial soils are characterized as dry to wet, medium dense to very dense or stiff to hard, with trace amounts of gravel up to 2 ½ inches in diameter observed.

6. GROUNDWATER

Based on a review of the Seismic Hazard Zone Report of the Pasadena Quadrangle, (California Division of Mines and Geology [CDMG], 1998), the historically highest groundwater level in the area is approximately 20 feet beneath the ground surface. Groundwater information presented in this document is generated from data collected in the early 1900's to the late 1990s. Based on current groundwater basin management practices, it is unlikely that groundwater levels will ever exceed the historic high levels.

Groundwater was encountered in borings B2 and B3 at depths of 39 feet and 33½ feet the ground surface, respectively. Considering the depth of the groundwater encountered and the depth of the proposed construction, groundwater is neither expected to be encountered during construction, nor have a detrimental effect on the project. Also, it is not uncommon for groundwater levels to vary seasonally when subjected to excessive irrigation or heavy precipitation. Proper surface drainage of irrigation and precipitation will be critical to future performance of the project. Recommendations for drainage are provided in the S*urface Drainage* section of this report (see Section 8.12).

7. GEOLOGIC HAZARDS

7.1 Surface Fault Rupture

The numerous faults in Southern California include active, potentially active, and inactive faults. The criteria for these major groups are based on criteria developed by the California Geological Survey (CGS, formerly known as CDMG) for the Alquist-Priolo Earthquake Fault Zone Program (CGS, 2018). By definition, an active fault is one that has had surface displacement within Holocene time (about the last 11,700 years). A potentially active fault has demonstrated surface displacement during Quaternary time (approximately the last 1.6 million years), but has had no known Holocene movement. Faults that have not moved in the last 1.6 million years are considered inactive.

The subject site is within an area not-yet evaluated for the presence of surface fault rupture hazard. The Technical Background Report to the 2002 Safety Element City of Pasadena (ECI, 2002) shows that the site is not located within a Fault Management Zone for active faulting. No active or potentially active faults with the potential for surface fault rupture are known to pass directly beneath the site. Therefore, the potential for surface rupture due to faulting occurring beneath the site during the design life of the proposed development is considered low. However, the site is located in the seismically active Southern California region, and could be subjected to moderate to strong ground shaking in the event of an earthquake on one of the many active Southern California faults. The faults in the vicinity of the site are shown in Figure 3, Regional Fault Map.

The closest surface trace of an active fault to the site is the Verdugo Fault located approximately 3.7 miles to the southwest (CGS, 2014). Other nearby active faults are the Raymond Fault, Sierra Madre Fault Zone, the Hollywood Fault, and the East Montebello Fault located approximately 4.6.miles south, 5.8 miles northwest, 7.2 miles southwest, and 10.2 miles southeast of the site, respectively (Ziony and Jones, 1989). The active San Andreas Fault Zone is located approximately 24 miles northeast of the site.

Several buried thrust faults, commonly referred to as blind thrusts, underlie the Los Angeles Basin at depth. These faults are not exposed at the ground surface and are typically identified at depths greater than 3.0 kilometers. The October 1, 1987, M_w 5.9 Whittier Narrows earthquake and the January 17, 1994, M_w 6.7 Northridge earthquake were a result of movement on the Puente Hills Blind Thrust and the Northridge Thrust, respectively. These thrust faults and others in the Los Angeles area are not exposed at the surface and do not present a potential surface fault rupture hazard at the site; however, these deep thrust faults are considered active features capable of generating future earthquakes that could result in moderate to significant ground shaking at the site. The subject site is underlain at depth by the Los Angeles segment of the Puente Hills Blind Thrust.

7.2 Seismicity

As with all of Southern California, the site has experienced historic earthquakes from various regional faults. The seismicity of the region surrounding the site was formulated based on research of an electronic database of earthquake data. The epicenters of recorded earthquakes with magnitudes equal to or greater than 5.0 in the site vicinity are depicted on Figure 4, Regional Seismicity Map. A partial list of moderate to major magnitude earthquakes that have occurred in the Southern California area within the last 100 years is included in the following table.

LIST OF HISTORIC EARTHQUAKES

Earthquake (Oldest to Youngest)	Date of Earthquake	Magnitude	Distance to Epicenter (Miles)	Direction to Epicenter
Near Redlands	July 23, 1923	6.3	55	ESE
Long Beach	March 10, 1933	6.4	41	SSE
Tehachapi	July 21, 1952	7.5	74	NW
San Fernando	February 9, 1971	6.6	20	NW
Whittier Narrows	October 1, 1987	5.9	10	SE
Sierra Madre	June 28, 1991	5.8	11	ENE
Landers	June 28, 1992	7.3	99	E
Big Bear	June 28, 1992	6.4	77	E
Northridge	January 17, 1994	6.7	21	W
Hector Mine	October 16, 1999	7.1	112	ENE

The site could be subjected to strong ground shaking in the event of an earthquake. However, this hazard is common in Southern California and the effects of ground shaking can be mitigated if the proposed structures are designed and constructed in conformance with current building codes and engineering practices.

7.3 Seismic Design Criteria

The following table summarizes summarizes site-specific design criteria obtained from the 2016 California Building Code (CBC; Based on the 2015 International Building Code [IBC] and ASCE 7-10), Chapter 16 Structural Design, Section 1613 Earthquake Loads. The data was calculated using the computer program *U.S. Seismic Design Maps*, provided by the USGS. The short spectral response uses a period of 0.2 second. We evaluated the Site Class based on the discussion in Section 1613.3.2 of the 2016 CBC and Table 20.3-1 of ASCE 7-10. The values presented on the following page are for the risk-targeted maximum considered earthquake (MCE_R).

2016 CBC SEISMIC DESIGN PARAMETERS

Parameter	Value	2016 CBC Reference
Site Class	D	Table 1613.3.2
MCE_R Ground Motion Spectral Response Acceleration – Class B (short), S_S	2.723g	Figure 1613.3.1(1)
MCE_R Ground Motion Spectral Response Acceleration – Class B (1 sec), S_1	0.972g	Figure 1613.3.1(2)
Site Coefficient, F_A	1.0	Table 1613.3.3(1)
Site Coefficient, F_V	1.5	Table 1613.3.3(2)
Site Class Modified MCE_R Spectral Response Acceleration (short), S_{MS}	2.723g	Section 1613.3.3 (Eqn 16-37)
Site Class Modified MCE_R Spectral Response Acceleration – (1 sec), S_{M1}	1.458g	Section 1613.3.3 (Eqn 16-38)
5% Damped Design Spectral Response Acceleration (short), S_{DS}	1.816g	Section 1613.3.4 (Eqn 16-39)
5% Damped Design Spectral Response Acceleration (1 sec), S_{D1}	0.972g	Section1613.3.4 (Eqn 16-40)

The table below presents the mapped maximum considered geometric mean (MCE_G) seismic design parameters for projects located in Seismic Design Categories of D through F in accordance with ASCE 7-10.

ASCE 7-10 PEAK GROUND ACCELERATION

Parameter	Value	ASCE 7-10 Reference
Mapped MCE_G Peak Ground Acceleration, PGA	1.014g	Figure 22-7
Site Coefficient, F_{PGA}	1.0	Table 11.8-1
Site Class Modified MCE_G Peak Ground Acceleration, PGA_M	1.014g	Section 11.8.3 (Eqn 11.8-1)

The Maximum Considered Earthquake Ground Motion (MCE) is the level of ground motion that has a 2 percent chance of exceedance in 50 years, with a statistical return period of 2,475 years. According to the 2016 California Building Code and ASCE 7-10, the MCE is to be utilized for the evaluation of liquefaction, lateral spreading, seismic settlements, and it is our understanding that the intent of the Building code is to maintain “Life Safety” during a MCE event. The Design Earthquake Ground Motion (DE) is the level of ground motion that has a 10 percent chance of exceedance in 50 years, with a statistical return period of 475 years.

Deaggregation of the MCE peak ground acceleration was performed using the USGS online Unified Hazard Tool, 2008 Conterminous U.S. Dynamic edition. The result of the deaggregation analysis indicates that the predominant earthquake contributing to the MCE peak ground acceleration is characterized as a 6.76 magnitude event occurring at a hypocentral distance of 7.18 kilometers from the site.

Deaggregation was also performed for the Design Earthquake (DE) peak ground acceleration, and the result of the analysis indicates that the predominant earthquake contributing to the DE peak ground acceleration is characterized as a 6.74 magnitude occurring at a hypocentral distance of 10.68 kilometers from the site.

Conformance to the criteria in the above tables for seismic design does not constitute any kind of guarantee or assurance that significant structural damage or ground failure will not occur if a large earthquake occurs. The primary goal of seismic design is to protect life, not to avoid all damage, since such design may be economically prohibitive.

7.4 Liquefaction Potential

Liquefaction is a phenomenon in which loose, saturated, relatively cohesionless soil deposits lose shear strength during strong ground motions. Primary factors controlling liquefaction include intensity and duration of ground motion, gradation characteristics of the subsurface soils, in-situ stress conditions, and the depth to groundwater. Liquefaction is typified by a loss of shear strength in the liquefied layers due to rapid increases in pore water pressure generated by earthquake accelerations.

The current standard of practice, as outlined in the “Recommended Procedures for Implementation of DMG Special Publication 117, Guidelines for Analyzing and Mitigating Liquefaction in California” and “Special Publication 117A, Guidelines for Evaluating and Mitigating Seismic Hazards in California” requires liquefaction analysis to a depth of 50 feet below the lowest portion of the proposed structure. Liquefaction typically occurs in areas where the soils below the water table are composed of poorly consolidated, fine to medium-grained, primarily sandy soil. In addition to the requisite soil conditions, the ground acceleration and duration of the earthquake must also be of a sufficient level to induce liquefaction.

The State of California Seismic Hazard Zone Map for the Pasadena Quadrangle (CDMG, 1999) indicates that the site is on the margin of but outside of the area designated as having a potential for liquefaction.

7.5 Slope Stability

According to the County of Los Angeles Safety Element (Leighton, 1990), the site is located within an area identified as a “Hillside Area”. However, other than the slopes associated with the channel, the topography at the site is relatively level and the topography in the immediate site vicinity slopes gently to the south. The site is not located within an area identified as having a potential for seismic slope instability (CDMG, 1999; City of Pasadena, 2002). There are no known landslides near the site, nor is the site in the path of any known or potential landslides (Leighton, 1990). Therefore, the potential for slope stability hazards to adversely affect the proposed development is considered low.

We understand that subsequent to construction of the box-culvert, it is desired to reconstruct the channel side slopes at a gradient of 1:1 (H:V). We also understand that installation of the box-culvert will require excavations on the order of 10 feet below the existing creek bed. Although the exact configuration of the temporary excavation required to install the box-culvert has not been provided to us, we assume that temporary slopes will be laid back to facilitate construction of the box culvert. Furthermore, we assume that the reconstruction of the channel side slopes will require the placement and compaction of engineered fill for construction of the proposed slopes. It is anticipated that the engineered fill will be comprised of the soil that will be excavated during installation of the box culvert.

Based on these considerations as well as the laboratory test results, the shear strength values used in the slope stability analyses are summarized in the table below.

SUMMARY OF SOIL PROPERTIES USED FOR SLOPE STABILITY ANALYSES

Material	Wet Density (pcf)	Friction Angle (degrees)	Cohesion (psf)
Engineered Fill	125	38°	75

Analysis of the proposed permanent slopes was performed using the Taylor’s method of analysis for slopes having both cohesion and friction for a circular failure surface. Based on the results of the analysis, proposed permanent slopes constructed at a 1:1 gradient should have a maximum height of 9 feet (see Figure 5). Based on our understanding of the desired channel geometry, this height is insufficient for the proposed 12 to 14-foot-high slopes.

We understand that the City will accept responsibility for the construction and performance of the 1:1 slopes up to a height of 14 feet, even though the analysis indicates that these slopes are potentially unstable and may be subject to erosion or failure.

In order to evaluate the design and construction of the proposed bridge foundations, we have performed an analysis assuming that the proposed slopes will erode or fail to a gradient of 2:1 (H:V). Based on the results of this analysis, slopes inclined at a gradient of 2:1 (H:V) would be considered stable (see Figure 6). For the proposed bridge, it is recommended that footings be deepened below the potential failure surface.

7.6 Earthquake-Induced Flooding

The subject property is located above the Devil Gate Dam in the Arroyo Seco drainage and not additional dams are located upstream. Earthquake-induced flooding is inundation caused by failure of dams or other water-retaining structures due to earthquakes. Based on a review of the Los Angeles County Safety Element (Leighton, 1990), the site is not located within a potential inundation area for an earthquake-induced dam failure. Therefore, probability of earthquake-induced flooding is considered very low.

7.7 Tsunamis, Seiches, and Flooding

The site is not located within a coastal area. Therefore, tsunamis are not considered a significant hazard at the site.

Seiches are large waves generated in enclosed bodies of water in response to ground shaking. No major water-retaining structures are located immediately up gradient from the project site. Therefore, flooding resulting from a seismically-induced seiche is considered unlikely.

The site is within an area of minimal flooding (Zone X) as defined by the Federal Emergency Management Agency (FEMA, 2019; LACDPW, 2019).

7.8 Oil Fields & Methane Potential

Based on a review of the California Division of Oil, Gas and Geothermal Resources (DOGGR) Well Finder Website, the site is not located within the limits of an oilfield and there are no active or inactive oil or gas wells within the immediate vicinity of the site (DOGGR, 2019). However, due to the voluntary nature of record reporting by the oil well drilling companies, wells may be improperly located or not shown on the location map and undocumented wells could be encountered during construction. Any wells encountered will need to be properly abandoned in accordance with the current requirements of the DOGGR.

The site is not located within the boundaries of a known oil field and the potential for the presence of methane is considered low. However, should it be determined that a methane study is required for the proposed development it is recommended that a qualified methane consultant be retained to perform the study and provide mitigation measures as necessary.

7.9 Subsidence

Subsidence occurs when a large portion of land is displaced vertically, usually due to the withdrawal of groundwater, oil, or natural gas. Soils that are particularly subject to subsidence include those with high silt or clay content. The site is not located within an area of known ground subsidence. No large-scale extraction of groundwater, gas, oil, or geothermal energy is occurring or planned at the site or in the general site vicinity. There appears to be little or no potential for ground subsidence due to withdrawal of fluids or gases at the site.

8. CONCLUSIONS AND RECOMMENDATIONS

8.1 General

8.1.1 It is our opinion that neither soil nor geologic conditions were encountered during the investigation that would preclude the construction of the proposed improvements provided the recommendations presented herein are followed and implemented during design and construction.

8.1.2 Up to 6½ feet of existing artificial fill was encountered during the site investigation. The existing fill encountered is believed to be the result of past grading and construction activities at the site. Deeper fill may exist in other areas of the site that were not directly explored. The existing fill and site soils are suitable for re-use as engineered fill provided the recommendations in the Grading section of this report are followed (see Section 8.4).

8.1.3 We understand that the City will accept responsibility for the construction and performance of slopes inclined at a gradient of 1:1 with heights up to 14 feet, even though our analysis indicates that these slopes are potentially unstable and may be subject to erosion or failure. However, for the design and construction of the bridge foundation, it is recommended that proposed foundations derive support below a theoretical erosional surface inclined at a gradient of 2:1 (see illustration on Figure 2B). This theoretical failure surface includes consideration of the potential for 2 feet of scour occurring below the proposed channel bottom.

8.1.4 Where new foundations are required for support of the proposed bridge structure, a deepened foundation system consisting of drilled cast-in-place piles may be utilized. All foundations should derive support in the undisturbed alluvial soils found at and below the theoretical failure surface inclined at a gradient of 2:1. Recommendations for the design of pile foundations are provided in the *Deepened Foundation Design* section of this report (see Section 8.7).

8.1.5 It is anticipated that stable excavations can be achieved with sloping measures. Excavation recommendations are provided in the *Temporary Excavations* section of this report (Section 8.10).

8.1.6 Proposed fill slopes should be properly benched and keyed into competent alluvial soil prior to the placement of engineered fill. All slope and backcut excavations must be observed and approved in writing by the Geotechnical Engineer prior to placement of additional engineered fill. Recommendations for slope construction are provided in Section 8.5.

8.1.7 All slopes should be planted, drained, and properly maintained to reduce erosion. It is recommended that finished slopes be planted as soon after completion of grading as possible. Planting on the slope stabilizes the surface and reduces the potential for erosion. It is further suggested that a jute or mesh product be placed on the slope face prior to planting; however, the planting of the slope should be performed at the direction of a qualified landscaping consultant.

8.1.8 Based on the results of percolation testing performed at the site, a stormwater infiltration system is considered feasible for this project. Recommendations for infiltration are provided in the *Stormwater Infiltration* section of this report (see Section 8.11).

8.1.9 Once the design and foundation loading configuration for the proposed bridge structure proceeds to a more finalized plan, the recommendations within this report should be reviewed and revised, if necessary. Based on the final foundation loading configurations, the potential for settlement should be re-evaluated by this office.

8.1.10 Any changes in the design, location or elevation, as outlined in this report, should be reviewed by this office. Geocon should be contacted to determine the necessity for review and possible revision of this report.

8.2 Soil and Excavation Characteristics

8.2.1 The in-situ soils can be excavated with moderate effort using conventional excavation equipment. Excessive caving is not anticipated in the alluvial soils for vertical excavations less than 5 feet unless granular soils are encountered. Operation of construction equipment during grading activates conducted on the slope may also induce sloughing and/or raveling. The contractor should be prepared for sloughing and raveling of temporary slopes during construction activities.

8.2.2 It is the responsibility of the contractor to ensure that all excavations and trenches are properly shored and maintained in accordance with applicable OSHA rules and regulations to maintain safety and maintain the stability of adjacent existing improvements.

8.2.3 All onsite excavations must be conducted in such a manner that potential surcharges from existing structures, construction equipment, and vehicle loads are resisted. The surcharge area may be defined by a 1:1 projection down and away from the bottom of an existing foundation or vehicle load. Penetrations below this 1:1 projection will require special excavation measures such as sloping and shoring. Excavation recommendations are provided in the *Temporary Excavations* section of this report (see Section 8.10).

8.3 Water-Soluble Sulfate

8.3.1 Laboratory tests were performed on representative samples of the site materials to measure the percentage of water-soluble sulfate content. Results from the laboratory water-soluble sulfate tests are presented in Appendix B (Figure B5) and indicate that the on-site materials possess a sulfate exposure class of “S0” to concrete structures as defined by 2016 CBC Section 1904 and ACI 318-14 Table 19.3.1.1.

8.3.2 Geocon West, Inc. does not practice in the field of corrosion engineering and mitigation. If corrosion sensitive improvements are planned, it is recommended that a corrosion engineer be retained to evaluate corrosion test results and incorporate the necessary precautions to avoid premature corrosion of buried metal pipes and concrete structures in direct contact with the soils.

8.4 Grading

8.4.1 A preconstruction conference should be held at the site prior to the beginning of grading operations with the owner, contractor, civil engineer, geotechnical engineer, and building official in attendance. Special soil handling requirements can be discussed at that time.

8.4.2 Earthwork should be observed, and compacted fill tested by representatives of Geocon West, Inc. The existing fill and alluvial soil encountered during exploration is suitable for re-use as engineered fill, provided any encountered oversize material (greater than 6 inches) and any encountered deleterious debris are removed.

8.4.3 Grading should commence with the removal of all existing vegetation and existing improvements from the area to be graded. Deleterious debris such as wood and root structure should be exported from the site and should not be mixed with the fill soils. Asphalt and concrete should not be mixed with the fill soils unless approved in writing by the Geotechnical Engineer. All existing underground improvement planned for removal should be completely excavated and the resulting depressions properly backfilled in accordance with the procedures described herein. Once a clean excavation bottom has been established it must be observed and approved in writing by the Geotechnical Engineer (a representative of Geocon West, Inc.).

8.4.4 All fill and backfill soils should be placed in horizontal loose layers approximately 6 to 8 inches thick, moisture conditioned to optimum moisture content, and properly compacted to a minimum 90 percent of the maximum dry density in accordance with ASTM D 1557 (latest edition).

8.4.5 Although not anticipated for this project, all imported fill shall be observed, tested, and approved by Geocon West, Inc. prior to bringing soil to the site. Rocks larger than 6 inches in diameter shall not be used in the fill. If necessary, import soils used as structural fill should have an expansion index less than 20 and corrosivity properties that are equally or less detrimental to that of the existing onsite soils (see Figure B5).

8.4.6 All trench and foundation excavation bottoms must be observed and approved in writing by the Geotechnical Engineer (a representative of Geocon), prior to placing bedding materials, fill, steel, gravel, or concrete.

8.5 Slope Construction

8.5.1 Fill slopes comprised of on-site material may be initially constructed at a gradient of 1:1 or flatter. As previously discussed, slopes constructed at a gradient of 1:1 are not considered stable and may be subject to erosion or failure. Prior to the construction of fill slopes, representative samples of the backfill material should be tested for verification of the shear strength parameters.

8.5.2 Fill slopes should be overbuilt by at least 3 feet measured perpendicular to the slope face and trimmed back to the tight fill core. This procedure is considered preferable to track-walking of slopes, as described in the following paragraph.

8.5.3 As an alternative, fill slope faces may be compacted by backrolling with a loaded sheepsfoot roller at vertical intervals not to exceed 4 feet, and should be track-walked at the completion of each slope such that the fill is compacted to a dry density of at least 90 percent of the laboratory maximum dry density and near or slightly above optimum moisture content to the face of the finished sloped.

8.5.4 Prior to the placement of engineered fill, the existing grade should be benched and keyed into competent alluvial soil. If soils exposed along the backcut excavation consist of artificial fill or soft, unsuitable alluvium, additional excavation or supplemental geotechnical recommendations may be required. All backcut excavations must be observed and approved in writing by the Geotechnical Engineer prior to placement of engineered fill.

8.5.5 During the construction of fill slopes, there is a risk that the temporary backcut slopes will become unstable. This risk can be reduced by placing fill in short segments and/or flattening the inclination of the temporary slope.

8.5.6 All slopes should be planted, drained, and property maintained to reduce erosion. It is recommended that finished slopes be planted as soon after completion of grading as possible. Planting on the slope stabilizes the surface and reduces the potential for erosion. It is further suggested that a jute or mesh product be placed on the slope face prior to planting; however, the planting of the slope should be performed at the direction of a qualified landscaping consultant.

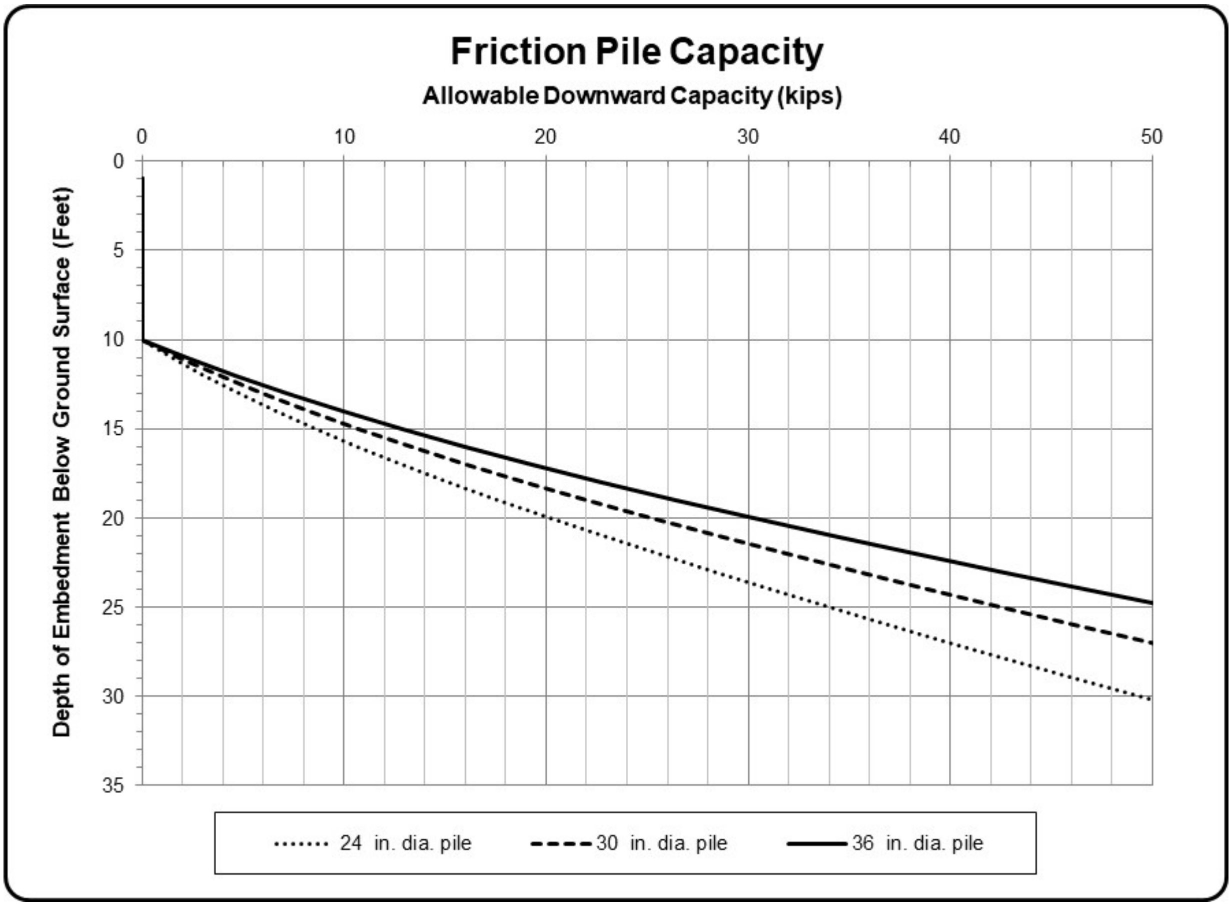
8.6 Foundation Setback

8.6.1 The Building Code requires that foundations be sufficiently setback from an ascending or descending slope. The required setback from a descending slope is 1/3 the height of the descending slope with a minimum of 5 feet and a maximum of 40 feet measured horizontally from the exterior face of the foundation to the slope face. In lieu of relocating a structure to achieve the setback at the ground surface, foundations may be deepened as necessary to achieve the required setback.

8.6.2 The required building setbacks should be understood and implemented into the orientation and location of the proposed structures by the project architect.

8.7 Deepened Foundation Design – Friction Piles

8.7.1 The proposed bridge abutments may be supported on deepened pile foundations deriving support in the competent alluvial soils. It is recommended that proposed pile foundations derive support below a theoretical failure surface inclined at a gradient of 2:1 (see illustration on Figure 2B). For preliminary design purposes 24-, 30-, and 36-inch-diameter drilled cast-in-place friction piles have been evaluated. The allowable axial capacities for embedment into the competent alluvial soils are provided in the chart on the following page.



8.10.2 All drilled pile excavations must be continuously observed by personnel of this firm to verify adequate depth and penetration into the recommended bearing materials. The uplift capacity may be taken as ½ of the downward capacity. The capacity may be increased by one-third for transient loads due to wind or seismic forces.

8.9.5 The capacity presented is based on the strength of the soils. The compressive and tensile strength of the pile sections should be checked to verify the structural capacity of the piles.

8.9.2 The maximum expected settlement for the structure supported on friction and end-bearing piles is estimated to be less than ½ inch. Differential settlement between adjacent pile foundations is not expected to exceed ¼ inch. The majority of the foundation settlement is expected to occur on initial application of loading and during construction. These settlements are estimates and will require confirmation once bridge loads become available.

8.7.2 If piles are spaced at least at least 3 diameters on center, no reduction in axial capacity is considered necessary for group effects. If pile spacing is closer than three pile diameters, an evaluation for group effects including appropriate reductions should be incorporated into the pile design based on pile dimension, spacing, and the direction of loading.

8.7.3 Friction piles do not require the complete removal of all loose earth materials from the bottom of the excavation since the end-bearing capacity is not being considered for design. However, a cleanout of the excavation bottom will be required.

8.8 Deepened Foundation Installation

8.8.1 Casing may be required if caving is experienced, and the contractor should have casing available prior to commencement of pile excavation. If casing is used, extreme care should be employed so that the pile is not pulled apart as the casing is withdrawn. At no time should the distance between the surface of the concrete and the bottom of the casing be less than 5 feet. Continuous observation of the drilling and pouring of the piles by the Geotechnical Engineer (a representative of Geocon West, Inc.), is required.

8.8.2 Groundwater was encountered during site exploration at depths of approximately 33½ and 39 feet. Therefore, the contractor should be prepared for groundwater if pile installation extends close to or below this depth. If more than 6 inches of water is present in the bottom of the excavation, a tremie is required to place the concrete into the bottom of the hole. A tremie should consist of a rigid, water-tight tube having a diameter of not less than 6 inches with a hopper at the top. The tube should be equipped with a device that will close the discharge end and prevent water from entering the tube while it is being charged with concrete. The tremie should be supported so as to permit free movement of the discharge end over the entire top surface of the work and to permit rapid lowering when necessary to retard or stop the flow of concrete. The discharge end should be closed at the start of the work to prevent water entering the tube and should be entirely sealed at all times, except when the concrete is being placed. The tremie tube should be kept full of concrete. The flow should be continuous until the work is completed and the resulting concrete seal should be monolithic and homogeneous. The tip of the tremie tube should always be kept about 5 feet below the surface of the concrete and definite steps and safeguards should be taken to ensure that the tip of the tremie tube is never raised above the surface of the concrete.

8.8.3 A special concrete mix should be used for concrete to be placed below water. The design should provide for concrete with an unconfined compressive strength psi of 1,000 psi over the initial job specification. An admixture that reduces the problem of segregation of paste/aggregates and dilution of paste should be included. The slump should be commensurate to any research report for the admixture, provided that it should also be the minimum for a reasonable consistency for placing when water is present.

8.8.4 Friction piles do not require the complete removal of all loose earth materials from the bottom of the excavation since the end-bearing capacity is not being considered for design. However, a cleanout of the excavation bottom will be required.

8.8.5 Closely spaced piles should be drilled and filled alternately, with the concrete permitted to set at least eight hours before drilling an adjacent hole. Pile excavations should be filled with concrete as soon after drilling and inspection as possible; the holes should not be left open overnight unless approved by the Geotechnical Engineer.

8.9 Lateral Design

8.9.1 Resistance to lateral loading may be provided by friction acting at the base of foundations, slabs and by passive earth pressure. An allowable coefficient of friction of 0.4 may be used with the dead load forces in the alluvial soils.

8.9.2 The passive earth pressure for the sides of foundations and slabs poured against the alluvial soils may be computed as an equivalent fluid having a density of 290 pounds per cubic foot with a maximum earth pressure of 2,900 pounds per square foot. When combining passive and friction for lateral resistance, the passive component should be reduced by one-third.

8.9.3 Passive pressure for piles on a descending slope may be generated at and below a pile embedment of 3 feet below the lowest theoretical failure surface. The allowable passive earth pressure for piles embedded into competent alluvial soils with a descending sloping ground condition may be computed as having an equivalent fluid density of 500 pounds per cubic foot per foot of embedment. The passive earth pressure may be increased an additional 250 pcf for each additional foot of embedment up to a maximum allowable earth pressure of 5,000 psf. This passive value is based on consideration of a sloping ground surface and resistance from both friction and cohesion. The allowable passive value may be doubled for isolated piles spaced at least 3 diameters on-center. To develop the full lateral value, provisions should be implemented to assure firm contact between the piles and the competent alluvial soils.

8.10 Temporary Excavations

8.10.1 Excavations up to 15 feet in height may be required for construction of the proposed improvements. If temporary excavations greater than 15 feet in height are anticipated, Geocon should be contacted to provide additional recommendations. Temporary excavations are expected to expose artificial fill and alluvial soils, which are suitable for vertical excavations up to 5 feet in height where loose soils or caving sands are not present, and where not surcharged by adjacent traffic or structures.

8.10.2 Vertical excavations greater than 5 feet will require sloping and/or shoring measures in order to provide a stable excavation. Where sufficient space is available, temporary unsurcharged embankments up to 15 feet high could be sloped back at a uniform 1¼:1 slope gradient or flatter. A uniform slope does not have a vertical portion. Where space is limited, shoring measures will be required. If needed, recommendations for shoring can be provided under separate cover.

8.10.3 Where sloped embankments are utilized, the top of the slope should be barricaded to prevent vehicles and storage loads at the top of the slope within a horizontal distance equal to the height of the slope. If the temporary construction embankments are to be maintained during the rainy season, berms are suggested along the tops of the slopes where necessary to prevent runoff water from entering the excavation and eroding the slope faces. Geocon personnel should inspect the soils exposed in the cut slopes during excavation so that modifications of the slopes can be made if variations in the soil conditions occur. All excavations should be stabilized within 30 days of initial excavation.

8.11 Stormwater Infiltration

8.11.1 During the March 14, 2019 site exploration, borings B1 and B3 were utilized to perform percolation testing. The borings were advanced to the depths listed in the table below. Slotted casing was placed in the borings, and the annular space between the casing and excavation was filled with gravel. The borings were then filled with water to pre-saturate the soils. On March 15, 2019, the casings were refilled with water and percolation test readings were performed after repeated flooding of the cased excavation. Based on the test results, the measured percolation rate and design infiltration rate, for the earth materials encountered, are provided in the following table. These values have been calculated in accordance with the Boring Percolation Test Procedure in the County of Los Angeles Department of Public Works GMED *Guidelines for Geotechnical Investigation and Reporting, Low Impact Development Stormwater Infiltration* (June 2017). Percolation test field data and calculation of the measured percolation rate and design infiltration rate are provided on Figures 8 and 9.

Boring	Soil Type	Infiltration Depth (ft)	Measured Percolation Rate (in / hour)	Design Infiltration Rate (in / hour)
B1	Silty Sand (SM)	10-15	4.48	2.24
B3	Silty Sand (SM)	20-23	1.07	0.53

8.11.2 Based on the test method utilized (Boring Percolation Test), the reduction factor RF_t may be taken as 2.0 in the infiltration system design. Based on the number of tests performed and consistency of the soils throughout the site, it is suggested that the reduction factor RF_v be taken as 1.0. In addition, provided proper maintenance is performed to minimize long-term siltation and plugging, the reduction factor RF_s may be taken as 1.0. Additional reduction factors may be required and should be applied by the engineer in responsible charge of the design of the stormwater infiltration system and based on applicable guidelines.

8.11.3 The results of the percolation testing indicate that the soils at depths in the above table are conductive to infiltration. It is our opinion that the soil zone encountered at the depth and location as listed in the table above are suitable for infiltration of stormwater.

8.11.4 It is our further opinion that infiltration of stormwater and will not induce excessive hydro-consolidation (see Figures B3 and B4), will not create a perched groundwater condition, will not affect soil structure interaction of existing or proposed foundations due to expansive soils, will not saturate soils supported by existing or proposed retaining walls, and will not increase the potential for liquefaction. Resulting settlements are anticipated to be less than ¼ inch, if any.

8.11.5 The infiltration system must be located such that the closest distance between an adjacent foundation is at least 10 feet in all directions from the zone of saturation. The zone of saturation may be assumed to project downward from the discharge of the infiltration facility at a gradient of 1:1. Additional property line or foundation setbacks may be required by the governing jurisdiction and should be incorporated into the stormwater infiltration system design as necessary.

8.11.6 Where the 10-foot horizontal setback cannot be maintained between the infiltration system and an adjacent footing, and the infiltration system penetrates below the foundation influence line, the proposed stormwater infiltration system must be designed to resist the surcharge from the adjacent foundation. The foundation surcharge line may be assumed to project down away from the bottom of the foundation at a 1:1 gradient. The stormwater infiltration system must still be sufficiently deep to maintain the 10-foot vertical offset between the bottom of the footing and the zone of saturation.

8.11.7 Subsequent to the placement of the infiltration system, it is acceptable to backfill the resulting void space between the excavation sidewalls and the infiltration system with minimum two-sack slurry provided the slurry is not placed in the infiltration zone. It is recommended that pea gravel be utilized adjacent to the infiltration zone so communication of water to the soil is not hindered.

8.11.8 Due to the preliminary nature of the project at this time, the type of stormwater infiltration system and location of the stormwater infiltration systems has not yet been determined. The design drawings should be reviewed and approved by the Geotechnical Engineer. The installation of the stormwater infiltration system should be observed and approved by the Geotechnical Engineer (a representative of Geocon).

8.12 Surface Drainage

8.12.1 Proper surface drainage is critical to the future performance of the project. Uncontrolled infiltration of irrigation excess and storm runoff into the soils can adversely affect the performance of the planned improvements. Saturation of a soil can cause it to lose internal shear strength and increase its compressibility, resulting in a change in the original designed engineering properties. Proper drainage should be maintained at all times.

8.12.2 All site drainage should be collected and controlled in non-erosive drainage devices. Drainage should not be allowed to pond anywhere on the site, and especially not against any foundation or retaining wall. The site should be graded and maintained such that surface drainage is directed away from structures in accordance with 2016 CBC 1804.4 or other applicable standards. In addition, drainage should not be allowed to flow uncontrolled over any descending slope.

8.12.3 Positive site drainage should be provided away from the tops of slopes to swales or other controlled drainage structures.

8.13 Plan Review

8.13.1 Grading and foundation plans should be reviewed by the Geotechnical Engineer (a representative of Geocon West, Inc.), prior to finalization to verify that the plans have been prepared in substantial conformance with the recommendations of this report and to provide additional analyses or recommendations.

LIMITATIONS AND UNIFORMITY OF CONDITIONS

1. The recommendations of this report pertain only to the site investigated and are based upon the assumption that the soil conditions do not deviate from those disclosed in the investigation. If any variations or undesirable conditions are encountered during construction, or if the proposed construction will differ from that anticipated herein, Geocon West, Inc. should be notified so that supplemental recommendations can be given. The evaluation or identification of the potential presence of hazardous or corrosive materials was not part of the scope of services provided by Geocon West, Inc.

2. This report is issued with the understanding that it is the responsibility of the owner, or of his representative, to ensure that the information and recommendations contained herein are brought to the attention of the architect and engineer for the project and incorporated into the plans, and the necessary steps are taken to see that the contractor and subcontractors carry out such recommendations in the field.

3. The findings of this report are valid as of the date of this report. However, changes in the conditions of a property can occur with the passage of time, whether they are due to natural processes or the works of man on this or adjacent properties. In addition, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and should not be relied upon after a period of three years.

4. The firm that performed the geotechnical investigation for the project should be retained to provide testing and observation services during construction to provide continuity of geotechnical interpretation and to check that the recommendations presented for geotechnical aspects of site development are incorporated during site grading, construction of improvements, and excavation of foundations. If another geotechnical firm is selected to perform the testing and observation services during construction operations, that firm should prepare a letter indicating their intent to assume the responsibilities of project geotechnical engineer of record. A copy of the letter should be provided to the regulatory agency for their records. In addition, that firm should provide revised recommendations concerning the geotechnical aspects of the proposed development, or a written acknowledgement of their concurrence with the recommendations presented in our report. They should also perform additional analyses deemed necessary to assume the role of Geotechnical Engineer of Record.

LIST OF REFERENCES

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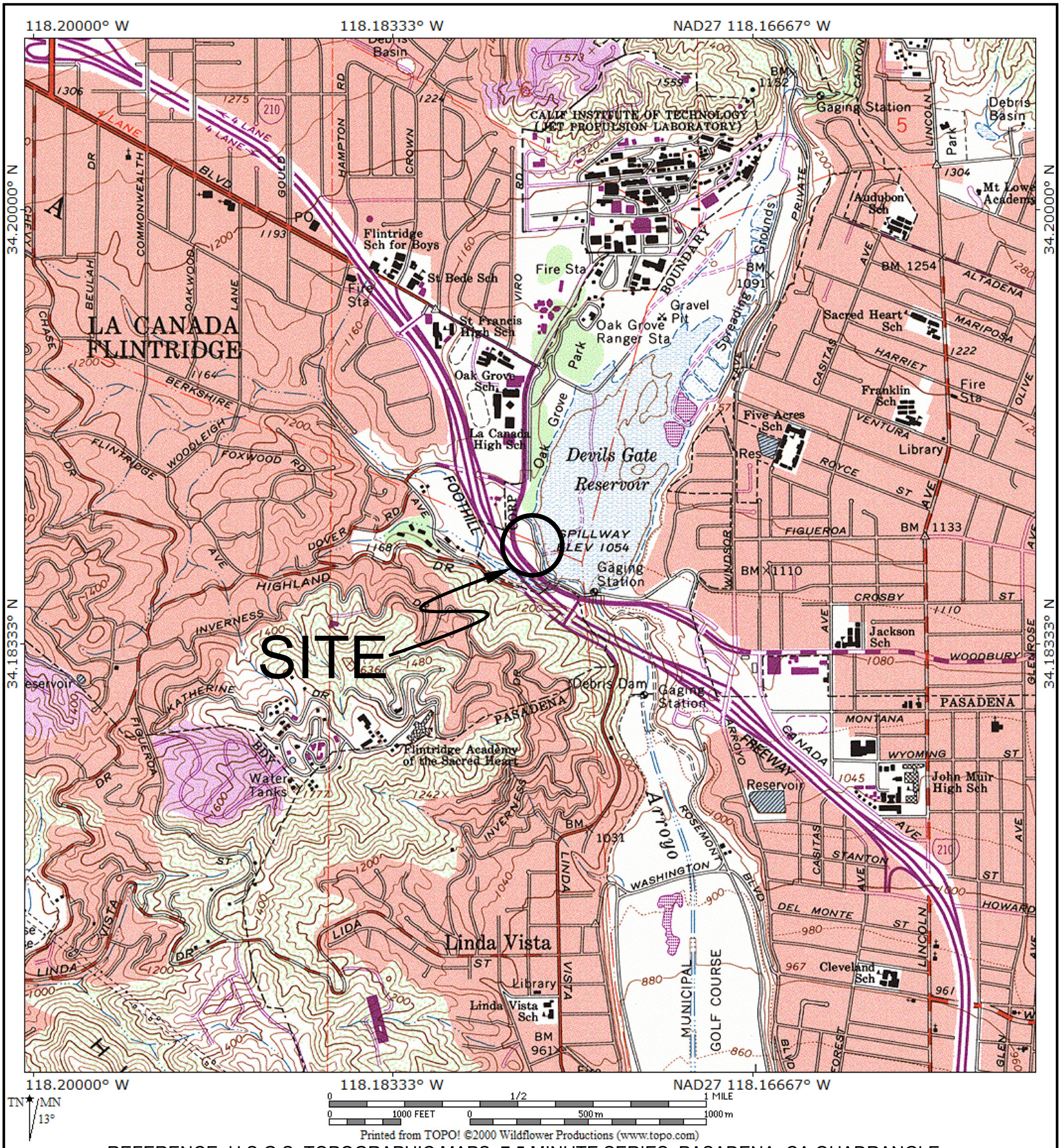

REFERENCE: U.S.G.S. TOPOGRAPHIC MAPS, 7.5 MINUTE SERIES, PASADENA, CA QUADRANGLE

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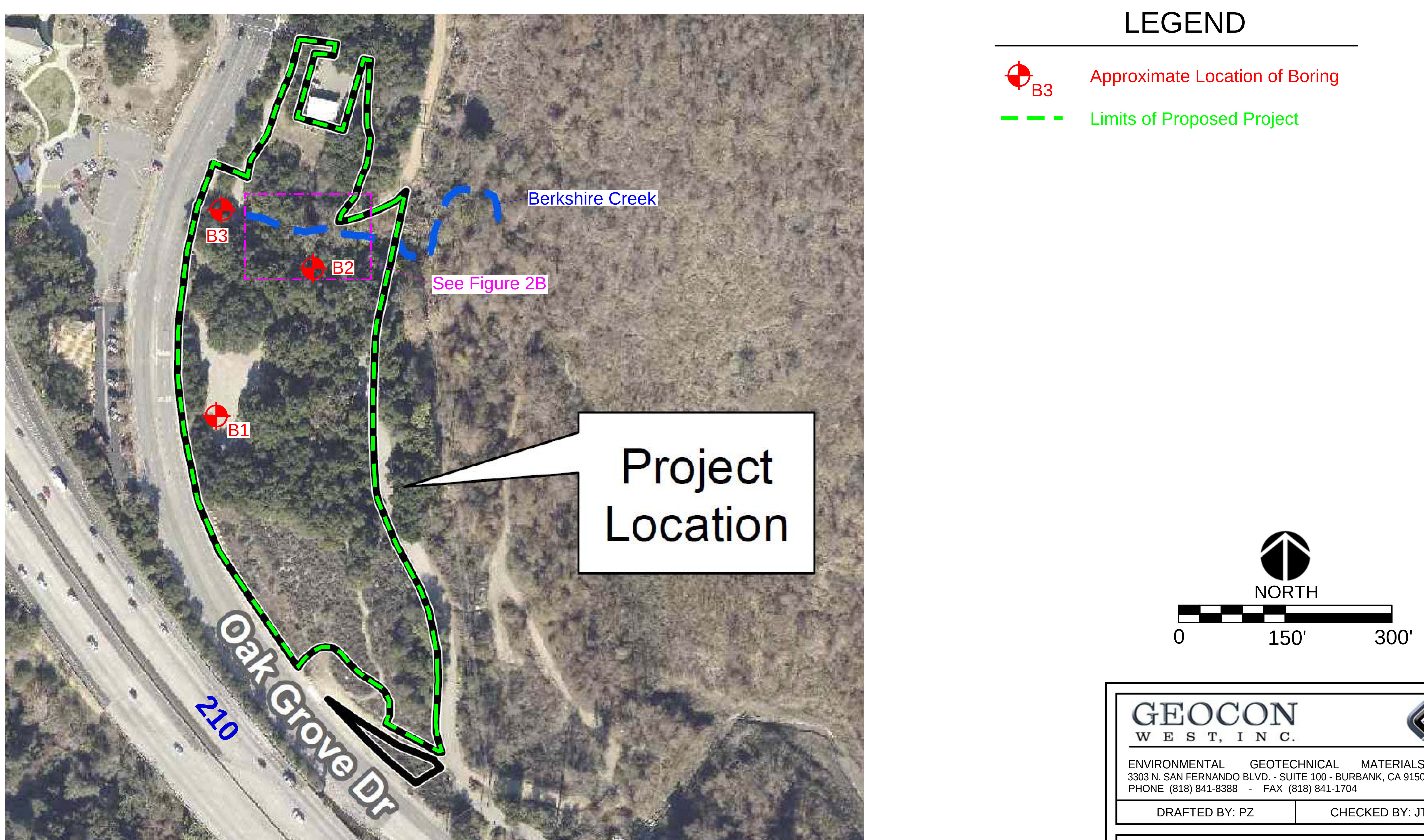
DRAFTED BY: JA | CHECKED BY: SFK

VICINITY MAP

CITY OF PASADENA
BERKSHIRE CREEK

APRIL 2019	PROJECT NO. A9175-06-20	FIG. 1



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SITE PLAN

CITY OF PASADENA
BERKSHIRE CREEK

APRIL 2019	PROJECT NO. A9175-06-20	FIG. 2A

ILLUSTRATION OF PROPOSED CHANNEL CONFIGURATION

FOR REFERENCE ONLY, NOT FOR CONSTRUCTION

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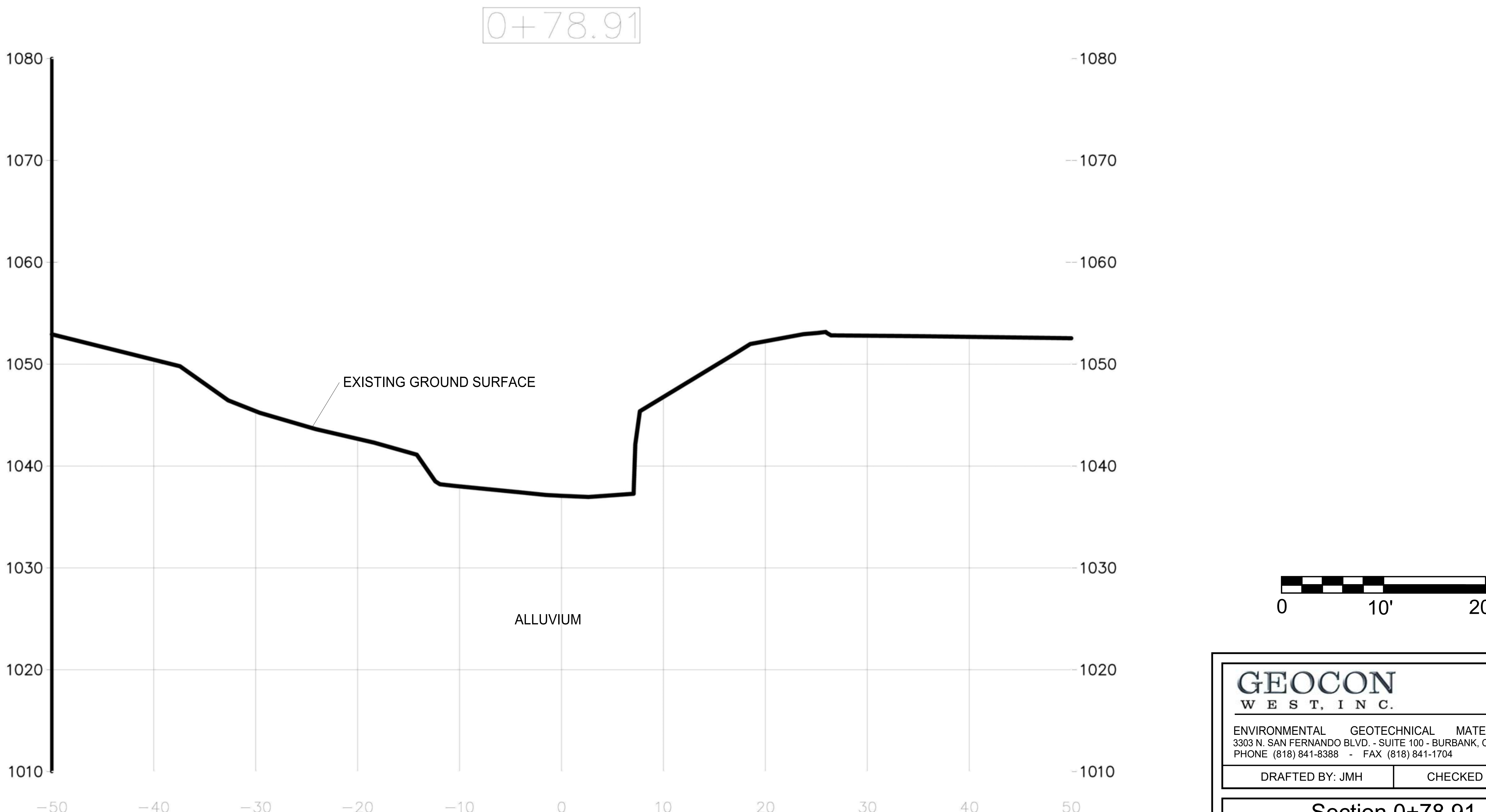
GEOLOGIC MAP & SITE PLAN

CITY OF PASADENA
BERKSHIRE CREEK

APRIL 2018 | PROJECT NO. A9175-06-20 | FIG. 2B



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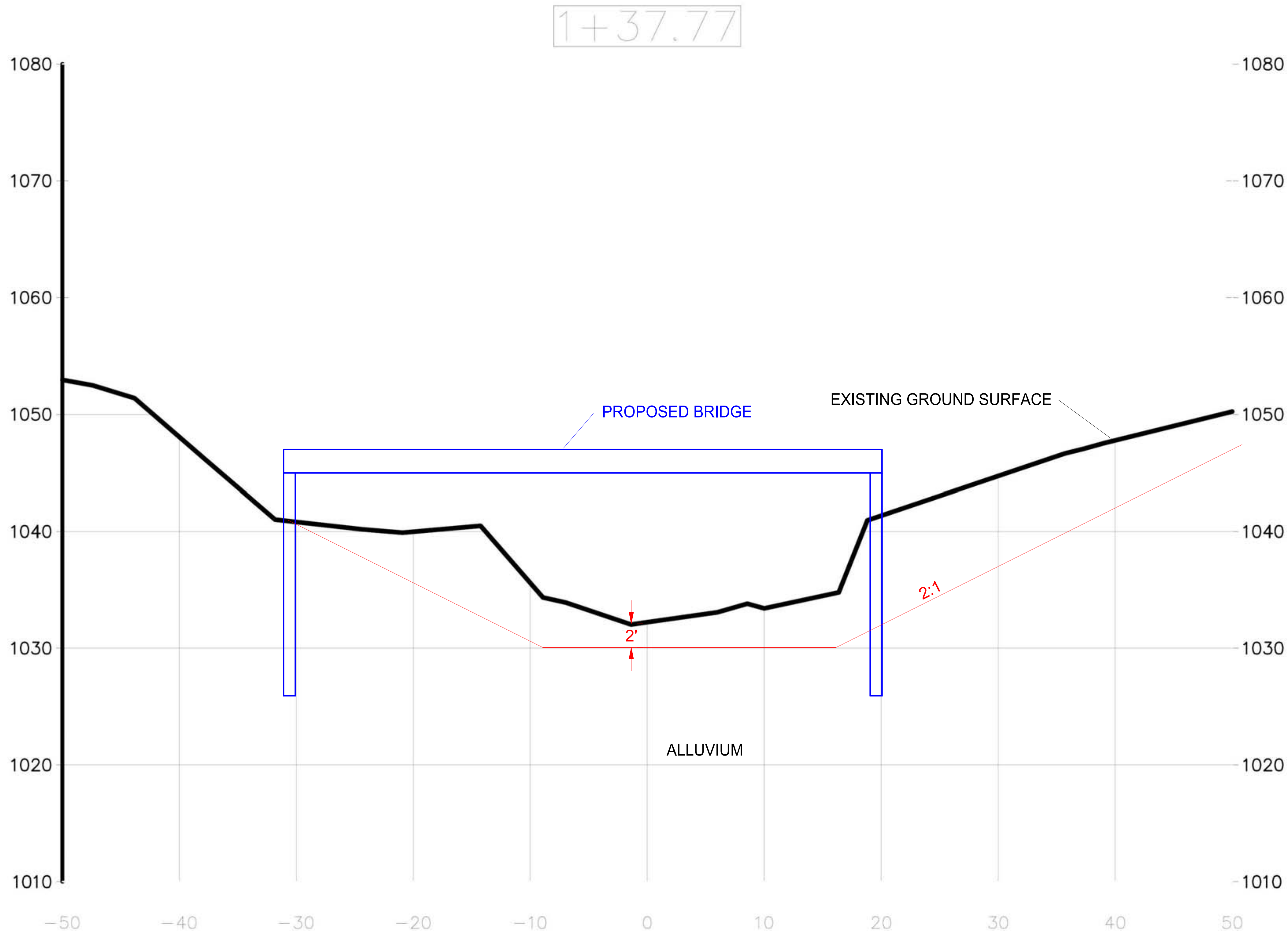
Section 0+78.91

CITY OF PASADENA
BERKSHIRE CREEK

APRIL 2019	PROJECT NO. A9175-06-20	FIG. 2C



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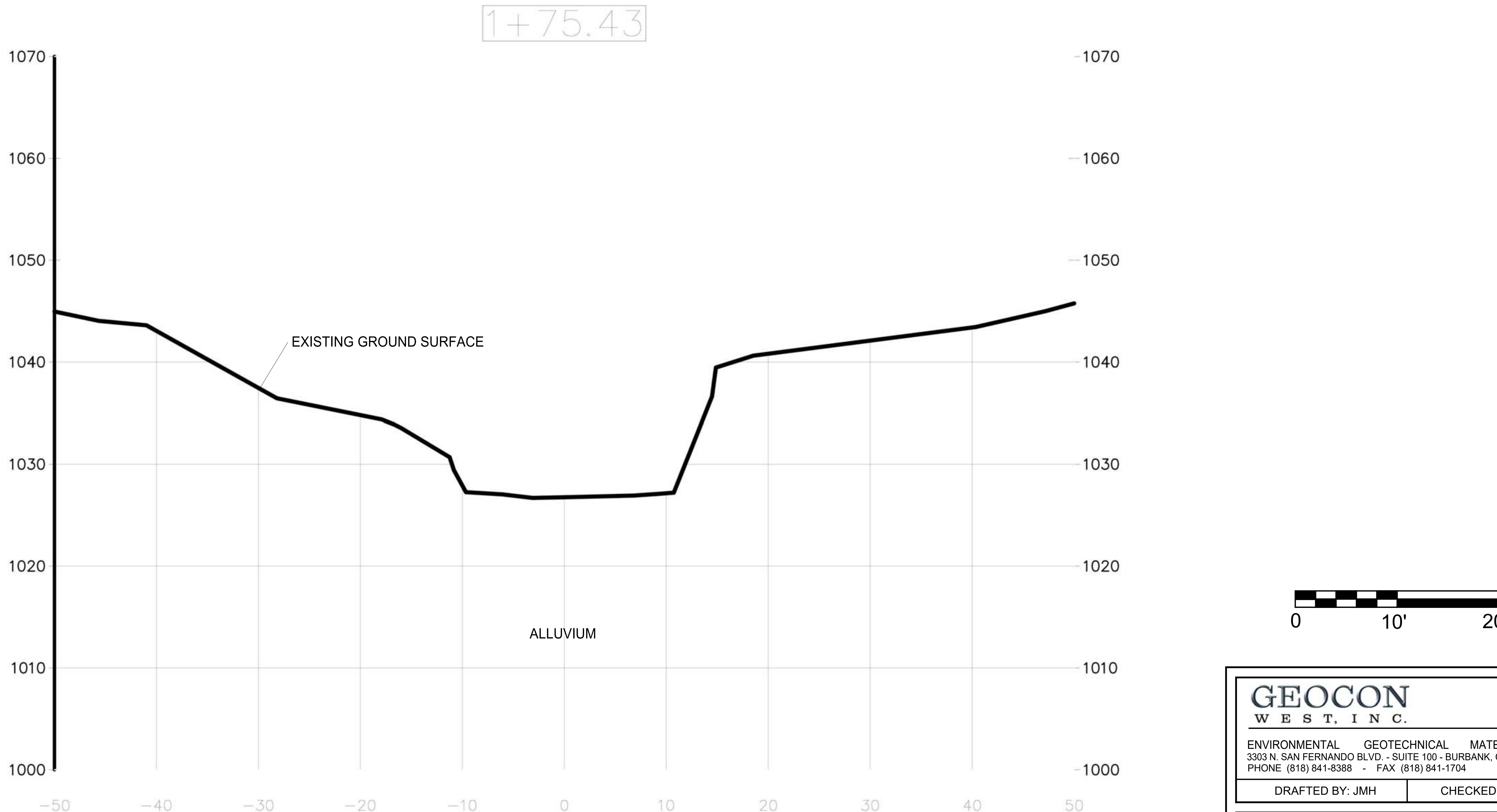
Section 1+37.77

CITY OF PASADENA
BERKSHIRE CREEK

APRIL 2019 | PROJECT NO. A9175-06-20 | FIG. 2D



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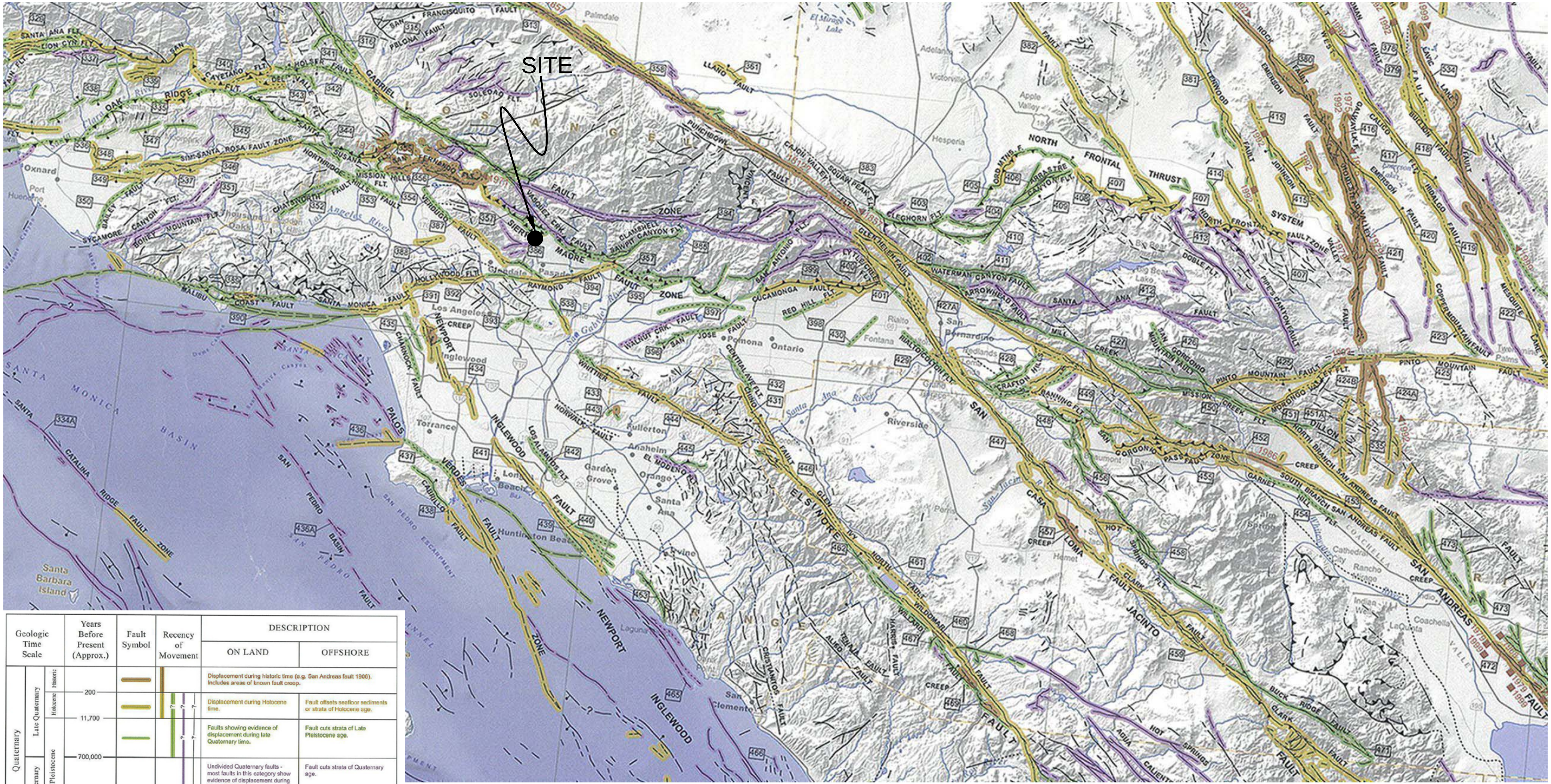
Section 1+75.43

CITY OF PASADENA
BERKSHIRE CREEK

APRIL 2019 | PROJECT NO. A9175-06-20 | FIG. 2E

Reference: Jennings, C.W. and Bryant, W. A., 2010, Fault Activity Map of California, California Geological Survey Geologic Data Map No. 6.



Geologic Time Scale			Years Before Present (Approx.)	Fault Symbol	Recency of Movement	DESCRIPTION: ON LAND	DESCRIPTION: OFFSHORE
Quaternary	Late Quaternary	Historic	200			Displacement during historic time (e.g. San Andreas fault 1906). Includes areas of known fault creep.	
		Holocene	11,700			Displacement during Holocene time.	Fault offsets seafloor sediments or strata of Holocene age.
		Pleistocene	700,000			Faults showing evidence of displacement during late Quaternary time.	Fault cuts strata of Late Pleistocene age.
	Early Quaternary		1,600,000*			Undivided Quaternary faults - most faults in this category show evidence of displacement during the last 1,600,000 years; possible exceptions are faults which displace rocks of undifferentiated Plio-Pleistocene age.	Fault cuts strata of Quaternary age.
Pre-Quaternary			4.5 billion (Age of Earth)			Faults without recognized Quaternary displacement or showing evidence of no displacement during Quaternary time. Not necessarily inactive.	Fault cuts strata of Pliocene or older age.

* Quaternary now recognized as extending to 2.6 Ma (Walker and Geissman, 2009). Quaternary faults in this map were established using the previous 1.6 Ma criterion.

0 12 24 Miles

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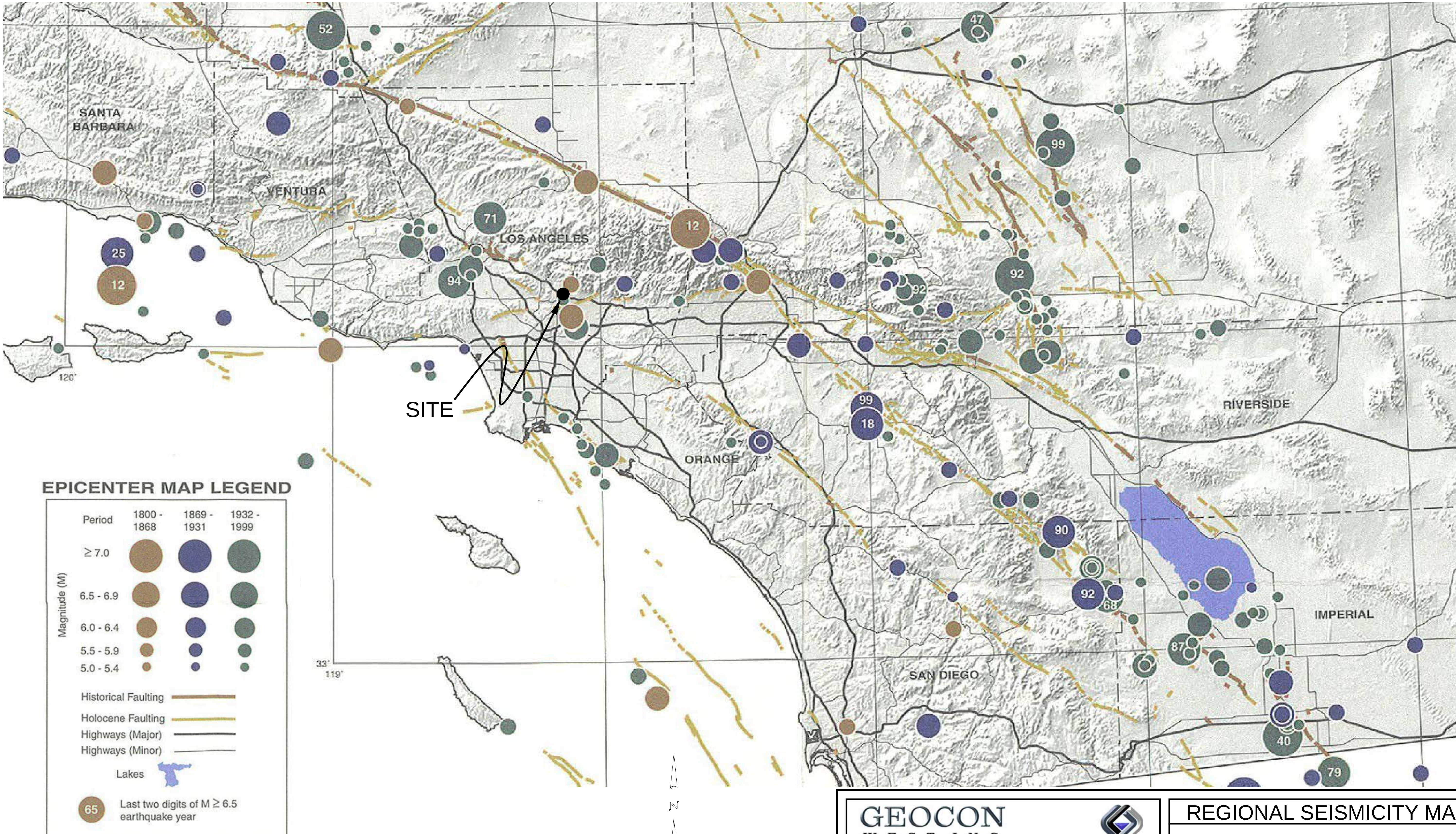
REGIONAL FAULT MAP

CITY OF PASADENA
BERKSHIRE CREEK

APRIL 2019 | PROJECT NO. A9175-06-20 | FIG. 3



Reference: Toppozada, T., Branum, D., Petersen, M., Hallstrom, C., Cramer, C., and Reichle, M., 2000, Epicenters and Areas Damaged by M≥5 California Earthquakes, 1800 - 1999, California Geological Survey, Map Sheet 49.

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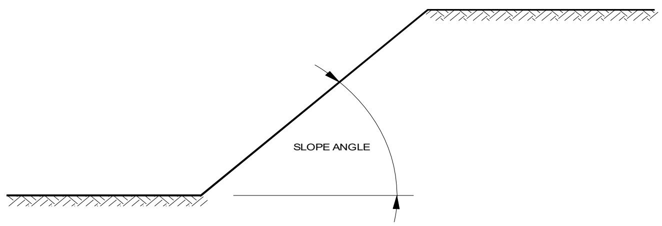
REGIONAL SEISMICITY MAP

CITY OF PASADENA
BERKSHIRE CREEK

APRIL 2019	PROJECT NO. A9175-06-20	FIG. 4

Taylor's Critical Slope Height

Soil Unit Weight (γ) =	125	pcf
Friction Angle (φ) =	38	degrees
Cohesion (c) =	75	psf
Slope Angle =	45	degrees
Factor of Safety =	1.5	



Factored Parameters:

(φ_{FS})	27.5	degrees
(c_{FS})	50	psf

For φ_{FS} > 25 degrees, use φ_{FS} = 25 degrees

Interpolate Stability Number (SN) from chart below:

Friction Angle (φ_{FS})	Slope Angle 20	30	40	50	60	70	80	90
5	0.09	0.11	0.13	0.145	0.16	0.185	0.21	0.26
10	0.045	0.075	0.1	0.12	0.14	0.16	0.188	0.22
15	0.02	0.045	0.07	0.095	0.115	0.14	0.168	0.2
20	0	0.025	0.05	0.075	0.098	0.12	0.15	0.18
25	0	0.01	0.033	0.055	0.08	0.105	0.13	0.17

SN = 0.044

Hc = c_{FS} / (γ * SN) = Critical Height

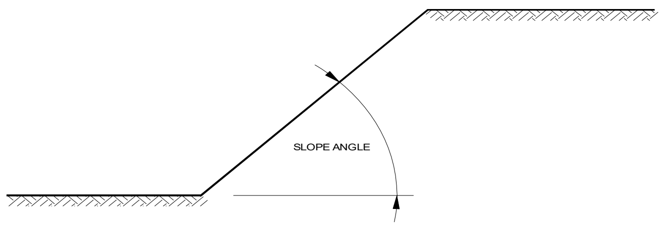
Hc = 9.1 feet

SURFICIAL SLOPE STABILITY ANALYSIS

Berkshire Creek
Pasadena, California

Taylor's Critical Slope Height

Soil Unit Weight (γ) =	125	pcf
Friction Angle (φ) =	38	degrees
Cohesion (c) =	75	psf
Slope Angle =	26.6	degrees
Factor of Safety =	1.5	



Factored Parameters:

(φ_{FS})	27.5	degrees
(c_{FS})	50	psf

For φ_{FS} > 25 degrees, use φ_{FS} = 25 degrees

Interpolate Stability Number (SN) from chart below:

Friction Angle (φ_{FS})	Slope Angle 20	30	40	50	60	70	80	90
5	0.09	0.11	0.13	0.145	0.16	0.185	0.21	0.26
10	0.045	0.075	0.1	0.12	0.14	0.16	0.188	0.22
15	0.02	0.045	0.07	0.095	0.115	0.14	0.168	0.2
20	0	0.025	0.05	0.075	0.098	0.12	0.15	0.18
25	0	0.01	0.033	0.055	0.08	0.105	0.13	0.17

SN = 0.007

Hc = c_{FS} / (γ * SN) = Critical Height

Hc = 60.6 feet

SURFICIAL SLOPE STABILITY ANALYSIS

Berkshire Creek
Pasadena, California

BORING PERCOLATION TEST FIELD LOG

Date:	Friday, March 15, 2019	**Boring/Test Number:**	Boring 1
Project Number:	A9175-06-20	**Diameter of Boring:**	8 inches
Project Location:	Berkshire Creek	**Diameter of Casing:**	2 inches
Earth Description:	SM	**Depth of Boring:**	15 feet
Tested By:	JMH	**Depth to Invert of BMP:**	10 feet
Liquid Description:	Clear Clean Tap Water	**Depth to Water Table:**	30 feet
Measurement Method:	Sounder	**Depth to Initial Water Depth (d_1):**	120 inches
Start Time for Pre-Soak:	9:30 AM	**Water Remaining in Boring (Y/N):**	No
Start Time for Standard:	10:30 AM	**Standard Time Interval Between Readings:**	10 min

Reading Number	Time Start (hh:mm)	Time End (hh:mm)	Elapsed Time Δtime (min)	Water Drop During Standard Time Interval, Δd (in)	Soil Description Notes Comments
1	10:30 AM	10:40 AM	10	60.0	
2	11:00 AM	11:10 AM	10	39.6	
3	11:30 AM	11:40 AM	10	33.6	
4	12:00 PM	12:10 PM	10	28.8	
5	12:30 PM	12:40 PM	10	24.0	
6	1:00 PM	1:10 PM	10	22.8	Stabilized Readings
7	1:30 PM	1:40 PM	10	22.8	Achieved with Readings
8	2:00 PM	2:10 PM	10	21.6	6, 7, and 8

MEASURED PERCOLATION RATE & DESIGN INFILTRATION RATE CALCULATIONS*

* Calculations Below Based on Stabilized Readings Only

Boring Radius, r: 4 inches

Test Section Height, h: 60.0 inches

$Test\ Section\ Surface\ Area, A = 2\pi rh$

A = **1508** in^2

$Discharged\ Water\ Volume, V = \pi r^2 \Delta d$

$Percolation\ Rate = \left(\frac{V/A}{\Delta T}\right)$

Reading 6	V =	**1146**	in^3	Percolation Rate =	**4.56**	inches/hour
Reading 7	V =	**1146**	in^3	Percolation Rate =	**4.56**	inches/hour
Reading 8	V =	**1086**	in^3	Percolation Rate =	**4.32**	inches/hour

Measured Percolation Rate = **4.48** inches/hour

Reduction Factors

Boring Percolation Test, RF_t = 2

Site Variability, RF_v = 1

Long Term Siltation, RF_s = 1

$Total\ Reduction\ Factor, RF = RF_t \times RF_v \times RF_s$

Total Reduction Factor = 2

Design Infiltration Rate

$Design\ Infiltration\ Rate = Measured\ Percolation\ Rate\ / RF$

Design Infiltration Rate = **2.24** inches/hour

FIGURE 7

BORING PERCOLATION TEST FIELD LOG

Date:	Friday, March 15, 2019	**Boring/Test Number:**	Boring 3
Project Number:	A9175-06-20	**Diameter of Boring:**	8 inches
Project Location:	Berkshire Creek	**Diameter of Casing:**	2 inches
Earth Description:	SM	**Depth of Boring:**	23 feet
Tested By:	JMH	**Depth to Invert of BMP:**	20 feet
Liquid Description:	Clear Clean Tap Water	**Depth to Water Table:**	33 feet
Measurement Method:	Sounder	**Depth to Initial Water Depth (d_1):**	240 inches
Start Time for Pre-Soak:	9:30 AM	**Water Remaining in Boring (Y/N):**	Yes
Start Time for Standard:	10:30 AM	**Standard Time Interval Between Readings:**	30 min

Reading Number	Time Start (hh:mm)	Time End (hh:mm)	Elapsed Time Δtime (min)	Water Drop During Standard Time Interval, Δd (in)	Soil Description Notes Comments
1	10:30 AM	11:00 AM	30	31.2	
2	11:00 AM	11:30 AM	30	24.0	
3	11:30 AM	12:00 PM	30	14.4	
4	12:00 PM	12:30 PM	30	10.8	
5	12:30 PM	1:00 PM	30	10.8	
6	1:00 PM	1:30 PM	30	9.6	Stabilized Readings
7	1:30 PM	2:00 PM	30	9.6	Achieved with Readings
8	2:00 PM	2:30 PM	30	9.6	6, 7, and 8

MEASURED PERCOLATION RATE & DESIGN INFILTRATION RATE CALCULATIONS*

* Calculations Below Based on Stabilized Readings Only

Boring Radius, r: 4 inches

Test Section Height, h: 36.0 inches

$Test\ Section\ Surface\ Area, A = 2\pi rh$

A = **905** in^2

$Discharged\ Water\ Volume, V = \pi r^2 \Delta d$

$Percolation\ Rate = \left(\frac{V/A}{\Delta T}\right)$

Reading 6	V =	**483**	in^3	Percolation Rate =	**1.07**	inches/hour
Reading 7	V =	**483**	in^3	Percolation Rate =	**1.07**	inches/hour
Reading 8	V =	**483**	in^3	Percolation Rate =	**1.07**	inches/hour

Measured Percolation Rate = **1.07** inches/hour

Reduction Factors

Boring Percolation Test, RF_t = 2

Site Variability, RF_v = 1

Long Term Siltation, RF_s = 1

$Total\ Reduction\ Factor, RF = RF_t \times RF_v \times RF_s$

Total Reduction Factor = 2

Design Infiltration Rate

$Design\ Infiltration\ Rate = Measured\ Percolation\ Rate\ / RF$

Design Infiltration Rate = **0.53** inches/hour

FIGURE 8

APPENDIX A

APPENDIX A

FIELD INVESTIGATION

The site was explored on March 8, 2019 by excavating three 4-inch-diameter borings to depths between 11 and 16 feet below the ground surface using hand auger equipment. The site was further explored on March 14, 2019 by excavating three 8-inch-diameter borings to depths between 25 and 45 feet below the ground surface using a truck-mounted hollow-stem auger drilling machine. Representative and relatively undisturbed samples were obtained by driving a 3 inch, O. D., California Modified Sampler into the "undisturbed" soil mass with blows from a slide hammer and a 140-pound auto-hammer falling 30 inches. The California Modified Sampler was equipped with 1-inch by $2^3/_8$-inch diameter brass sampler rings to facilitate soil removal and testing.

The soil conditions encountered in the borings were visually examined, classified and logged in general accordance with the Unified Soil Classification System (USCS). The logs of the borings are presented on Figures A1 through A6. The logs depict the soil and geologic conditions encountered and the depth at which samples were obtained. The logs also include our interpretation of the conditions between sampling intervals. Therefore, the logs contain both observed and interpreted data. We determined the lines designating the interface between soil materials on the logs using visual observations, penetration rates, excavation characteristics and other factors. The transition between materials may be abrupt or gradual. Where applicable, the logs were revised based on subsequent laboratory testing. The locations of the borings are shown on Figures 2A and 2B.

BORING HA1

ELEV. (MSL.) **1035** DATE COMPLETED **3/8/19**

EQUIPMENT **HAND AUGER** BY: **JMH**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT*)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					**ALLUVIUM**			
					Sandy Clay, soft, wet, dark brown, fine-grained.			
	HA1@1'				- firm		72.0	50.6
2								
4				CL	- cobbles (to 4")			
	HA1@5'				- brown, trace medium-grained		78.3	44.5
6								
8	HA1@8'				- fine- to medium-grained, increase in sand content		120.0	9.7
					Clayey Sand, medium dense, brown, saturated, medium- to coarse-grained.			
10	HA1@10'			SC			108.5	18.9

Total depth of boring: 11 feet (refusal)
No fill.
Groundwater encountered at 10 feet.
Backfilled with soil cuttings and tamped.

A9175-06-20 FIG A1-A3 BORING LOGS.GPJ

Figure A1,
Log of Boring HA1, Page 1 of 1

SAMPLE SYMBOLS			
	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

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BORING HA2

ELEV. (MSL.) **1040** DATE COMPLETED **3/8/19**

EQUIPMENT **HAND AUGER** BY: **JMH**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT*)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					**ARTIFICIAL FILL** Clayey Sand, medium dense, moist, yellowish brown, fine- to medium-grained.			
2	HA2@2'				- trace cobbles (to 4")		--	--
4	HA2@3.5'				- olive brown, decrease in clay content		111.9	15.8
6	HA2@5.5'						114.3	7.7
	HA2@7'				**ALLUVIUM** Sand, poorly graded, medium dense, light brown, fine- to medium-grained. - cobbles (to 4")		108.5	6.3
8								
10				SP				
	HA2@10.5						97.6	20.6
12								
				SC	Clayey Sand, loose, brown, wet, fine-grained, trace medium-grained.			
14	HA2@13.5						91.0	28.6
				CL	Sandy Clay, soft, saturated, brown, fine- to medium-grained.			
16	HA2@15.5				- fine-grained		103.1	23.3

Total depth of boring: 16 feet (refusal)
Fill to 6.5 feet.
Groundwater encountered at 15 feet.
Backfilled with soil cuttings and tamped.

Figure A2,
Log of Boring HA2, Page 1 of 1

A9175-06-20 FIG A1-A3 BORING LOGS.GPJ

SAMPLE SYMBOLS
- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

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BORING HA3

ELEV. (MSL.) **1043** DATE COMPLETED **3/8/19**

EQUIPMENT **HAND AUGER** BY: **JMH**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT*)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					**ARTIFICIAL FILL** Silty Sand, loose, moist, brown, fine- to medium-grained, trace coarse-grained.			
2	HA3@1.5'			SC	**ALLUVIUM** Clayey Sand, loose, moist, yellowish brown, fine- to medium-grained.		108.1	12.0
4								
6	HA3@5.5'			SP	Sand, poorly graded, medium dense, moist, reddish brown, fine- to medium-grained, trace silt.		111.1	9.9
8								
10	HA3@10.5'				- no silt		116.5	8.9

Total depth of boring: 11 feet
Fill to 1.5 feet.
No groundwater encountered.
Backfilled with soil cuttings and tamped.

Figure A3,
Log of Boring HA3, Page 1 of 1

A9175-06-20 FIG A1-A3 BORING LOGS.GPJ

SAMPLE SYMBOLS			
	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

BORING B1

ELEV. (MSL.) -- DATE COMPLETED 3/14/19

EQUIPMENT HOLLOW STEM AUGER BY: JAO

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT*)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					**ASPHALT: 2" BASE: NONE**			
					ARTIFICIAL FILL			
2	B1@2'			SM	Silty Sand, loose to medium dense, slightly moist, dark brown, fine- to medium-grained, trace to some gravel (to 1/2").	7		
					ALLUVIUM			
4					Silty Sand, loose, slightly moist, dark yellowish brown, fine- to medium-grained, some coarse gravel (to 1/2")			
6	B1@5'			SP-SM	Sand with Silt, poorly-graded, medium dense to dense, slightly moist, yellowish brown, fine- to medium-grained, trace fine gravel (to 1"). - dense to very dense, dry to slightly moist, light yellowish brown, fine- to coarse-grained, some gravel (to 1")	65		
8				SW-SM	Sand with Silt and Gravel, well-graded, dense to very dense, slightly moist, yellowish brown, fine- to coarse-grained, gravel (to 2").			
10	B1@10'			SM	Silty Sand, medium dense, slightly moist, yellowish brown, fine- to medium-grained.	26		
12								
14	B1@14.5'			SM	Silty Sand with Gravel, very dense, dry to slightly moist, bownish yellow, fine- to coarse-grianed, gravel (to 3/4").	50 (4")	108.8	1.3
16								
18				SP-SM	Sand with Silt, poorly-graded, dense, slighlty moist, yellowish brown, fine- to medium-grained.			
20	B1@20'			SM	Silty Sand, dense, slightly moist, dark yellowish brown, fine- to medium-grained.	78	107.8	4.6
22								
24	B1@24.5'			SP-SM	Sand with Silt, poorly-graded, dense to very dense, slighlty moist, yellowish brown, fine- to medium-grained.	67 (6")	124.8	11.9
				ML	Silt, hard, slightly moist, dark brown, some fine- to medium-grained sand.			

Total depth of boring: 25 feet
Fill to 1 foot.
No groundwater encountered.
Percolation testing performed.
*Penetration resistance for 140-pound hammer falling 30 inches by auto-hammer.

A9175-06-20 FIG A4-A6 BORING LOGS.GPJ

Figure A4,
Log of Boring B1, Page 1 of 1

SAMPLE SYMBOLS			
	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

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PROJECT NO. A9175-06-20

BORING B2

ELEV. (MSL.) -- DATE COMPLETED 3/14/19

EQUIPMENT **HOLLOW STEM AUGER** BY: **JAO**

DEPTH IN FEET	SAMPLE NO.	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT*)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0			**ASPHALT: 3" BASE: NONE**			
			ARTIFICIAL FILL			
			Sand with Silt, medium dense, slightly moist, dark brown, fine- to coarse-grained, trace fine gravel (to 1/2").			
2	B2@2.5'	SW-SM	**ALLUVIUM** Sand with Silt, well-graded, medium dense, slightly moist, yellowish brown, fine- to coarse-grianed, trace to some coarse gravel (to 1.5").	21		
4	B2@4.5'	SM	Silt Sand, dense to very dense, dry to slightly moist, dark yellowish brown, fine- to medium-grained, some fine gravel (to 3/4"), trace coarse-grained sand.	50 (3")	122.7	4.0
8	B2@7.5'		- dense	41		
	B2@9'		- trace coarse gravel (to 2.5")	60 (6")	119.6	1.8
10			- medium dense to dense, yellowish brown, fine- to medium-grained			
12	B2@12.5'			25		
14	B2@14.5'	SP-SM	Sand with Silt, poorly-graded, dense to very dense, slightly moist, yellowish brown, fine- to medium-grained.	50 (4")	110.8	6.1
16		SM	Silty Sand, medium dense, slightly moist, yellowish brown, fine- to medium-grained.			
18	B2@17.5'			37		
		SP	Sand, poorly-graded, dense, slightly moist, yellowish brown, fine- to medium-grained.			
20	B2@19.5'		- very dense, fine- to coarse-grained	50 (4")	107.8	2.5
22	B2@22.5'		- medium dense	27		
24		ML	Sandy Silt, firm to stiff, slightly moist, dark yellowish brown, fine- to medium-grained.			
	B2@25'	SM	Silty Sand, very dense, slighlty moist to moist, dark yellowish brown, fine- to medium-grained.	50 (4")	109.6	19.8
28	B2@27.5'	SW	Sand, well-graded, dense, slightly moist, dark yellowish brown, fine- to coarse-grained, trace silt, trace fine gravel (to 1/2").	36		
		SM	Silty Sand, medium dense, slightly moist to moist, dark yellowish brown, fine- to medium-grained.			

A9175-06-20 FIG A4-A6 BORING LOGS.GPJ

Figure A5,
Log of Boring B2, Page 1 of 2

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

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PROJECT NO. A9175-06-20

BORING B2

ELEV. (MSL.) -- DATE COMPLETED 3/14/19

EQUIPMENT HOLLOW STEM AUGER BY: JAO

DEPTH IN FEET	SAMPLE NO.	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT*)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
30	B2@30'	SM	- very dense, fine- to coarse-grained	50 (4")	114.3	18.0
32		ML	Sandy Silt stiff to hard, slightly moist, dark yellowish brown, fine- to medium-grained.			
	B2@32.5'	SM	Silty Sand, very dense, slightly moist, brown, fine- to medium-grained, trace to some coarse-grained sand.	52		
34	B2@34'			50 (6")	125.5	13.9
36						
38	B2@37.5'	SW	Sand, well-graded, very dense, moist, dark yellowish brown, fine- to coarse-grained, trace fine gravel (to 1/2"), some silt.	84		
40	B2@39.5'		- moist to wet, trace silt	50 (4")	122.9	8.8
42	B2@42.5'			58		
44	B2@44.5		- some silt	50 (5")	120.6	13.9

Total depth of boring: 45 feet
Fill to 2 feet.
Groundwater encountered at 39 feet.
Backfilled with soil cuttings and tamped.

*Penetration resistance for 140-pound hammer falling 30 inches by auto-hammer.

A9175-06-20 FIG A4-A6 BORING LOGS.GPJ

Figure A5,
Log of Boring B2, Page 2 of 2

SAMPLE SYMBOLS
... SAMPLING UNSUCCESSFUL ... STANDARD PENETRATION TEST ... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE ... CHUNK SAMPLE ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

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PROJECT NO. A9175-06-20

BORING B3

ELEV. (MSL.) -- DATE COMPLETED 3/14/19

EQUIPMENT HOLLOW STEM AUGER BY: JAO

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT*)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					**ARTIFICIAL FILL** Silty Sand, loose to medium dense, slightly moist, dark brown, fine- to coarse-grained, some rootlets, trace fine gravel (to 3/4").			
2 – 12				SP-SM	**ALLUVIUM** Sand with Silt, poorly-graded, loose to medium dense, dark yellowish brown, fine- to medium-grained, trace fine gravel (to 3/4"). - medium dense to dense, yellowish brown, trace coarse-grained sand - fine- to coarse-grained			
12 – 20				SW-SM	Sand with Silt and Gravel, well-graded, medium dense to dense, dry to slightly moist, yellowish brown, fine- to coarse-grained, gravel (to 1.5"). - dense to very dense, dark yellowish brown, no gravel			
20 – 22				SM	Silty Sand, medium dense to dense, slightly moist, dark yellowish brown, fine- to coarse-grained.			
22 – 25	B3@24'			SW-SM	Sand with Silt, well-graded, medium dense to dense, slighlty moist, dark yellowish brown, fine- to coarse-grained. - no recovery	50 (2")		
25 – 29				ML	Sandy Silt, firm to stiff, slightly moist, dark yellowish brown, fine- to medium-grained.			

Figure A6,
Log of Boring B3, Page 1 of 2

A9175-06-20 FIG A4-A6 BORING LOGS.GPJ

SAMPLE SYMBOLS			
	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

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DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	BORING B3 ELEV. (MSL.) -- DATE COMPLETED 3/14/19 EQUIPMENT HOLLOW STEM AUGER BY: JAO	PENETRATION RESISTANCE (BLOWS/FT*)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
30	B3@30'			SM	Silty Sand,very dense, slighlty moist, dark yellowish brown, fine- to medium-grained.	50 (5")	122.7	12.7
32								
34			▼					
	B3@35'				- dark brown, fine- to coarse-grained	50 (5")	122.7	4.0

Total depth of boring: 35.5 feet
Fill to 1.5 feet.
Groundwater encountered at 33.5 feet.
Percolation testing performed.

*Penetration resistance for 140-pound hammer falling 30 inches by auto-hammer.

Figure A6,
Log of Boring B3, Page 2 of 2

A9175-06-20 FIG A4-A6 BORING LOGS.GPJ

SAMPLE SYMBOLS			
	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

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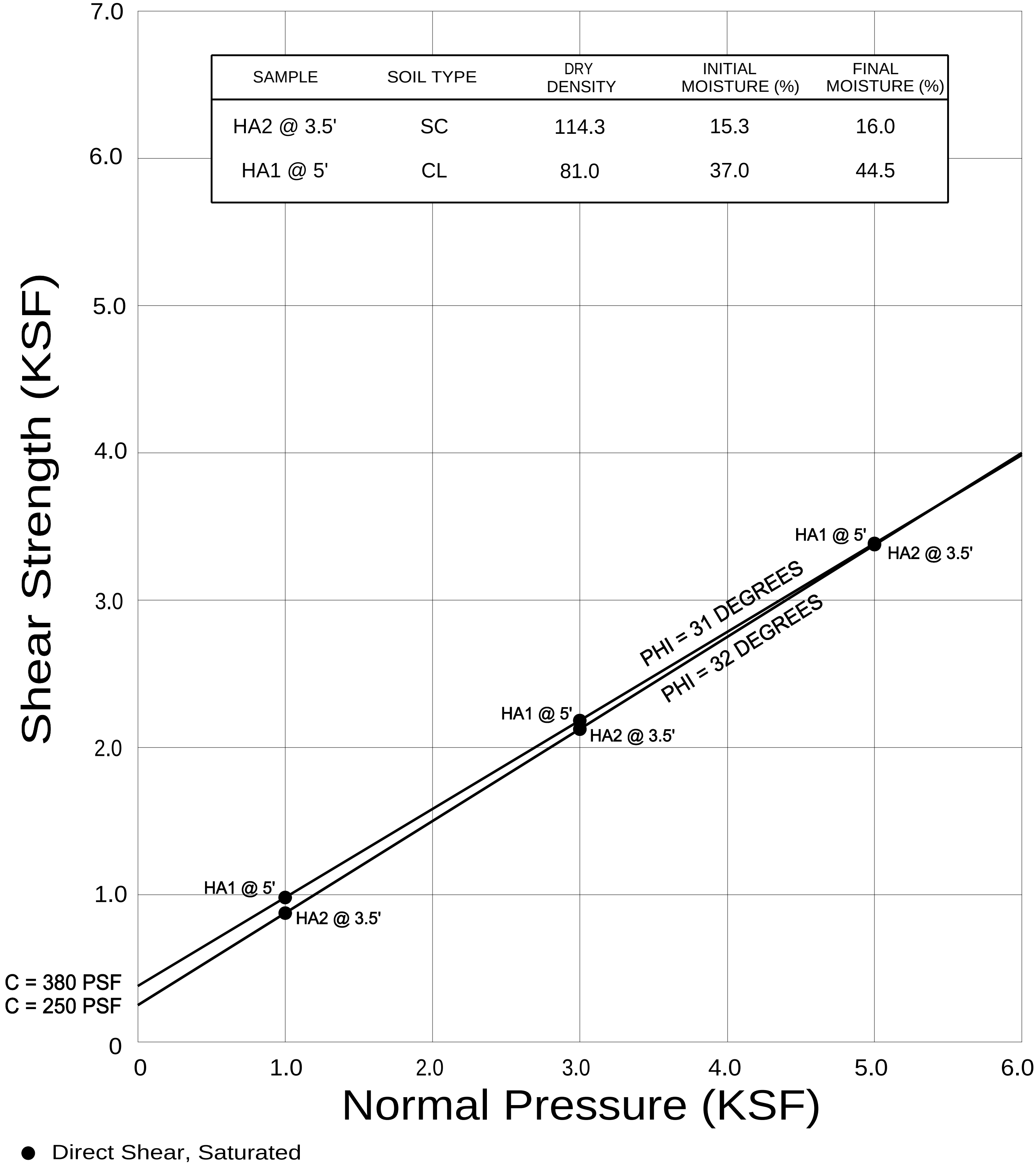
APPENDIX B

APPENDIX B

LABORATORY TESTING

Laboratory tests were performed in accordance with generally accepted test methods of the "American Society for Testing and Materials (ASTM)", or other suggested procedures. Selected samples were tested for direct shear strength, consolidation characteristics, water-soluble sulfate, in-place dry density and moisture content. The results of the laboratory tests are summarized in Figures B1 through B5. The in-place dry density and moisture content of the samples tested are presented on the boring logs, Appendix A.



SAMPLE	SOIL TYPE	DRY DENSITY	INITIAL MOISTURE (%)	FINAL MOISTURE (%)
HA2 @ 3.5'	SC	114.3	15.3	16.0
HA1 @ 5'	CL	81.0	37.0	44.5

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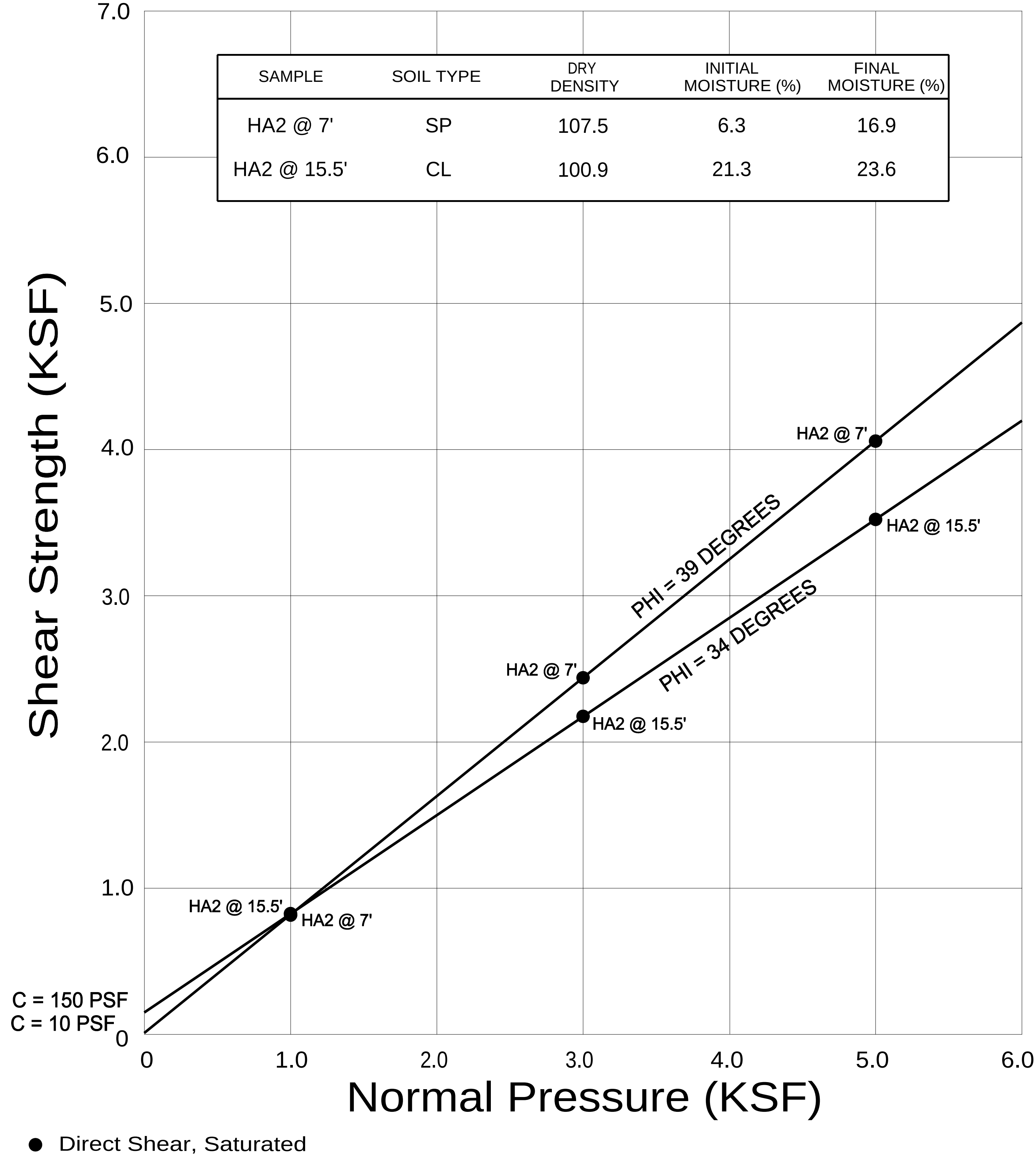
DIRECT SHEAR TEST RESULTS

CITY OF PASADENA
BERKSHIRE CREEK

DRAFTED BY: PZ	CHECKED BY: JTA	APRIL 2019	PROJECT NO. A9175-06-20	FIG. B1



SAMPLE	SOIL TYPE	DRY DENSITY	INITIAL MOISTURE (%)	FINAL MOISTURE (%)
HA2 @ 7'	SP	107.5	6.3	16.9
HA2 @ 15.5'	CL	100.9	21.3	23.6

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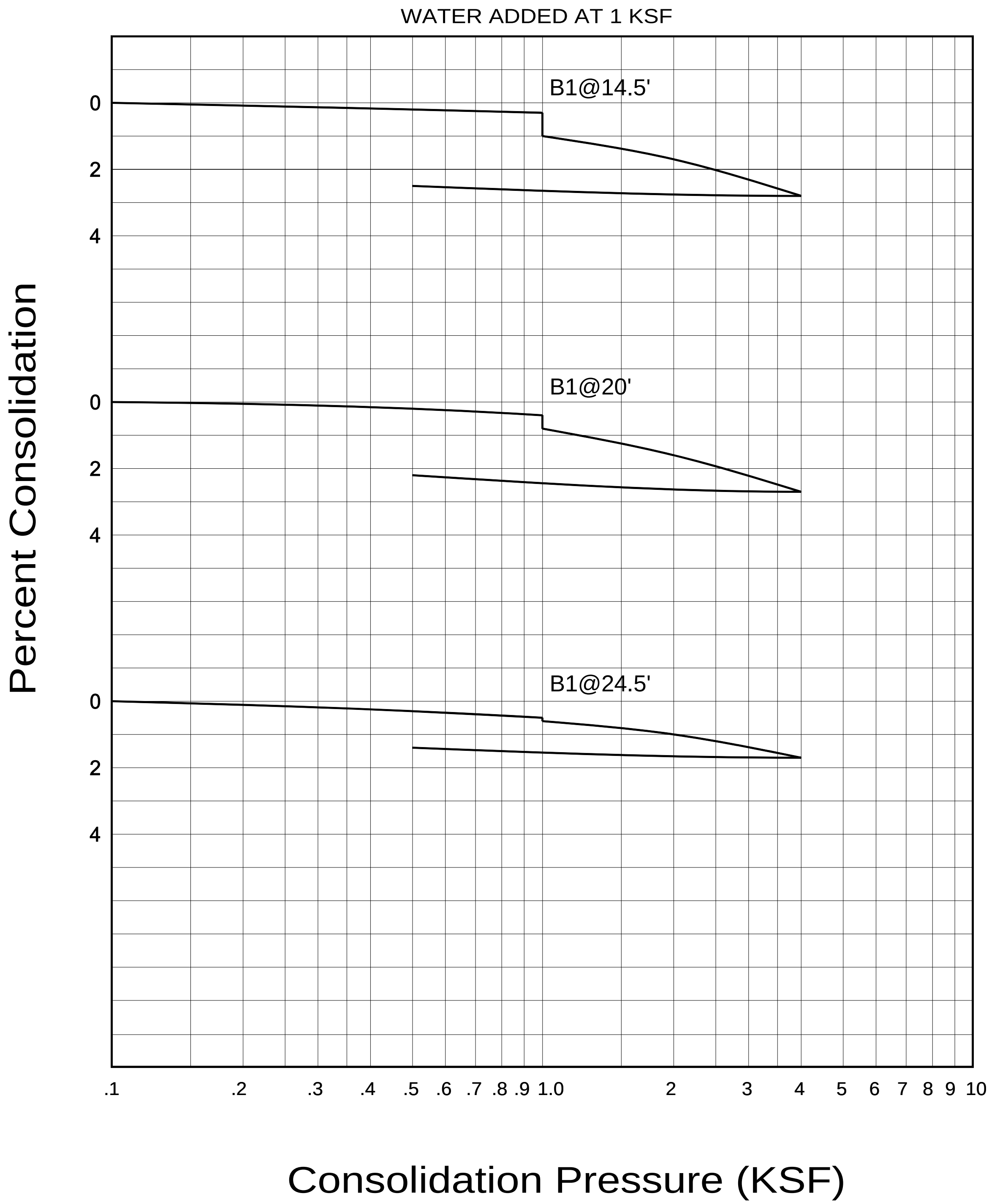
PHONE (818) 841-8388 - FAX (818) 841-1704

DIRECT SHEAR TEST RESULTS

CITY OF PASADENA
BERKSHIRE CREEK

DRAFTED BY: PZ	CHECKED BY: JTA	APRIL 2019	PROJECT NO. A9175-06-20	FIG. B2



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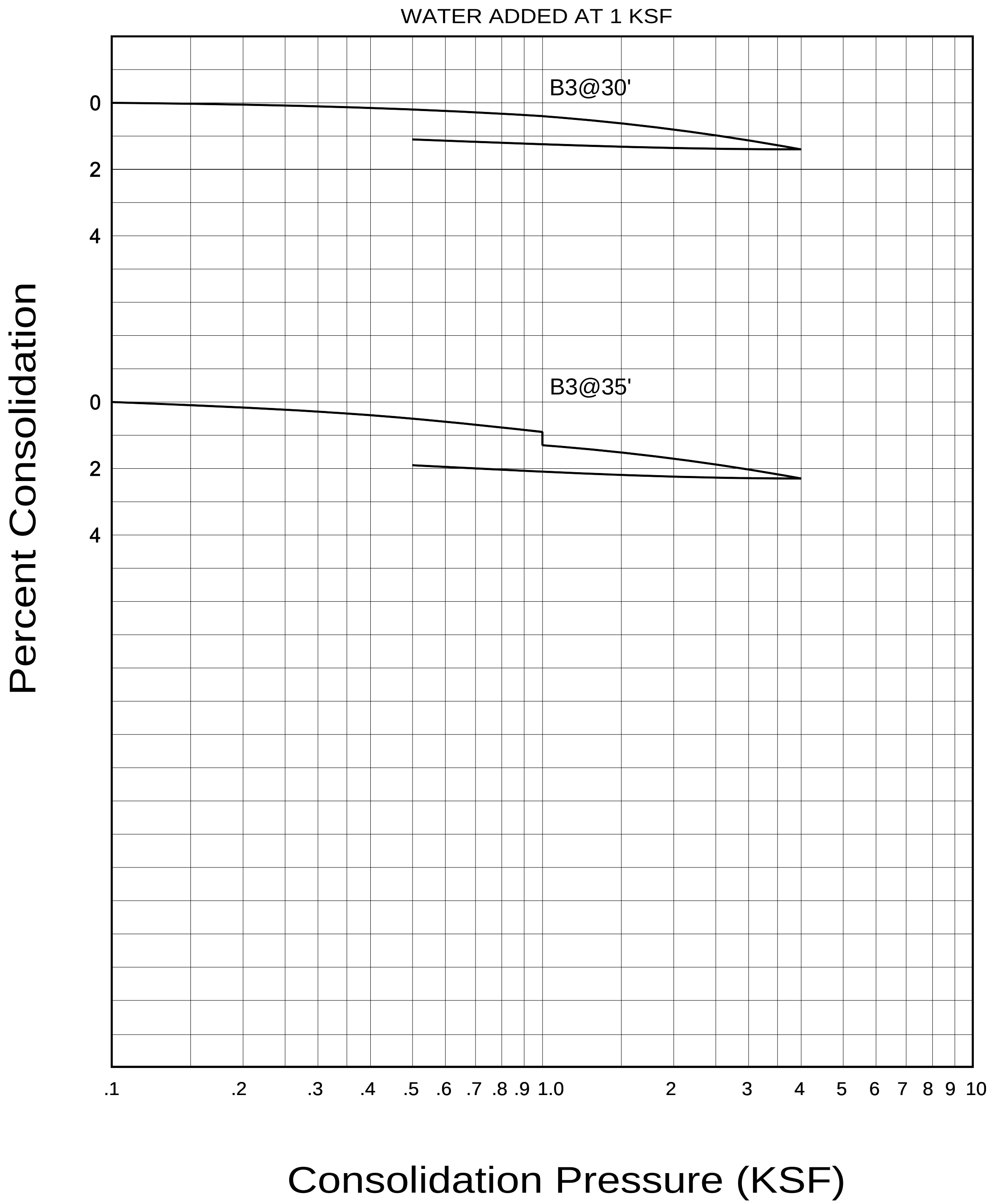
CONSOLIDATION TEST RESULTS

CITY OF PASADENA
BERKSHIRE CREEK

DRAFTED BY: PZ	CHECKED BY: JTA	APRIL 2019	PROJECT NO. A9175-06-20	FIG. B3



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CONSOLIDATION TEST RESULTS

CITY OF PASADENA
BERKSHIRE CREEK

DRAFTED BY: PZ	CHECKED BY: JTA	APRIL 2019	PROJECT NO. A9175-06-20	FIG. B4

SUMMARY OF LABORATORY WATER SOLUBLE SULFATE TEST RESULTS
CALIFORNIA TEST NO. 417

Sample No.	Water Soluble Sulfate (% SO_4)	Sulfate Exposure*
HA1 @ 2.5'	0.002	S0

* Reference: 2016 California Building Code, Section 1904.3 and ACI 318 Table 19.3.1.1

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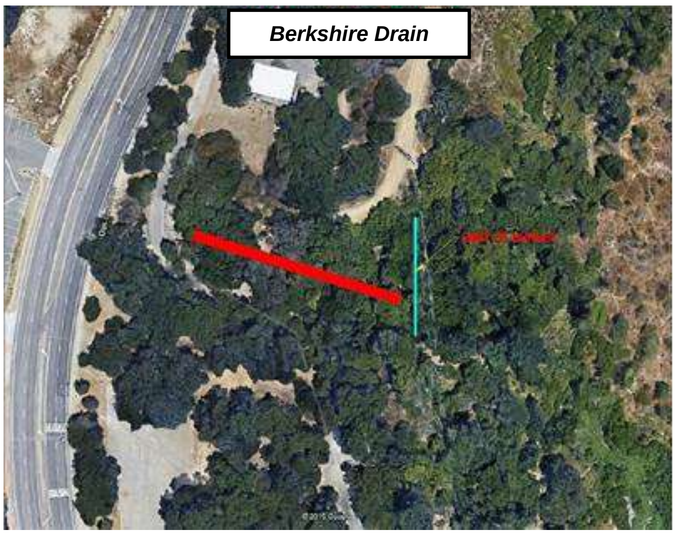
LABORATORY TEST RESULTS

CITY OF PASADENA
BERKSHIRE CREEK

DRAFTED BY: PZ	CHECKED BY: JTA	APRIL 2019	PROJECT NO. A9175-06-20	FIG. B5

APPENDIX C

GEOTECHNICAL ENGINEERING INVESTIGATION
BERKSHIRE DRAIN AND FOOTHILL DRAIN IMPROVEMENTS PROJECT
HAHAMONGNA WATERSHED PARK
PASADENA, LOS ANGELES COUNTY, CALIFORNIA



Prepared for

JMD

18645 E. Gale Ave., Suite 212
Industry, CA 91748-1363

Prepared by

HAI
HUSHMAND ASSOCIATES, INC.
Geotechnical and Earthquake Engineers

250 Goddard
Irvine, California 92618

January 2016

HUSHMAND ASSOCIATES, INC.
Geotechnical and Earthquake Engineers

Hushmand Associates, Inc.
1721 E. Lambert Rd, Ste. B
La Habra, CA 90631

p. (562) 690-3737
w. haieng.com
e. hai@haieng.com

January 29, 2016

JMDiaz, Inc.
18645 E. Gale Ave., Suite 212
Industry, CA 91748-1363

Attention: Mr. Kamran Saber, PE, QSD

SUBJECT: GEOTECHNICAL ENGINEERING INVESTIGATION
BERKSHIRE DRAIN AND FOOTHILL DRAIN IMPROVEMENTS PROJECT
HAHAMONGNA WATERSHED PARK
PASADENA, LOS ANGELES COUNTY, CALIFORNIA
HAI Project No. JMD-16-001

Dear Mr. Saber:

Hushmand Associates, Inc. (HAI) is pleased to submit the geotechnical engineering report for two (2) sites, Berkshire Drain and Foothill Drain, within the Hahamongna Watershed Park located at 4550 Oak Grove Drive, Pasadena, California. This report has been prepared in accordance with the scope of work of HAI's Proposal No. P15-1124 dated November 24, 2015.

HAI appreciates the opportunity of being of service to JMDiaz, Inc. Should you need additional information or any clarifications please call the undersigned.

Sincerely yours,

HUSHMAND ASSOCIATES, INC.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

BERKSHIRE DRAIN AND FOOTHILL DRAIN
IMPROVEMENTS PROJECT
HAHAMONGNA WATERSHED PARK
PASADENA, LOS ANGELES COUNTY, CALIFORNIA
HAI Project No. JMD-16-001

1.0 INTRODUCTION

1.1 Purpose and Scope of Services

This report presents the results of the geotechnical investigation performed by Hushmand Associates, Inc. (HAI) at two (2) sites, Berkshire Drain and Foothill Drain, within the Hahamongna Watershed Park located at 4550 Oak Grove Drive, Pasadena (City), California. The approximate project site location is shown on Figure 1. This report was prepared in accordance with the scope of work of HAI's Proposal No. P15-1124 dated November 24, 2015. The scope of work comprised conducting a field investigation, performing laboratory testing and engineering analyses, and preparing this report presenting our findings, conclusions, and recommendations for the project.

The scope of our work included the following tasks:

- Project coordination and review of information provided to us by JMDiaz, Inc. (JMD).
- Site reconnaissance to document the existing condition of the site, and to select and mark the proposed boring locations. Coordinate with Underground Service Alert for marking underground utility locations prior to drilling.
- Drilling and sampling of soil borings to characterize the subsurface soils at the site.
- Laboratory testing of soil samples from the drilling program.
- Field and laboratory data compilation and engineering analyses required to develop soil classification, grading, pavement, and foundation design recommendations (a more detailed explanation of the tasks requested by JMD from HAI is presented in Section 1.2 of this report).
- Preparation of this written report presenting our findings, conclusions and recommendations for the project.

The engineering conclusions and recommendations presented herein address the following:

- Earthwork and compaction criteria;
- Potential seismic hazards;
- Site seismic design coefficients;
- Lateral earth pressures;
- Pavement design;
- Shallow foundation design parameters; and
- Corrosion and chemical attack potential of soils.

Environmental services were not included as part of this study. Our scope of services did not include evaluations or recommendations regarding groundwater quality, hazardous waste, asbestos or lead abatement, demolition of existing structures and utilities, or erosion and scour potential.

1.2 Project Description and Background

Based on the information provided to us by JMD, we understand that the project has been divided into two (2) sites, Berkshire Drain and Foothill Drain. A brief description of the proposed improvements at each site as well as the tasks requested by JMD from HAI is provided next.

<u>SITE 1 – Berkshire Drain</u>

The proposed improvements at this site consist of:

- Design a new reinforced concrete box (RCB) culvert structure for widening the existing road.
- Raise the existing road surface (approximately 4 feet) at the new RCB culvert location extending to approximately 50 feet along the road at both directions from the new RCB culvert location.
- Design pavement structural sections for the widened sections of the road.
- Raise the existing dirt trail surface to match the existing road surface.
- Design erosion control structures (e.g., gabion structures) along the existing creek side slopes between the new RCB culvert location and the raised trail location.

JMD requested HAI to provide the following information:

- Foundation recommendations for the new RCB culvert.
- Pavement recommendations for widening the existing road.
- Grading recommendations for raising the existing road and dirt trail.
- Classification of the existing creek bottom and side slopes soils for erosion control design (to be performed by JMD).

<u>SITE 2 – Foothill Drain</u>

The proposed improvements at this site consist of:

- Design erosion control structures (i.e., rock wall/retaining structure on each side of the creek) along the existing relatively flat creek between the existing road and an approximately 40-inch diameter existing pipe location.

JMD requested HAI to provide classification of the existing relatively flat creek soils for erosion control design (to be performed by JMD).

2.0 FIELD EXPLORATION

Prior to drilling the exploratory borings, our staff marked the boring locations and evaluated these locations with respect to utility lines and other subsurface structures and trace of undocumented fills. Underground Service Alert was then notified for the proposed boring locations (Ticket number A53370700-01A). Drilling activities were performed under the field supervision of the HAI State of California Professional Geologist on December 18, 2015. Seven (7) borings (B-1, HB-1, HB-2, HB-3, HB-4, HB-5, and HB-6) were drilled at Site 1 to maximum depths of 36.5 feet, and 2.17, 3, 3, 5, 1.25, and 1.67 feet below ground surface (bgs), respectively (Figure 2). Six (6) borings (HB-1, HB-2, HB-3, HB-4, HB-5, and HB-6) were drilled at Site 2 to maximum depths of 2.5, 5.33, 4.75, 2, 2.67, and 1.5 feet bgs, respectively (Figure 3).

Boring locations, depths, and soil sampling intervals were specified by HAI. All borings were drilled with hand auger drilling equipment with the exception of boring B-1 that was drilled with an 8-inch outside diameter hollow-stem auger (HSA) on a truck-mounted drill rig. Geoboden, Inc. from Irvine, California was subcontracted to drill the HSA boring. Soil bulk samples were retrieved from the hand auger borings. Soil bulk samples from the upper 10 feet and relatively undisturbed samples at about every 5 feet were retrieved from boring B-1 using a Modified California (MC) ring sampler. The MC sampler has a 2.42-inch inside diameter and a 3.0-inch outside diameter.

After samplers were withdrawn from the borings, soil samples were carefully removed, visually inspected and classified according to the USCS, sealed to reduce moisture loss, and delivered to our laboratory for further inspection, soil classification, and testing. All borings were backfilled with compacted soil cuttings. Approximate locations of the exploratory borings are shown in Figures 2 and 3 for Site 1 and Site 2, respectively. Logs of exploratory borings, as well as a key to these logs, are presented in Appendix A.

3.0 LABORATORY TESTING

Soil samples collected during the field investigation were examined in our laboratory and selected samples were tested to evaluate their physical characteristics, in-situ conditions, classification, index, and engineering properties.

Laboratory tests performed included:

- In-Situ Moisture Content and Dry Density (ASTM D2937);
- Particle-Size Analysis of Soils (ASTM D422);
- Direct Shear (ASTM D3080);
- R Value (CTM 301) performed by Labelle Marvin of Santa Ana, California; and
- Corrosion Potential (including pH, minimum resistivity, soluble sulfates and chlorides tests in accordance with CTM 643, 417 and 422) performed by HDR Schiff of Claremont, California.

Classifications made in the field were modified as appropriate based on the laboratory test results. These modifications and the type of tests performed on the selected soil samples are reflected in boring logs in Appendix A. Laboratory test results are presented in Appendix B.

4.0 SITE GEOLOGY AND SUBSURFACE CONDITIONS

4.1 General

The project site is located at the northwest corner of the San Gabriel Valley at the east end of a narrow alluvial corridor that extends between the San Gabriel Mountains and the Verdugo Mountains/San Rafael Hills. The alluvial fill in the valley consists primarily of fans shed southward from the San Gabriel Mountains and the other adjoining mountain ranges. The site is located on the alluvial valley fill, in the watershed of the Arroyo Seco, on the west side of the Devils Gate Reservoir. Regionally, the project site is located at the southern edge of the Transverse Ranges geomorphic province where geologic structure is characterized by generally east-west to northeasterly trending structures such as the Tujunga, Raymond, Sierra Madre, and Duarte faults.

4.2 Geology Units and Statigraphy

Most of the San Gabriel Valley is underlain by alluvial fans shed southward primarily from the San Gabriel Mountains, and to a lesser degree from the other adjacent mountain ranges. The basement rock of the San Gabriel Mountains includes Cretaceous-aged quartz-diorite and granite that has been intruded and faulted into gneissic rock of possible Precambrian age (Dibblee, 1989). Materials shed from these "basement complex" igneous and metamorphic rocks tend to consist primarily of gravels and sands with relatively minor amounts of silt and clay.

The project is located on an abandoned fan on the west side of the Arroyo Seco, and is immediately underlain by alluvial fan materials that consist primarily of sand and silty sand with a gravel component that varies from pebbles to boulders. Alluvial materials are reported to extend to estimated depths of about 150 to 200 feet below the site, and are underlain at that depth by Pico Formation and Saugus Formation to a depth of about 500 to 600 feet (Smith, 1986).

Materials encountered to a depth of 36.5 feet bgs in boring B-1 consisted of sand and silty sand with minor gravel, and were found to be moist, and dense to very dense. Based on the laboratory test results, the in-place moisture content of the samples collected varies between approximately 1.4 and 26.2 percent. The in-place dry unit weight of the soils varies between approximately 96.1 and 124.3 pounds per cubic feet (pcf). The fraction passing the #200 (0.075 mm) sieve varies between approximately 7.9 and 46.4 percent. The fraction passing two microns (2µ) (0.002 mm) varies between approximately 2.8 and 12.5 percent.

Geology maps prepared by the HAI State of California Professional Geologist are presented in Figures 2 and 3 for Site 1 and Site 2, respectively. The regional geologic map is presented in Figure 4.

4.3 Groundwater

Groundwater below the site is reported to occur at depths ranging from about 20 to 50 feet (Figure 5). A significant increase in moisture was noted in materials recovered from a depth of 35 feet bgs at the boring B-1 location suggesting that groundwater may exist near this depth. The Devils Gate Reservoir and Spreading Grounds are located immediately west of the site. Groundwater levels can be expected to fluctuate over a wide range depending on annual precipitation and surface recharge activities.

4.4 Expansion Potential

According to the 2013 California Building Code (CBC), if the expansion index is greater than 20, soils shall be considered expansive when they are in compliance with all of these:

- Plasticity index (PI) greater than 15 (ASTM D4318);
- More than 10 percent of the soil particles pass a No. 200 sieve (ASTM D422); and
- More than 10 percent of the soil particles are less than 5 micrometers in size (ASTM D422).

Taking into consideration the granular characteristics of the site soils, the upper 5 feet of site soils are considered non expansive.

4.5 Collapse Potential

To assess the collapse potential of the site soils, one (1) collapse potential test was performed on a soil sample (B-1 @ 10 feet) at their in-situ moisture and then by wetting (adding water) to the soil sample in the oedometer apparatus based on ASTM D4546 test method.

The Collapse Potential (CP) is defined to roughly estimate the order of magnitude of settlement that may occur at a particular layer at a particular site when soil is wetted. Settlement of the soil layer at a specific applied vertical stress may be obtained by multiplying CP by H/100, where H is the thickness of the soil layer.

We computed the CP value as listed next:

- B-1 at 10 feet bgs: 3.3% at 2,000 psf

This test was performed on an individual sample at a depth where the lower blow counts were recorded. The average CP value of the upper 20 feet of site soils is expected to range between 1 and 2 percent.

A classification of the Collapse Potential (CP), as an indicator of the severity of the condition is given on Table 1, from NAVFAC (DM 7.1-40).

Table 1. Degree of Collapse

Degree of Collapse	Collapse Potential, CP (%)
No Problem	0 to 1
Moderate Trouble	1 to 5
Trouble	5 to 10
Severe Trouble	10 to 20
Very Severe Trouble	20

Based on the above test results, the general indicators provided by NAVFAC (DM 7.1-40), absence of groundwater at the time of our field investigation, and the relatively deep historical highest groundwater depth, it appears that the severity of the collapse potential at the project site classifies as "no problem" to the lower range of "moderate trouble".

4.6 Corrosion Potential

One (1) sample was submitted to an analytical laboratory for pH, soluble sulfate and chloride content testing. The results of the tests are summarized in Table 2.

Table 2. Results of Corrosivity Testing

Sample No.	Depth	Chloride (mg/kg) (1)	Sulfate (mg/kg) (1)	pH	Minimum Resistivity (ohm-cm)	Corrosivity Potential	
						Based on Resistivity (2)	Based on Sulfates (3)
HB-3 Site 1	0 – 36"	5.5	13	5.3	14,500	Very Mildly Corrosive	S0 – Not Applicable

Notes:

1. mg/kg = milligrams per kilogram (parts per million) of dry soil.
2. The approximate relationship between soil resistivity and soil corrosivity was developed based on the findings of studies presented in ASTM STP 1013 titled "Effects of Soil Characteristics on Corrosion" (February, 1989).
3. The approximate relationship between water-soluble sulfate (SO_4) in soil (percent by weight) and soil corrosivity was developed based on the 2013 California Building Code (CBC), referring to ACI 318-11.

Based on Caltrans Corrosion Guidelines, version 2.0, dated November 2012 (Caltrans 2012), *"For structural elements, the Department considers a site to be corrosive if one or more of the following conditions exist for the representative soil and/or water samples taken at the site: Chloride concentration is 500 ppm or greater, sulfate concentration is 2,000 ppm or greater, or the pH is 5.5 or less"*.

<u>Taking into consideration that the tested soils do not meet Caltrans requirements for corrosive soils based on chloride and sulfate concentrations and that the pH is at the borderline of Caltrans requirements (5.3 compared to 5.5 per Caltrans), the site soils are not considered to be corrosive per the Caltrans criteria</u>.

The above tests were performed for screening purposes only. <u>Our firm does not practice corrosion engineering; therefore, we recommend that a corrosion engineer be retained to evaluate the corrosion potential of the onsite soils and any impact on the proposed project improvements</u>.

5.0 SEISMIC DESIGN CONSIDERATIONS

5.1 Site Seismicity

The project site is not located within a currently established Alquist-Priolo Earthquake Fault (AP) Zone for surface rupture hazard, and there are no known active faults present at the site. The closest AP Zone to the project is established along the Tujunga Fault Zone approximately 5½ miles northwest of the site. The Tujunga fault extends southeast from this location and passes just over ½ mile north of the site, but has not as yet been included in a regulatory zone. The Sierra Madre Fault Zone (Sierra Madre B), closest known active fault to project area, is located around 1.6 kilometers (1.0 mile) away from the site (Caltrans ARS Online tool, version 2.3.06). The project will likely be subjected to significant ground shaking in the event of an earthquake on any of a number of nearby faults. This hazard is common to southern California and can be mitigated if future structures are designed and constructed in conformance with applicable building codes and sound engineering practices. According to the California Geological Survey (CGS) Seismic Hazard Map for the Pasadena quadrangle dated March 25, 1999, the project site is located within liquefaction-prone areas. Liquefaction, earthquake-induced settlements, and lateral spreading hazards exist at the site. Evaluation of the potential for liquefaction and related earthquake-induced hazards at the site was not included within the scope of the current project as requested by JMD.

5.2 2013 CBC Seismic Design Coefficients

The seismic design coefficients based on Chapter 16 of the 2013 CBC are provided in Table 3.

Table 3. Site Categorization and Site Coefficients

Categorization/Coefficient	Design Value
Site Soil Classification	S_D
Short Period Spectral Acceleration S_S (g)	2.721
1-sec. Period Spectral Acceleration S_1 (g)	0.971
Short Period (MCE_R) Spectral Acceleration S_{MS} (g)	2.721
1-sec. Period (MCE_R) Spectral Acceleration S_{M1} (g)	1.457
Short Period Design Spectral Acceleration S_{DS} (g)	1.814
1-sec. Period Design Spectral Acceleration S_{D1} (g)	0.971

Notes:
1. Values obtained from the *United Stated Geological Survey (USGS) U.S. Seismic Design Maps* tool, based on 2010 ASCE 7 Standard and 2012 International Building Code (IBC).
2. MCE_R stands for Risk-Targeted Maximum Considered Earthquake.
3. The seismic hazard analysis was performed based on the coordinates of N34.1883° and W118.1785°, at the approximate location of the new RCB culvert.

The Mapped Peak Ground Acceleration (PGA_M) adjusted for site effects at the site was calculated to be 1.013g, as defined by ASCE 7-10 Chapter 11. Deaggregation analyses for the site performed based on the *USGS 2008 Interactive Deaggregation* tool for an exceedance probability of 2 percent in 50 years show that earthquakes having a mean magnitude of 6.8 occurring at a mean distance of 7.6 km (4.7 miles) have the highest contribution to the seismic hazard at the site.

6.0 CONCLUSIONS AND RECOMMENDATIONS

The discussions and recommendations presented in the following sections are based on our understanding of the proposed project requirements, the results of our geotechnical investigation, and our professional judgment. It is our opinion that based on the above-cited geotechnical findings, the site is suitable for the proposed improvements, provided that the recommendations in this report are followed, and onsite construction observations and field testing are performed. There are no known geologic hazards that would preclude the project as planned.

6.1 Site Preparation and Grading

Prior to construction, the site should be cleared of all above-ground obstacles and structures. Existing utility and irrigation lines should be protected in-place, rerouted, or removed if they interfere with the proposed construction. The resulting cavities from removal of utility lines should be properly backfilled and compacted under the supervision of the project geotechnical engineer. Vegetation, debris, and organic matter should not be incorporated into the structural fill.

After the site has been properly cleared and necessary excavations have been made, exposed surface soils in areas receiving fill should be scarified in-place to a depth of 8 inches, moisture conditioned, and compacted in accordance with the recommendations presented next. The finished compacted subgrade should be firm and non-yielding under the weight of compaction equipment.

Engineered fill should be used to raise the grade and widen the existing road as well as to raise the existing dirt trail grade at Site 1. Engineered fill should consist of imported, clean, non-corrosive, non-expansive “granular” soils (soils having less than 20 percent passing standard sieve #200, free of debris, vegetation, and with rocks less than 6 inches in diameter with no more than 15 percent greater than 3 inches in diameter, confirmed with laboratory testing prior to construction).

Engineered fill as well as scarified surface soils in those areas to receive fill should be compacted to at least 90 percent relative compaction as determined by ASTM Test Designation D1557, latest edition. The upper one (1) foot and two (2) feet of fill below the pavement structural section and below the final grade, respectively, should be compacted to 95 percent relative compaction as determined by ASTM Test Designation D1557, latest edition.

Engineered fill should be placed in lifts no greater than 8 inches in uncompacted thickness at a moisture content of 2 percent points higher than the laboratory optimum. Each successive lift should be firm and non-yielding under the weight of construction equipment.

<u>Areas to receive fill should be protected with erosion control structures to be designed by JMD. In addition, the structural engineer of the project should verify that the existing pipe located at the bottom of the existing trail intended to be raised can tolerate the weight of the fill to be placed over it, or if pipe protection (i.e., concrete encasement, etc.) is necessary</u>.

6.2 Excavation Stability and Shoring Requirements

Based on our observations during the subsurface investigation and results of laboratory tests, the upper 5 feet of the project soils can be excavated by conventional heavy-duty earthmoving equipment. Excavations deeper than 4 feet should be either laid back or shored according to appropriate jurisdiction guidelines before personnel are allowed to enter. In addition, special care should be taken for excavations near existing improvements to ensure that their integrity is not impacted.

Typical cantilever shoring should be designed based on an active fluid pressure of 33H pcf. If excavations are braced at the top and at specific design intervals, the shoring pressure may then be approximated by a rectangular soil pressure distribution with a pressure per foot of width equal to 25H (psf), where H is equal to the depth of the excavation being shored. The project geotechnical engineer should review the contractor's shoring design prior to implementation. In addition to the abovementioned pressures, the shoring system must be designed to resist horizontal pressures that may be generated by surcharge loads applied at the ground surface such as from uniform loads or vehicle loads. The edges of all excavations should be kept away from the property line a minimum horizontal distance equal to 2H (where H is the height of the excavation) or as set forth by local ordinances, whichever is more strict.

6.3 Lateral Earth Pressure for Retaining Structures

Based on laboratory test results and encountered soil conditions, the recommended lateral earth pressures are presented in Table 4.

Table 4. Recommended Lateral Earth Pressures

Design Parameter	Design Value
Active Pressure (P_a)	33H
At-Rest Pressure (P_o)	52H
Passive Pressure (P_p)	335H (maximum 3,350 psf)
Seismic Force (F_e)	$15H^2$ (cantilever walls) $29H^2$ (rigid walls)
Coefficient of Friction (μ)	0.40

Notes:

1. All values of height (H) in feet (ft), pressure (P) and surcharge (q) in pounds per square feet (psf) and force (F) in pounds (lb) are for unit width of walls.
2. The above pressure values apply to horizontal backfill and do not include hydrostatic pressures that might be caused by groundwater or water trapped behind the structure.
3. For 2:1 and 3:1 slopes above the wall, increase P_a and P_o by 65 and 35 percent, respectively.
4. μ is the friction coefficient applied to dead normal (buoyant) loads. F_e is in addition to the active and at-rest pressures, P_a and P_o.
5. For passive pressure use a factor of safety of 2.5 if wall rotation (D/H) is smaller than 0.04. The passive pressure might not be used if soil is subjected to scour.

6. Neglect the upper 1 foot for passive pressure unless the surface is contained by pavement or a slab.
7. The earthquake load (F_e) should be distributed as an inverted triangle along the wall height.
8. In addition to the abovementioned pressures, retaining walls must be designed to resist horizontal pressures that may be generated by surcharge loads applied at the ground surface such as from uniform loads or vehicle loads.

An efficient drainage system should be provided behind retaining walls, which should consist of a curtain of free-draining material, such as Caltrans permeable Class 2 Aggregate. This drain curtain should be a minimum of 2 feet wide and extend from the bottom of the wall to within 1.5 feet of finish grade. Additionally, drainage geocomposite (Miradrain or equivalent) should be used to wrap the gravel material. The upper 1.5 feet should be a select material of low permeability (clayey soil) to minimize infiltration. A perforated pipe should be placed along the base of the wall and should be sloped at least two percent to drain water by gravity to a suitable discharge facility.

6.4 Slope Stability (Site 1 – Berkshire Drain)

With the main purpose of providing recommendations for design of erosion control structures (i.e., gabion structures), the global stability of the existing creek slopes for Site 1 was evaluated. The soil properties of 38 degrees and 50 pounds per square foot (psf) for internal friction angle and cohesion, respectively, were chosen mainly based on results of the subsurface exploration, including the measured blow counts, as well as direct shear (ASTM D3080) laboratory test results.

Similarly, we performed slope stability analyses to determine the design side slopes for raising the existing trail grade. The soil properties of 30 degrees and 40 psf for internal friction angle and cohesion, respectively, are proposed for the imported engineered fill. The imported engineered fill should be tested prior to transporting to the site for a minimum internal friction angle of 30 degrees and cohesion of 40 psf under ultimate "residual" conditions (the direct shear test should be performed on a sample remolded to 90 percent of the maximum dry density and to the optimum moisture content per ASTM D1557, Modified Proctor).

Based on section 3.5.1.2, Static and Seismic Slope Stability (Global), of the Los Angeles County Manual for Preparation of Geotechnical Reports dated July 1, 2013, *"The minimum factor of safety for gross static stability is 1.50 for static loads. The minimum factor of safety for pseudostatic stability is 1.10 for loading due to seismic shaking"*. Hence, our analyses were performed to obtain minimum safety factors of 1.5 and 1.1 for static and pseudostatic conditions, respectively.

The program Slide (v 6.0) developed by RocScience was used to evaluate the stability of the slopes. The slope stability analysis cases are listed in Table 5 and presented in Appendix C.

Table 5. Summary of Slope Stability Analysis Cases and Results

File Name	Analysis Description	Surcharge[1] (psf)	Factor of Safety
Sec 1 (15ft-36deg).slim	Site 1 - Berkshire Drain (Gabion Design, Existing Creek Slopes, 36° [~1.35H:1V] Slope Steepness) Static	250	1.53
Sec 1 (15ft-36deg)-p.slim	Site 1 - Berkshire Drain (Gabion Design, Existing Creek Slopes, 36° [~1.35H:1V] Slope Steepness) Pseudostatic	250	1.18
Sec 2 (15ft-26 deg).slim	Site 2 - Berkshire Drain (Existing Trail Grade Raise, 26° [~2H:1V] Slope Steepness) Static	250	1.54
Sec 2 (15ft-26 deg)-p.slim	Site 2 - Berkshire Drain (Existing Trail Grade Raise, 26° [~2H:1V] Slope Steepness) Pseudostatic	250	1.13

Notes:
1. Traffic load.
2. Based on section 4.3 of this report, a maximum historically high groundwater depth of 20 feet bgs was used in our analyses.

Based on the results of our analyses, erosion control structures (i.e., gabion structures), can be founded on slopes with a maximum height of 15 feet and a maximum gradient of 1.35H:1V (Horizontal:Vertical). The existing trail grade can be raised by constructing side slopes with maximum heights of 15 feet and maximum gradients of 2H:1V with imported engineered fill having the strength properties listed above and protected against erosion and scour (to be designed by JMD).

6.5 Foundations

Relatively light structures, if any, could be supported on continuous or spread footings bearing on a 3-foot remove-and-recompact zone of onsite soils and extending 3 feet beyond the edge of the structure. The remove-and-recompact zone should be compacted in 8-inch-thick lifts (measured in loose state) to a minimum of 95 percent relative compaction per ASTM D1557 (Modified Proctor) at a moisture content of 2 percent points higher than the laboratory optimum. Prior to constructing the remove-and-recompact zone of onsite soils, the upper 8 inches of the excavation bottom should be scarified, moisture-conditioned to approximately 2 percent above the optimum moisture content, and recompacted to at least 95 percent of the maximum dry density per ASTM D1557 (Modified Proctor Test). We further recommend performing soil corrosivity tests prior to construction to confirm that the onsite soils are non-corrosive.

Based on laboratory test results, an allowable bearing capacity of 2,500 pounds per square foot may be used for design of 24-inch square or 18-inch wide continuous footings embedded a minimum of 18 inches below adjacent level ground. This value may be increased by 250 and 500 pounds per square foot for every additional foot of width or depth increase, respectively, to a maximum of 3,500 pounds per square foot.

A lateral passive soil resistance on footing walls embedded in compacted engineered fill of 335 psf per foot of depth below the lowest adjacent finished grade, to a maximum of 3,350 psf, may be used for design. This lateral passive resistance may be combined with a lateral base friction resistance. A base friction coefficient of 0.40 may be used. The coefficient of friction should be multiplied by the dead load to obtain the lateral base friction resistance.

Where footings are adjacent to below-grade walls or underground utilities, the footings should extend below a 45-degree plane projected upward from the backside of the wall footing or bottom of the underground utility. Structural loads were not available at the time of our investigation. We should be retained to review the final foundation plans and structural loads for soil settlement estimation.

Erosion control structures (e.g., gabion structures) can be designed for a bearing capacity of 2,500 psf provided the upper 8 inches of the excavation bottom (flat and sloped areas) is scarified, moisture-conditioned to approximately 2 percent above the optimum moisture content, and recompacted to at least 95 percent of the maximum dry density per ASTM D1557 (Modified Proctor Test).

6.6 Mat Foundations

An allowable net static bearing capacity of 2,000 pounds per square foot may be used for design of mat foundations assuming they will be placed on a 3-foot remove-and-recompact zone of onsite soils and extending 3 feet beyond the edge of the structure. The remove-and-recompact zone should be compacted in 8-inch-thick lifts (measured in loose state) to a minimum of 95 percent relative compaction per ASTM D1557 (Modified Proctor) at a moisture content of 2 percent points higher than the laboratory optimum. A base friction coefficient of 0.40 is recommended.

The mat thickness and amount of reinforcement should be determined by a Register Civil Engineer in the State of California. For structures supported by mat foundations, we recommend the use of a subgrade reaction coefficient defined as:

$$K_b = K_{v1} * \left[\frac{(m+0.5)}{1.5m} \right] * \left[\frac{(B+1)}{2B} \right]^2$$

Where:

K_{v1}: Normalized subgrade reaction coefficient (namely, corresponding to a 1 foot square bearing plate), estimated at 200 pounds per cubic inch (pci). It should be noted that this value applies to dry or moist materials, with groundwater at a depth of at least 1.5B below the base of the footing.
If groundwater is at the base of the footing use $K_{v1}/2$ to calculate settlements.

B: Width of the mat foundation measured in feet.

m: Ratio of length over width of a rectangular footing.

Circular, hexagonal, and octagonal foundation shapes can be approximated to an equivalent square.

Prior to constructing the remove-and-recompact zone of onsite soils, the upper 8 inches of the excavation bottom should be scarified, moisture-conditioned to approximately 2 percent above the optimum moisture content, and recompacted to at least 95 percent of the maximum dry density per ASTM D1557 (Modified Proctor Test). We further recommend performing soil corrosivity tests prior to construction to confirm that the onsite soils are non-corrosive.

6.7 Pavement Design

Pavement design criteria presented herein follow the guidelines set forth in the California Department of Transportation (Caltrans)'s Highway Design Manual (HDM), latest edition. One (1) R Value test was performed on a sample collected at the location of Boring HB-2 (Site 1) from 0 to 36 inches bgs yielding a value of 71. Based on R Values of 71 and 78 for subgrade soils and aggregate base, respectively, and using traffic indices varying between 5 and 10, we developed the recommended pavement sections presented in Table 6.

Table 6. Recommended Pavement Structural Sections

Traffic Index (TI)	**5**	**6**	**7**	**8**	**9**	**10**
	Minimum Thickness (inches)					
Asphalt Concrete *	3.0	3.5	4.0	4.5	5.5	6.0
over						
Aggregate Base *	4.5	4.5	4.5	4.5	4.5	4.5

* Material to be selected per Caltrans' Standard Specifications, Latest Edition.

Stability of the compacted pavement subgrade soils will be reduced under conditions of increased soil moisture. Therefore, base course or pavement materials should not be placed when the surface is in a wet condition. Adequate surface drainage should be provided away from the edge of paved areas to reduce lateral moisture intrusion to the subgrade.

Asphalt concrete surfacing should be placed as per Caltrans' Standard Specifications, latest edition. Minimum design R Values (71 and 78 for subgrade and aggregate base, respectively) should be confirmed with laboratory testing during construction. Aggregate base materials should be compacted to a minimum of 95 percent relative compaction. The upper 12 inches of the pavement subgrade should be scarified, moisture-conditioned to approximately 2 percent above the optimum moisture content and recompacted to at least 90 percent of the maximum dry density per ASTM D1557 (Modified Proctor).

6.8 Existing Utilities

The proposed improvements may be located near to and/or cross existing utilities. The contractor should exercise care not to disturb these utilities and to support them during construction.

Compacting backfill above the pipe zone could be detrimental to surrounding utilities; we recommend a weak slurry mix (minimum compressive strength of 100 psi) to be used for the backfilling operations wherever soil compaction is not feasible. These areas should be limited to zones between two (2) pipes and not exceeding 2 feet on either side of the crossing.

6.9 Site Drainage

The site should be graded to provide adequate drainage away from building foundations and to prevent ponding on pavements in accordance with guidelines established by the City, Greenbook (latest edition), and the 2013 CBC. Special surface drainage features should be incorporated to drain surface sheet flow of water from retaining walls and intercept sheet flow over the paved areas.

6.10 Disposal of Contaminated Soil

If contaminated soils are encountered during excavation, they should be disposed properly. Disposal of any contaminated soil or water should be in accordance with the local and county guidelines and jurisdictions.

6.11 Construction Observations and Field Testing

Construction observations and field testing should be performed by representatives of HAI to confirm that the conditions and assumptions described in this report are the best representation of the actual conditions. At a minimum, we recommend that a representative of HAI be present to observe and test during the following construction activities:

- Excavation, site grading of cuts and fills;
- Placement of all backfill, and pavement structural sections;
- Backfilling of utility trenches and pits; and
- When any unusual conditions are encountered during grading.

Onsite observation and field testing will be a key component to a suitable geotechnical design for this project. A final report of grading should be submitted to the City.

7.0 ADDITIONAL SERVICES AND LIMITATIONS

7.1 Additional Services

If considerable modifications to the concepts included herein are implemented over the course of the design, specific geotechnical consultation and input will be required. Accordingly, we recommend that HAI be retained to provide such consultation during site preparation and grading on an as-needed basis. As a minimum HAI should be retained to review the grading and design plans prior to their issuance for conformance and compatibility with the recommendations presented in this report.

7.2 Limitations

This report has been prepared for the sole use of JMD, specifically for design of this project within the Hahamongna Watershed Park in Pasadena, California. The opinions presented in this report have been formulated in accordance with existing accepted geotechnical engineering practices in the southern California at the time this report was written. No other warranty, expressed or implied, is made or should be inferred.

The opinions, conclusions and recommendations contained in this report are based upon the information obtained from our investigation, which includes data from widely separated discrete sampling locations, visual observations from our site reconnaissance, along with local experience and engineering judgment.

The recommendations presented in this report are based on the assumption that soil and geologic conditions at or between borings do not deviate substantially from those encountered during our investigation. We are not responsible for the data presented by others. We should be retained to review the geotechnical aspects of the final plans and specifications for conformance with our recommendations.

The recommendations provided in this report are based on the assumption that we will be retained to provide observation and testing services during construction to confirm that conditions are similar to that assumed for design and to form an opinion as to whether the work has been performed in accordance with the project plans and specifications. If we are not retained for these services, HAI cannot assume any responsibility for any potential claims that may arise during or after construction as a result of misuse or misinterpretation of HAI's report by others. Furthermore, HAI will cease to be the Geotechnical-Engineer-of-Record if we are not retained for these services and/or at the time another consultant is retained for follow up service to this report.

The opinions presented in this report are valid as of the present date for the site evaluated. Changes in the condition of the site will likely occur with the passage of time due to natural processes and/or the works of man. In addition, changes in applicable standards of practice can occur as a result of legislation and/or the broadening of knowledge. Furthermore, geotechnical issues may arise that were not apparent at the time of our investigation. Accordingly, the opinions presented in this report may be invalidated, wholly or partially, by changes outside of our control. Therefore, this report is subject to review and should not be relied upon after a period of three years, nor should it be used, or is it applicable, for any other properties.

8.0 REFERENCES

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FIGURES

NOT TO SCALE

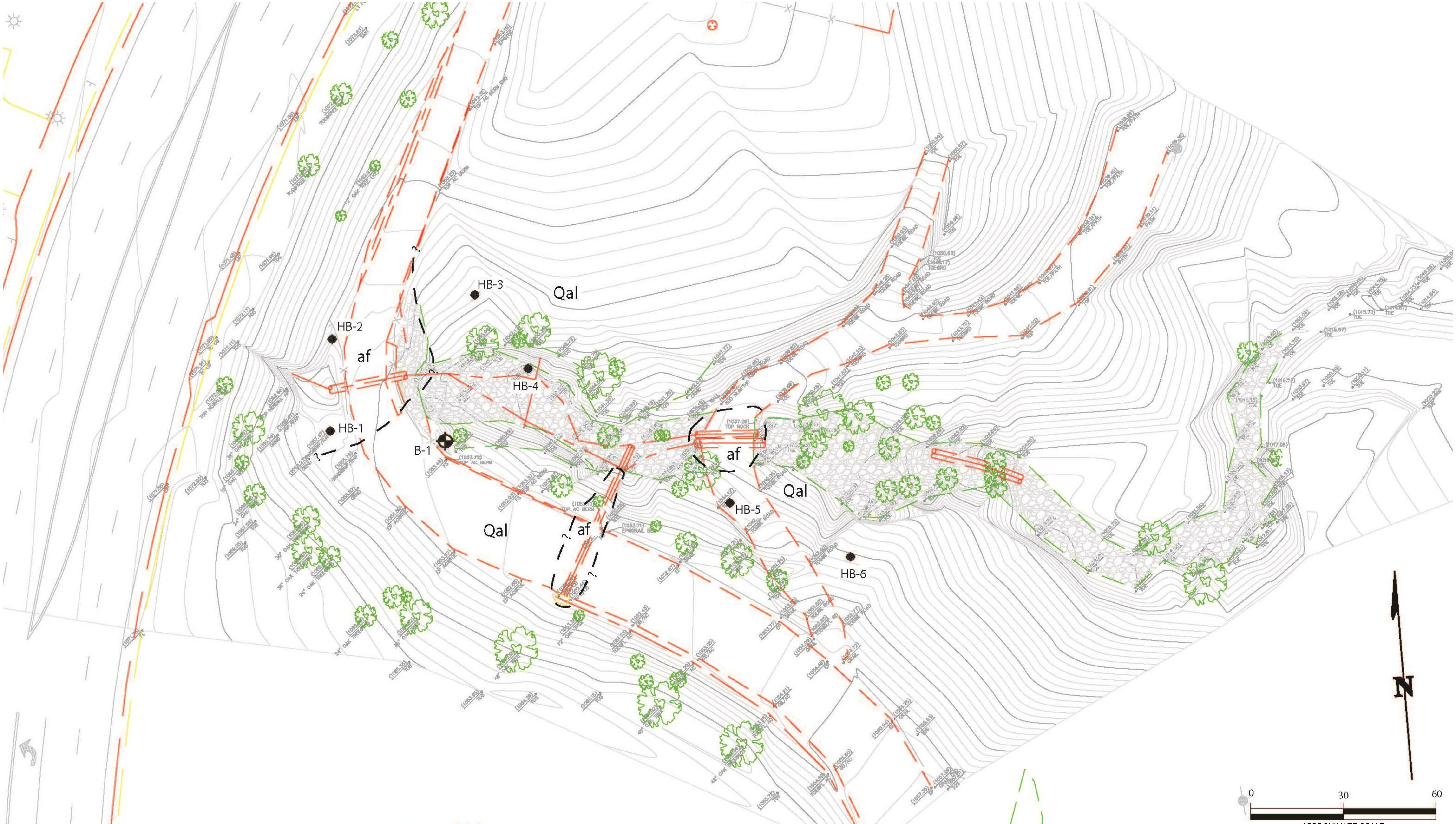
HAI
HUSHMAND ASSOCIATES, INC.
Geotechnical and Earthquake Engineers

Berkshire Drain and Foothill Drain Improvements
Hahamongna Watershed Park
Pasadena, Los Angeles County, CA

Project No.
JMD-16-001

SITE LOCATION MAP

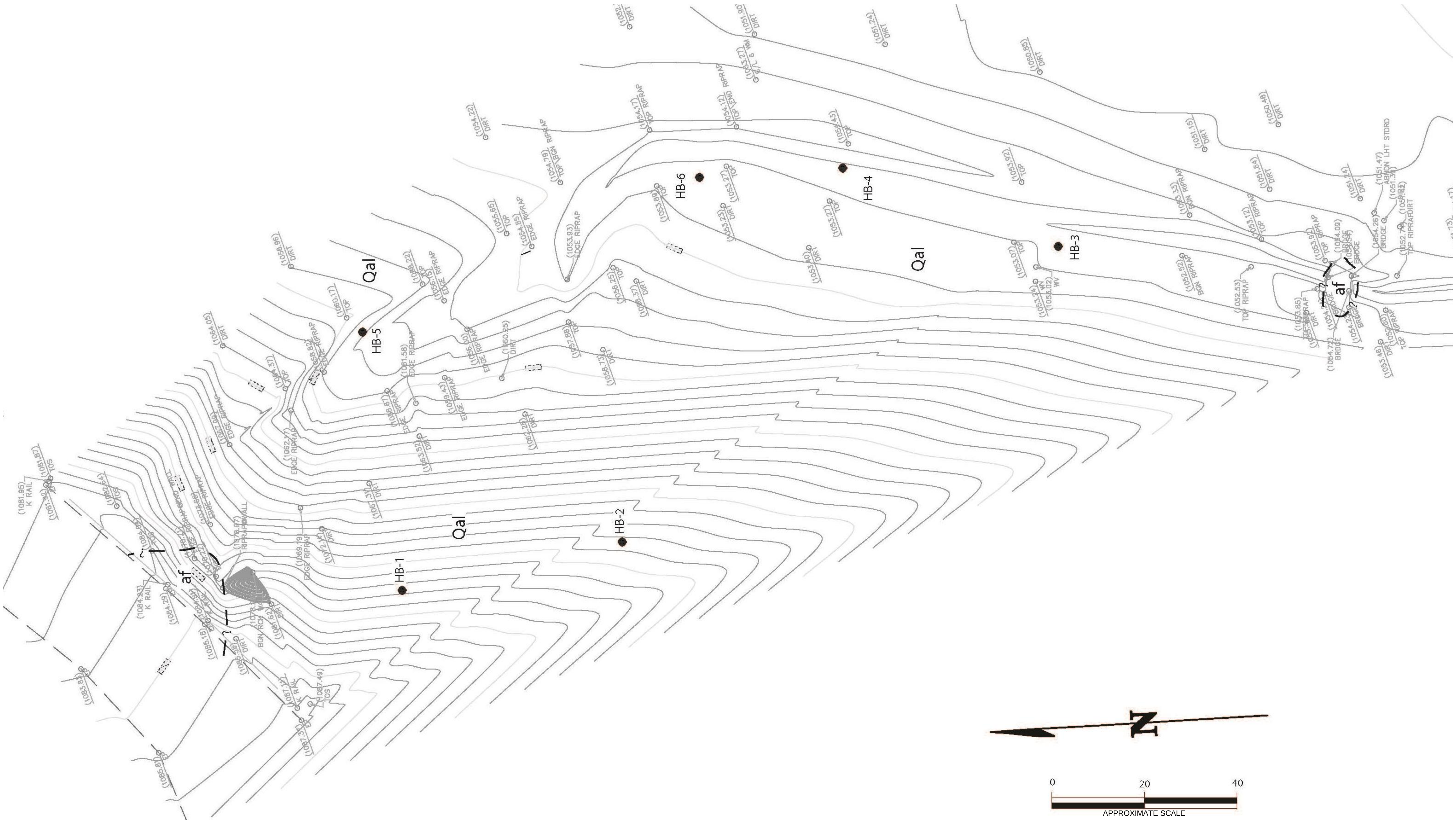
Figure
1



LEGEND:

- HB-6 Approximate Boring Location (Hand Auger)
- B-1 Approximate Boring Location (Hollow Stem Auger)

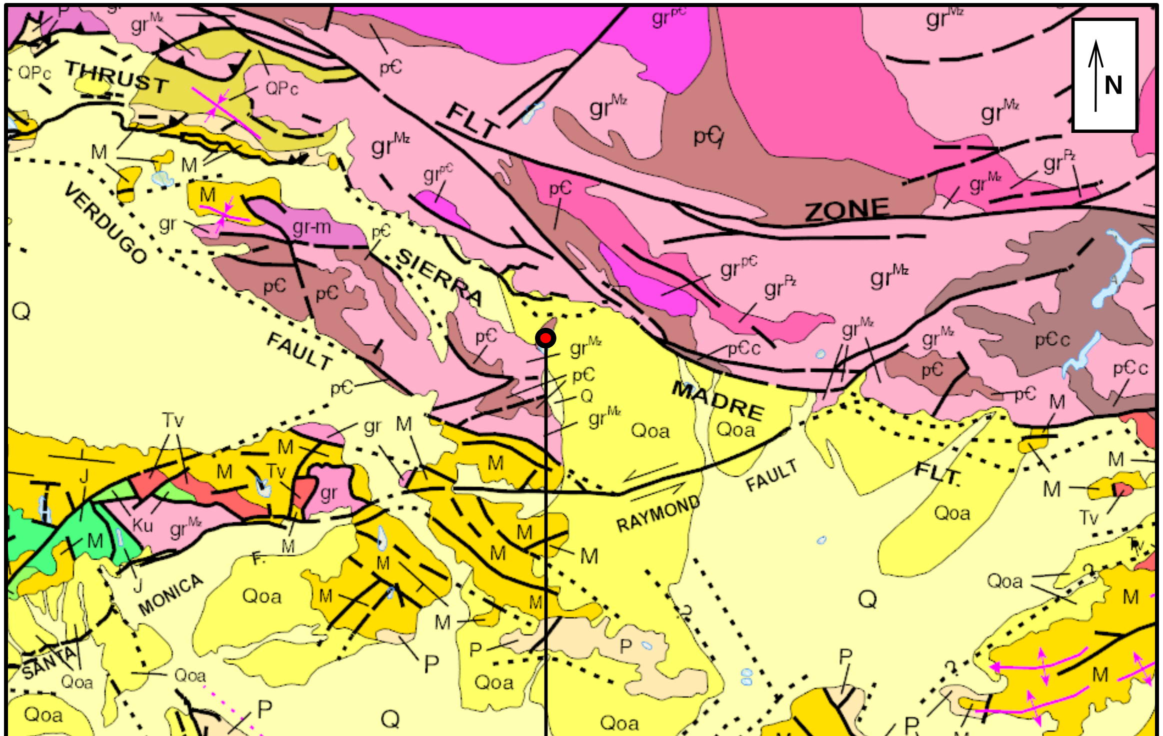
HAI HUSHMAND ASSOCIATES, INC. Geotechnical and Earthquake Engineers	Berkshire Drain and Foothill Drain Improvements Hahamongna Watershed Park Pasadena, Los Angeles County, CA	APPROXIMATE BORING LOCATIONS (SITE 1: BERKSHIRE DRAIN)	Figure 2
	Project No. JMD-16-001		



LEGEND:

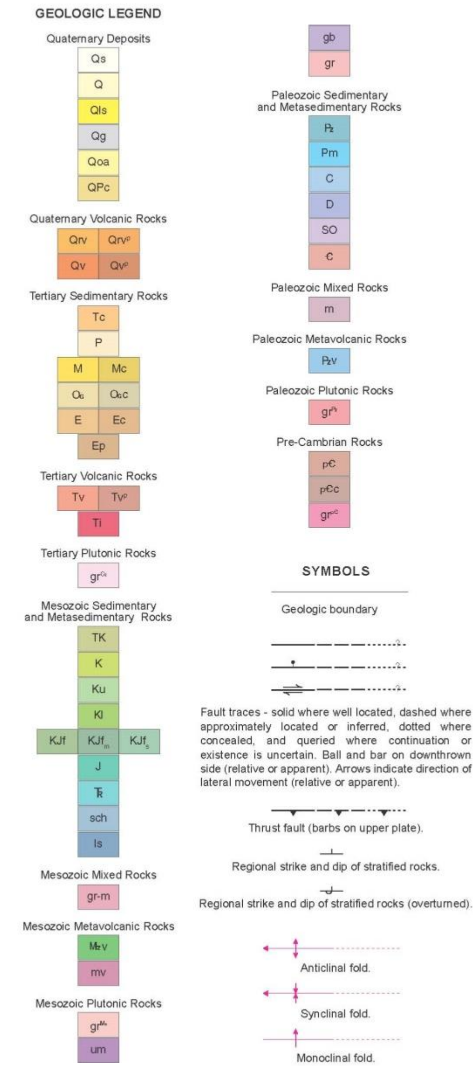
HB-6 Approximate Boring Location (Hand Auger)

HUSHMAND ASSOCIATES, INC. Geotechnical and Earthquake Engineers	**Berkshire Drain and Foothill Drain Improvements** **Hahamongna Watershed Park** Pasadena, Los Angeles County, CA	**APPROXIMATE BORING LOCATIONS**	Figure
	Project No. JMD-16-001	**(SITE 2: FOOTHILL DRAIN)**	**3**



SOURCE:
CALIFORNIA GEOLOGICAL SURVEY
2010 GEOLOGIC MAP OF CALIFORNIA

Approximate Project Location



NOT TO SCALE

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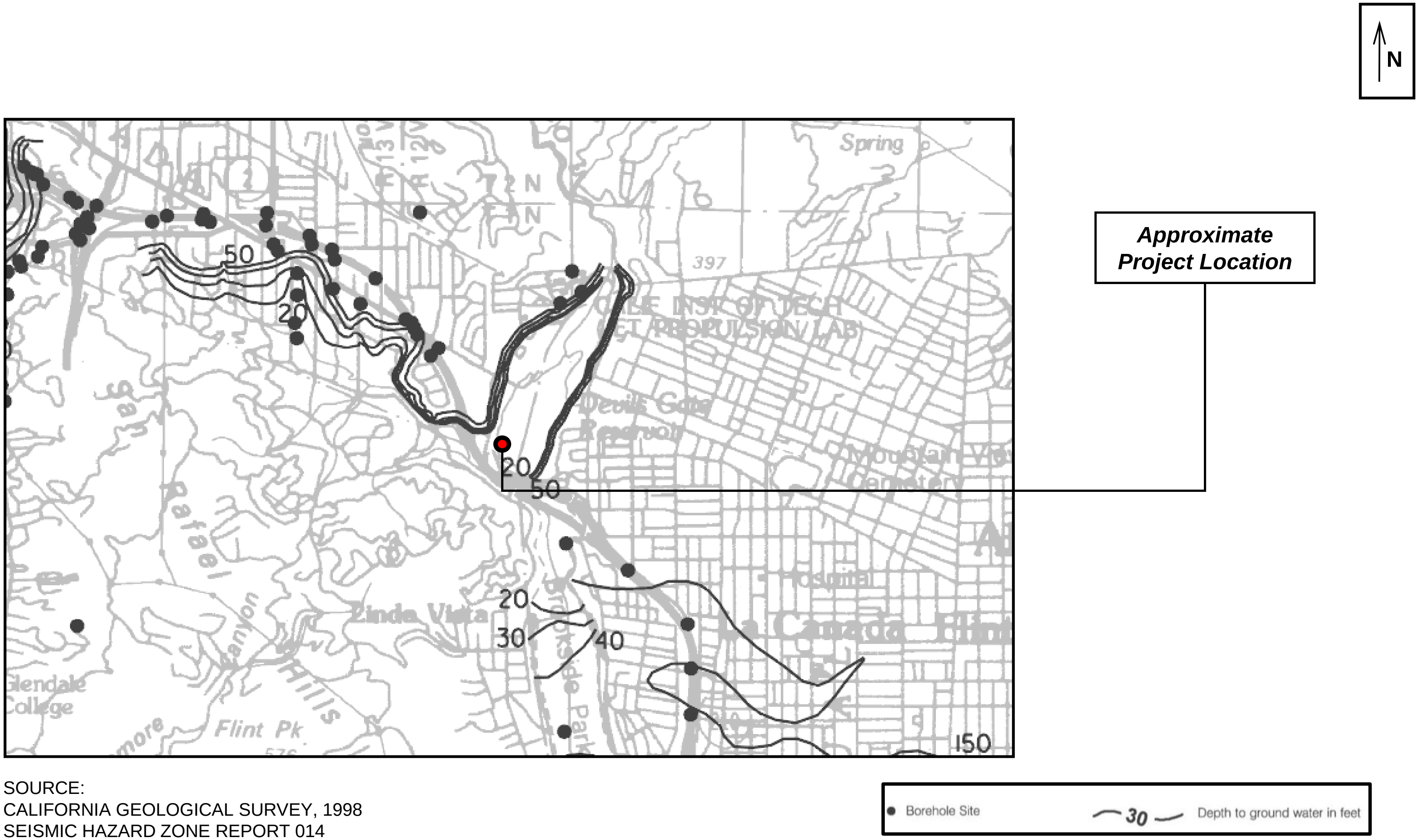
Geotechnical and Earthquake Engineers

Berkshire Drain and Foothill Drain Improvements
Hahamongna Watershed Park
Pasadena, Los Angeles County, CA

Project No.
JMD-16-001

GEOLOGIC MAP

Figure
4



SOURCE:
CALIFORNIA GEOLOGICAL SURVEY, 1998
SEISMIC HAZARD ZONE REPORT 014
FOR THE PASADENA 7.5-MINUTE QUADRANGLE

NOT TO SCALE

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Geotechnical and Earthquake Engineers

Berkshire Drain and Foothill Drain Improvements
Hahamongna Watershed Park
Pasadena, Los Angeles County, CA

Project No.
JMD-16-001

HISTORICAL HIGHEST GROUNDWATER CONTOUR MAP

Figure
5

SYMBOL EXPLANATION

Fault traces on land are indicated by solid lines where well located, by dashed lines where approximately located or inferred, and by dotted lines where concealed by younger rocks or by lakes or bays. Fault traces are queried where continuation or existence is uncertain. All offshore faults based on seismic reflection profile records are shown as solid lines where well defined, dashed where inferred, queried where uncertain.

FAULT CLASSIFICATION COLOR CODE
(Indicating Recency of Movement)

Fault along which historic (last 200 years) displacement has occurred.

A triangle to the right or left of the date indicates termination point of observed surface displacement. Solid red triangle indicates known location of rupture termination point. Open black triangle indicates uncertain or estimated location of rupture termination point.

Date bracketed by triangles indicates local fault break.

No triangle by date indicates an intermediate point along faultbreak.

Fault that exhibits fault creep slippage. Hachures indicate linear extent of fault creep. Annotation (creep with leader) indicates representative locations where fault creep has been observed and recorded.

Square on fault indicates where fault creep slippage has occured that has been triggered by an earthquake on some other fault. Date of causative earthquake indicated. Squares to right and left of date indicate terminal points between which triggered creep slippage has occurred (creep either continuous or intermittent between these end points).

Holocene fault displacement (during past 11,700 years) without historic record.

Late Quaternary fault displacement (during past 700,000 years).

Quaternary fault (age undifferentiated).

Pre-Quaternary fault (older that 1.6 million years) or fault without recognized Quaternary displacement.

ADDITIONAL FAULT SYMBOLS

Bar and ball on downthrown side (relative or apparent).

Arrows along fault indicate relative or apparent direction of lateral movement.

Arrow on fault indicates direction of dip.

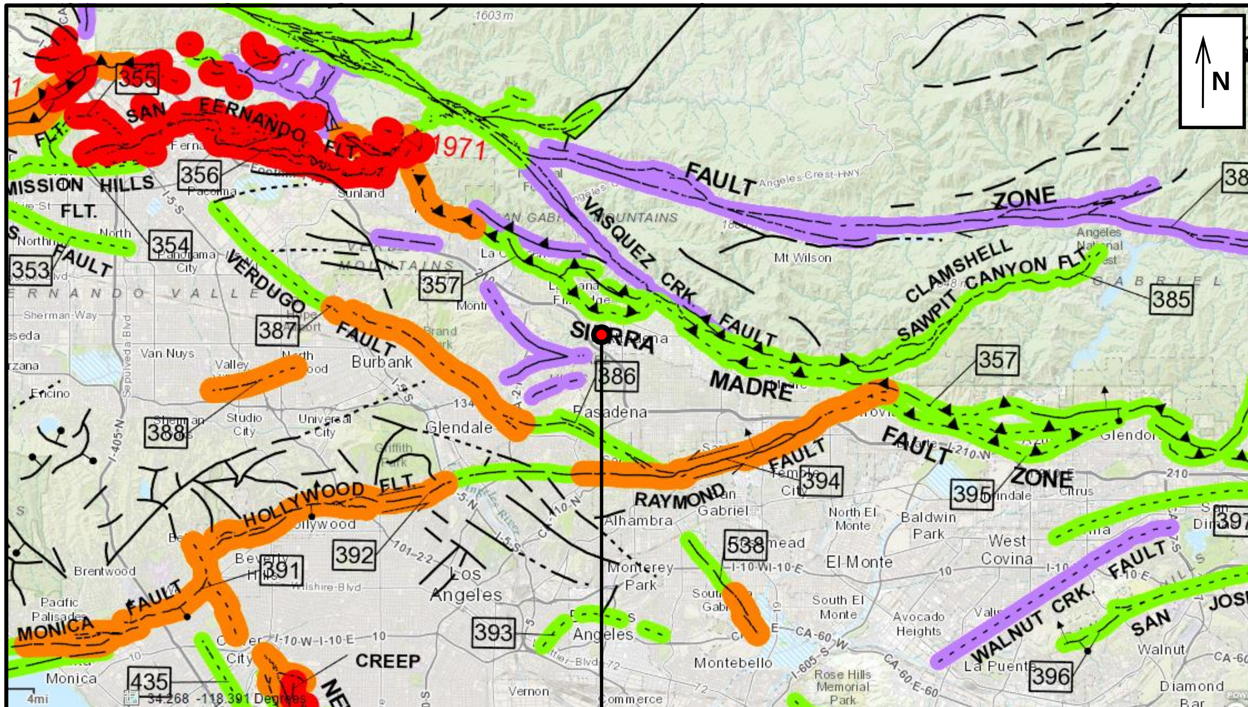
Low angle fault (barbs on upper plate).

OTHER SYMBOLS

Numbers refer to annotations listed in the appendices of the accompanying report.

Structural discontinuity (offshore) separating differing Neogene structural domains. May indicate discontinuities between basement rocks.

Brawley Seismic Zone, a linear zone of seismicity locally up to 10 km wide associated with the releasing step between the Imperial and San Andreas faults.



Approximate Project Location

SOURCE:
CALIFORNIA GEOLOGICAL SURVEY
2010 FAULT ACTIVITY MAP OF CALIFORNIA

NOT TO SCALE

HAI HUSHMAND ASSOCIATES, INC. Geotechnical and Earthquake Engineers	Berkshire Drain and Foothill Drain Improvements Hahamongna Watershed Park Pasadena, Los Angeles County, CA Project No. LYN-15-001	FAULT ACTIVITY MAP	Figure 6

APPENDIX A

LOG OF BORINGS

SOIL CLASSIFICATION SYSTEM - ASTM D2487

MAJOR DIVISIONS			SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		(LITTLE OR NO FINES)		GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	(APPRECIABLE AMOUNT OF FINES)		GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	SAND AND SANDY SOILS	CLEAN SANDS		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		(LITTLE OR NO FINES)		SP	POORLY-GRADED SANDS, GRAVELLY SAND LITTLE OR NO FINES
		SANDS WITH FINES		SM	SILTY SANDS, SAND - SILT MIXTURES
	MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	(APPRECIABLE AMOUNT OF FINES)		SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

SAMPLERS

AU Auger Cuttings

GB Grab Sample

MC Modified California Sampler

RC Rock Core

SPT Standard Penetration Test Sampler

ST Shelby Tube

LABORATORY TESTS

RV	: R Value
CONS	: Consolidation
SA	: Sieve Analysis
COMP	: Compaction
EI	: Expansion Index
SE	: Sand Equivalent
UC	: Unconfined Compression
DS	: Direct Shear
HA	: Hydrometer Analysis
%200	: Percentage Passing No. 200 Sieve
AL	: Atterberg Limits
CORR	: Corrosion Potential
SW	: Swell Potential
OM	: Organic Matter

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Berkshire Drain and Foothill Drain Improvements
Hahamonga Watershed Park
Pasadena, Los Angeles County, CA

Project No.
JMD-16-001

KEY TO BORING LOGS

Figure
A0

HAI Hushmand Associates, Inc.

BORING NUMBER B-1 (Site 1)

CLIENT JMD
PROJECT NAME Berkshire Drain and Foothill Drain Improvements
PROJECT NUMBER JMD-16-001
PROJECT LOCATION 4550 Oak Grove Drive, Pasadena, CA 91103
DATE STARTED 12/18/15 **COMPLETED** 12/18/15
GROUND ELEVATION --- **HOLE SIZE** 8"
DRILLING CONTRACTOR Geoboden
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger (HSA)
AT TIME OF DRILLING ---
LOGGED BY CS **CHECKED BY** JT
AT END OF DRILLING ---
NOTES Backfilled with compacted soil cuttings
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	CORE SAMPLE	BULK SAMPLE	SAMPLE NUMBER	BLOW COUNTS (N VALUE)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	OTHER LABORATORY TESTS
0		**ALLUVIUM** (3-36.5 ft) SILTY SAND (SM): Dark yellowish brown (10YR4/6), very dense, moist. Very fine-grained with 2-5% coarse-grained fraction ranging from coarse-grained sand to subrounded pebbles to 1" diam. @ 2 ft, hard drilling on larger clast @ 2.5 ft, color changes to light brown (2.5Y5/4). Angular rock fragments in cuttings. Driller reports gravelly layers (~ 6" diam.)			MC 1 AU Bulk 1	43-50/4"	107	3	DS
5		Same as above			MC 2	38-50/4"	117	5	
					AU Bulk 2				
10		Same as above but color changes to light olive brown (2.5Y5/6) and becomes medium dense. fine- to coarse-grained with <10% rounded granitic clasts ranging up to 3" diam.			MC 3	16-13-18 (31)	107	4	SW
15		Same as above but color darkens to yellowish brown (10YR5/8) and becomes dense			MC 4	19-22-26 (48)	115	5	
20		POORLY GRADED SAND (SP): Olive yellow (2.5Y6/6), very dense, moist. Fine- to medium-grained with lenses of coarse-grained sand and fine gravel			MC 5	29-50-50/5"	112	3	

(Continued Next Page)

Hushmand Associates, Inc.

BORING NUMBER B-1 (Site 1)

CLIENT JMD
PROJECT NAME Berkshire Drain and Foothill Drain Improvements
PROJECT NUMBER JMD-16-001
PROJECT LOCATION 4550 Oak Grove Drive, Pasadena, CA 91103

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	CORE SAMPLE	BULK SAMPLE	SAMPLE NUMBER	BLOW COUNTS (N VALUE)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	OTHER LABORATORY TESTS
25		SLIGHTLY SILTY SAND (SM): Olive (5Y4/4), very dense, moist. Very fine-grained			MC 6	24-33-35 (68)	96	26	
30		SILTY TO CLAYEY SAND (SM/SC): Dark brown (7.5YR3/3), very dense, moist. Fine- to coarse-grained			MC 7	21-40-48 (88)	124	13	
35		SILTY SAND (SM): Dark yellowish brown (10YR4/6), dense, very moist. Fine-grained			MC 8	14-23-31 (54)	105	24	

Borehole terminated at 36.5 feet.

Hushmand Associates, Inc.

BORING NUMBER HB-1 (Site 1)

CLIENT JMD	**PROJECT NAME** Berkshire Drain and Foothill Drain Improvements
PROJECT NUMBER JMD-16-001	**PROJECT LOCATION** 4550 Oak Grove Drive, Pasadena, CA 91103
DATE STARTED 12/18/15 **COMPLETED** 12/18/15	**GROUND ELEVATION** --- **HOLE SIZE** 4"
DRILLING CONTRACTOR Naka Engineering Contractors	**GROUND WATER LEVELS:**
DRILLING METHOD Hand Auger	**AT TIME OF DRILLING** ---
LOGGED BY CS **CHECKED BY** JT	**AT END OF DRILLING** ---
NOTES Backfilled with compacted soil cuttings	**AFTER DRILLING** ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	CORE SAMPLE	BULK SAMPLE	SAMPLE NUMBER	BLOW COUNTS (N VALUE)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	OTHER LABORATORY TESTS
		ARTIFICIAL FILL ? SILTY SAND WITH GRAVEL (SM): Light olive brown (2.5Y5/4), dry to slightly moist, fine-grained with 2-5% angular to subangular granitic clasts to 1" diam. Refusal on rock @ 26"			AU Bulk			2	SA HA
		Borehole terminated at 2.17 feet.							

HAI Hushmand Associates, Inc.

BORING NUMBER HB-2 (Site 1)

CLIENT JMD
PROJECT NAME Berkshire Drain and Foothill Drain Improvements
PROJECT NUMBER JMD-16-001
PROJECT LOCATION 4550 Oak Grove Drive, Pasadena, CA 91103
DATE STARTED 12/18/15 **COMPLETED** 12/18/15
GROUND ELEVATION --- **HOLE SIZE** 4"
DRILLING CONTRACTOR Naka Engineering Contractors
GROUND WATER LEVELS:
DRILLING METHOD Hand Auger
AT TIME OF DRILLING ---
LOGGED BY CS **CHECKED BY** JT
AT END OF DRILLING ---
NOTES Backfilled with compacted soil cuttings
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	CORE SAMPLE	BULK SAMPLE	SAMPLE NUMBER	BLOW COUNTS (N VALUE)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	OTHER LABORATORY TESTS
2.5		**ARTIFICIAL FILL ?** WELL-GRADED SAND WITH SILT AND GRAVEL (SW-SM): Light olive brown (2.5Y5/4), dry to slightly moist, fine- to coarse-grained gravel with 2-10% granitic clasts ranging to 5" diam. with 3/4-2" most common			AU Bulk			1	RV SA HA
		Borehole terminated at 3 feet.							

BORING NUMBER HB-3 (Site 1)

Hushmand Associates, Inc.

CLIENT JMD
PROJECT NAME Berkshire Drain and Foothill Drain Improvements
PROJECT NUMBER JMD-16-001
PROJECT LOCATION 4550 Oak Grove Drive, Pasadena, CA 91103
DATE STARTED 12/18/15 **COMPLETED** 12/18/15
GROUND ELEVATION --- **HOLE SIZE** 4"
DRILLING CONTRACTOR Naka Engineering Contractors
GROUND WATER LEVELS:
DRILLING METHOD Hand Auger
AT TIME OF DRILLING ---
LOGGED BY CS **CHECKED BY** JT
AT END OF DRILLING ---
NOTES Backfilled with compacted soil cuttings
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	CORE SAMPLE	BULK SAMPLE	SAMPLE NUMBER	BLOW COUNTS (N VALUE)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	OTHER LABORATORY TESTS
2.5		**ALLUVIUM** SILTY SAND WITH GRAVEL (SM): Olive brown (2.5Y4/4), slightly moist, fine-grained with 2-5% coarse-grained sand and fine gravel			AU Bulk			6	CORR SA HA
		Borehole terminated at 3 feet.							

BORING NUMBER HB-4 (Site 1)

HAI Hushmand Associates, Inc.

CLIENT JMD

PROJECT NAME Berkshire Drain and Foothill Drain Improvements

PROJECT NUMBER JMD-16-001

PROJECT LOCATION 4550 Oak Grove Drive, Pasadena, CA 91103

DATE STARTED 12/18/15 **COMPLETED** 12/18/15

GROUND ELEVATION --- **HOLE SIZE** 4"

DRILLING CONTRACTOR Naka Engineering Contractors

GROUND WATER LEVELS:

DRILLING METHOD Hand Auger

AT TIME OF DRILLING ---

LOGGED BY CS **CHECKED BY** JT

AT END OF DRILLING ---

NOTES Backfilled with compacted soil cuttings

AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	CORE SAMPLE	BULK SAMPLE	SAMPLE NUMBER	BLOW COUNTS (N VALUE)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	OTHER LABORATORY TESTS
		ALLUVIUM SILTY SAND (SM): Light olive brown (2.5Y5/6), moist, fine-grained						20	SA HA
2.5		From 24-42", silty interval, dark olive gray (5Y3/2)			AU Bulk				
5.0		Same SILTY SAND (SM)							
		Borehole terminated at 5 feet.							

BORING NUMBER HB-5 (Site 1)

Hushmand Associates, Inc.

CLIENT JMD

PROJECT NAME Berkshire Drain and Foothill Drain Improvements

PROJECT NUMBER JMD-16-001

PROJECT LOCATION 4550 Oak Grove Drive, Pasadena, CA 91103

DATE STARTED 12/18/15 **COMPLETED** 12/18/15

GROUND ELEVATION --- **HOLE SIZE** 4"

DRILLING CONTRACTOR Naka Engineering Contractors

GROUND WATER LEVELS:

DRILLING METHOD Hand Auger

AT TIME OF DRILLING ---

LOGGED BY CS **CHECKED BY** JT

AT END OF DRILLING ---

NOTES Backfilled with compacted soil cuttings

AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	CORE SAMPLE	BULK SAMPLE	SAMPLE NUMBER	BLOW COUNTS (N VALUE)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	OTHER LABORATORY TESTS
		ALLUVIUM SILTY SAND WITH GRAVEL (SM): Olive brown (2.5Y4/4), moist, fine-grained with 2-5% coarse-grained sand subangular to subrounded granitic clasts to 2" diam. with 1-4" most common. Refusal on rock @ 12"			AU Bulk			5	SA HA
		Borehole terminated at 1.25 feet.							

CLIENT JMD

PROJECT NAME Berkshire Drain and Foothill Drain Improvements

PROJECT NUMBER JMD-16-001

PROJECT LOCATION 4550 Oak Grove Drive, Pasadena, CA 91103

DATE STARTED 12/18/15 **COMPLETED** 12/18/15

GROUND ELEVATION --- **HOLE SIZE** 4"

DRILLING CONTRACTOR Naka Engineering Contractors

GROUND WATER LEVELS:

DRILLING METHOD Hand Auger

AT TIME OF DRILLING ---

LOGGED BY CS **CHECKED BY** JT

AT END OF DRILLING ---

NOTES Backfilled with compacted soil cuttings

AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	CORE SAMPLE	BULK SAMPLE	SAMPLE NUMBER	BLOW COUNTS (N VALUE)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	OTHER LABORATORY TESTS
		ALLUVIUM SILTY SAND WITH GRAVEL (SM): Olive brown (2.5Y4/4), moist, matrix of fine-grained sand with 2-5% coarse coarse-grained sand and fine gravel, 10-20% subangular to subrounded granitic clasts observed in nearby exposures to range up to 8" with 1/2-3" most common. Refusal on rock @ 20"			AU Bulk			6	SA HA
		Borehole terminated at 1.67 feet.							

BORING NUMBER HB-1 (Site 2)

CLIENT JMD
PROJECT NAME Berkshire Drain and Foothill Drain Improvements
PROJECT NUMBER JMD-16-001
PROJECT LOCATION 4550 Oak Grove Drive, Pasadena, CA 91103
DATE STARTED 12/18/15 **COMPLETED** 12/18/15
GROUND ELEVATION --- **HOLE SIZE** 4"
DRILLING CONTRACTOR Naka Engineering Contractors
GROUND WATER LEVELS:
DRILLING METHOD Hand Auger
AT TIME OF DRILLING ---
LOGGED BY CS **CHECKED BY** JT
AT END OF DRILLING ---
NOTES Backfilled with compacted soil cuttings
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	CORE SAMPLE	BULK SAMPLE	SAMPLE NUMBER	BLOW COUNTS (N VALUE)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	OTHER LABORATORY TESTS
2.5		**ALLUVIUM** SILTY SAND (SM): Dark yellowish brown (10YR4/6), fine-grained with 2-5% subrounded to subangular granitic clasts, cuttings sizes 1/4-1 1/2", boulders to 24" on surrounding surface. Refusal on rock @ 30"			AU Bulk			6	SA HA
		Borehole terminated at 2.5 feet.							

BORING NUMBER HB-2 (Site 2)

Hushmand Associates, Inc.

CLIENT JMD
PROJECT NAME Berkshire Drain and Foothill Drain Improvements
PROJECT NUMBER JMD-16-001
PROJECT LOCATION 4550 Oak Grove Drive, Pasadena, CA 91103
DATE STARTED 12/18/15 **COMPLETED** 12/18/15
GROUND ELEVATION --- **HOLE SIZE** 4"
DRILLING CONTRACTOR Naka Engineering Contractors
GROUND WATER LEVELS:
DRILLING METHOD Hand Auger
AT TIME OF DRILLING ---
LOGGED BY CS **CHECKED BY** JT
AT END OF DRILLING ---
NOTES Backfilled with compacted soil cuttings
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	CORE SAMPLE	BULK SAMPLE	SAMPLE NUMBER	BLOW COUNTS (N VALUE)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	OTHER LABORATORY TESTS
		ALLUVIUM SILTY SAND WITH GRAVEL (SM): Light olive brown (2.5Y5/6), moist, fine-grained with 2-5% fine gravel, isolated clasts to 3" diam. @ 1.5 ft, color changes to olive yellow (2.5Y6/6)							
2.5					AU Bulk			5	SA HA
5.0									
		Borehole terminated at 5.33 feet.							

BORING NUMBER HB-3 (Site 2)

Hushmand Associates, Inc.

CLIENT JMD

PROJECT NAME Berkshire Drain and Foothill Drain Improvements

PROJECT NUMBER JMD-16-001

PROJECT LOCATION 4550 Oak Grove Drive, Pasadena, CA 91103

DATE STARTED 12/18/15 **COMPLETED** 12/18/15

GROUND ELEVATION --- **HOLE SIZE** 4"

DRILLING CONTRACTOR Naka Engineering Contractors

GROUND WATER LEVELS:

DRILLING METHOD Hand Auger

AT TIME OF DRILLING ---

LOGGED BY CS **CHECKED BY** JT

AT END OF DRILLING ---

NOTES Backfilled with compacted soil cuttings

AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	CORE SAMPLE	BULK SAMPLE	SAMPLE NUMBER	BLOW COUNTS (N VALUE)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	OTHER LABORATORY TESTS
		ALLUVIUM SILTY SAND WITH GRAVEL (SM): Dark brown (7.5Y3/3) to brown (7.5YR4/4), moist, fine-grained with 2-5% subrounded to sub-angular granitic clasts and isolated cobbles, very minor clay							
2.5		@ 2.5 ft, color changes to light olive brown (2.5Y5/6)			AU Bulk			6	SA HA
		Borehole terminated at 4.75 feet.							

BORING NUMBER HB-4 (Site 2)

Hushmand Associates, Inc.

CLIENT JMD

PROJECT NAME Berkshire Drain and Foothill Drain Improvements

PROJECT NUMBER JMD-16-001

PROJECT LOCATION 4550 Oak Grove Drive, Pasadena, CA 91103

DATE STARTED 12/18/15 **COMPLETED** 12/18/15

GROUND ELEVATION --- **HOLE SIZE** 4"

DRILLING CONTRACTOR Naka Engineering Contractors

GROUND WATER LEVELS:

DRILLING METHOD Hand Auger

AT TIME OF DRILLING ---

LOGGED BY CS **CHECKED BY** JT

AT END OF DRILLING ---

NOTES Backfilled with compacted soil cuttings

AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	CORE SAMPLE	BULK SAMPLE	SAMPLE NUMBER	BLOW COUNTS (N VALUE)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	OTHER LABORATORY TESTS
		ALLUVIUM SILTY SAND WITH GRAVEL (SM): Dark yellowish brown (10YR5/4), moist, fine- to medium-grained with 2-10% coarse-grained sand and gravel to 2" diam. Refusal on rock @ 24"			AU Bulk			7	SA HA
		Borehole terminated at 2 feet.							

BORING NUMBER HB-5 (Site 2)

Hushmand Associates, Inc.

CLIENT JMD

PROJECT NAME Berkshire Drain and Foothill Drain Improvements

PROJECT NUMBER JMD-16-001

PROJECT LOCATION 4550 Oak Grove Drive, Pasadena, CA 91103

DATE STARTED 12/18/15 **COMPLETED** 12/18/15

GROUND ELEVATION --- **HOLE SIZE** 4"

DRILLING CONTRACTOR Naka Engineering Contractors

GROUND WATER LEVELS:

DRILLING METHOD Hand Auger

AT TIME OF DRILLING ---

LOGGED BY CS **CHECKED BY** JT

AT END OF DRILLING ---

NOTES Backfilled with compacted soil cuttings

AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	CORE SAMPLE	BULK SAMPLE	SAMPLE NUMBER	BLOW COUNTS (N VALUE)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	OTHER LABORATORY TESTS
2.5		**ALLUVIUM** SILTY SAND WITH GRAVEL (SM): Dark brown (2.5Y4/4), moist, fine- to coarse-grained with 10-15% granitic clasts to 3" diam. Refusal on rock @ 32"			AU Bulk			5	SA HA
		Borehole terminated at 2.67 feet.							

BORING NUMBER HB-6 (Site 2)

Hushmand Associates, Inc.

CLIENT JMD

PROJECT NAME Berkshire Drain and Foothill Drain Improvements

PROJECT NUMBER JMD-16-001

PROJECT LOCATION 4550 Oak Grove Drive, Pasadena, CA 91103

DATE STARTED 12/18/15 **COMPLETED** 12/18/15

GROUND ELEVATION --- **HOLE SIZE** 4"

DRILLING CONTRACTOR Naka Engineering Contractors

GROUND WATER LEVELS:

DRILLING METHOD Hand Auger

AT TIME OF DRILLING ---

LOGGED BY CS **CHECKED BY** JT

AT END OF DRILLING ---

NOTES Backfilled with compacted soil cuttings

AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	CORE SAMPLE	BULK SAMPLE	SAMPLE NUMBER	BLOW COUNTS (N VALUE)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	OTHER LABORATORY TESTS
		ALLUVIUM SILTY SAND WITH GRAVEL (SM): Dark yellowish brown (10YR4/6), moist, fine- to coarse-grained with 5-10% subangular to subrounded granitic clasts range 1/4-8" (1/4-1 1/2" most common). Refusal on rock @ 18"			AU Bulk			5	SA HA
		Borehole terminated at 1.5 feet.							

APPENDIX B

LABORATORY TEST RESULTS

SUMMARY OF LABORATORY TEST RESULTS

Client: JMD
Project Name: Hahamongna Watershed Park
Project No.: ---

HAI Project No: JMD-16-001
Performed by: JT
Date: 1/20/2016

Site	Boring No.	Sample No.	Depth	In-situ Moisture Content (%)	In-situ Dry Density (pcf)	Particle-size Analysis of Soils (ASTM D422) (Percent Passing)														R Value (CTM 301)	Direct Shear (ASTM D3080)			Corrosion			
						> 3 "	3 "	1 1/2 "	1 "	3/4 "	3/8 "	# 4	# 10	# 20	# 40	# 60	# 100	# 200	2µ		Load (ksf)	Peak Value (ksf)	Ultimate Value (ksf)	pH	Sulfates (ppm)	Chlorides (ppm)	Saturated Resistivity (ohm-cm)
Site 1 Berkshire Drain	B-1	1	2-3.5'																		0.5	0.50	0.46				
																					1.0	0.86	0.84				
																					2.0	1.70	1.70				
		2	5-6.5'	4.8	117.3																						
		3	10-11.5'	3.5	107.0																						
		4	15-16.5'	5.4	114.6																						
		5	20-21.5'	2.7	112.2																						
		6	25-26.5'	26.2	96.1																						
		7	30-31.5'	13.4	124.3																						
		8	35-36.5'	24.3	104.8																						
	HB-1	Bulk	0-26"	2.4			100.0	97.4	92.4	90.2	84.5	77.2	65.9	53.3	41.8	32.2	23.5	14.0	3.6								
	HB-2	Bulk	0-36"	1.4			100.0	95.1	89.4	88.1	82.9	77.1	66.1	49.0	33.2	21.6	14.0	7.9	2.8	71							
	HB-3	Bulk	0-36"	5.9		100.0	84.9	79.1	75.3	73.4	70.2	67.0	60.0	52.7	45.1	37.9	30.2	19.8	4.2					5.3	13	5.5	14,500
	HB-4	Bulk	0-60"	20.1					100.0	99.7	98.0	96.5	92.2	84.9	76.6	67.9	56.3	39.3	8.4								
	HB-5	Bulk	0-15"	4.5				100.0	95.6	94.9	86.4	77.7	63.3	52.9	43.4	35.9	29.1	21.1	5.5								
	HB-6	Bulk	0-20"	5.5				100.0	94.1	92.4	85.7	78.5	67.3	57.5	47.7	39.5	32.4	23.4	5.5								
Site 2 Foothill Drain	**HB-1**	Bulk	0-30"	6.0				100.0	98.9	98.9	97.5	96.6	92.0	80.7	70.9	63.9	57.5	46.4	12.5								
	HB-2	Bulk	0-64"	4.7			100.0	91.0	89.4	87.9	86.6	84.8	79.1	69.7	60.7	53.0	45.3	33.1	6.2								
	HB-3	Bulk	0-57"	5.7				100.0	97.5	94.8	88.8	83.3	78.2	69.7	61.3	53.4	44.6	33.2	8.3								
	HB-4	Bulk	0-24"	6.9			100.0	98.0	98.0	95.1	85.3	76.6	68.0	57.4	47.5	37.5	27.9	18.3	5.4								
	HB-5	Bulk	0-32"	5.1			100.0	93.1	87.6	83.0	75.6	69.4	61.1	50.3	40.4	31.1	22.9	14.6	4.0								
	HB-6	Bulk	0-18"	5.1				100.0	98.6	97.2	91.4	84.0	76.9	64.9	53.8	43.4	34.5	22.5	6.2								

Note: Swell/Colapse test results (ASTM D4546) are not included in this summary.

HUSHMAND ASSOCIATES, INC.
Geotechnical and Earthquake Engineers

HUSHMAND ASSOCIATES, INC.
Geotechnical and Earthquake Engineers

MOISTURE CONTENT AND DRY DENSITY

Client: JMD
Project Name: Hahamongna Watershed Park
Location: Site 1 - Berkshire Drain

HAI Project No.: JMD-16-001
Performed by: SE/KL
Checked by: JT
Date: 1/5/2016

Boring No.		**B-1**						
Sample No.		**2**	**3**	**4**	**5**	**6**	**7**	**8**
Depth (ft)		**5-6.5**	**10-11.5**	**15-16.5**	**20-21.5**	**25-26.5**	**30-31.5**	**35-36.5**
Total wt of tube and soil	gr	956.92	883.57	944.18	910.86	1135.92	1278.02	800.69
Height of sample	in	5.00	5.00	5.00	5.00	6.00	6.00	4.00
Diameter of sample	in	2.416	2.416	2.416	2.416	2.416	2.416	2.416
Volume of sample	cu.ft	0.0133	0.0133	0.0133	0.0133	0.0159	0.0159	0.0106
Weight of rings	gr	217.11	217.11	217.11	217.11	260.53	260.53	173.69
Weight of soil	lbs.	1.631	1.469	1.603	1.529	1.930	2.243	1.382
Wet Density	pcf	123.0	110.8	120.8	115.3	121.2	140.9	130.3
Container No.		34	42	53	36	200	27	50
Weight of cont.+ wet soil	gr	104.49	87.95	114.04	105.59	97.80	93.96	105.12
Weight of cont.+ dry soil	gr	99.93	85.16	108.45	102.92	78.81	83.46	85.78
Weight of container	gr	4.97	4.98	5.24	5.03	6.37	5.00	6.27
Weight of water	gr	4.56	2.79	5.59	2.67	18.99	10.50	19.34
Weight of dry soil	gr	94.96	80.18	103.21	97.89	72.44	78.46	79.51
Moisture Content	**%**	**4.8**	**3.5**	**5.4**	**2.7**	**26.2**	**13.4**	**24.3**
Dry Density	**pcf**	**117.3**	**107.0**	**114.6**	**112.2**	**96.1**	**124.3**	**104.8**

HUSHMAND ASSOCIATES, INC.
Geotechnical and Earthquake Engineers

MOISTURE CONTENT OF BULK SAMPLES

Client: JMD
Project Name: Hahamongna Watershed Park
Location.: Site 1 - Berkshire Drain

HAI Project No.: JMD-16-001
Performed by: SE/KL
Checked by: JT
Date: 1/5/2016

Boring No.		**HB-1**	**HB-2**	**HB-3**	**HB-4**	**HB-5**	**HB-6**
Sample No.		**Bulk**	**Bulk**	**Bulk**	**Bulk**	**Bulk**	**Bulk**
Depth (inches)		**0-26**	**0-36**	**0-36**	**0-60**	**0-15**	**0-20**
Container No.		P14	P19	P20	P22	P28	P37
Weight of cont.+ wet soil	(gr)	310.50	336.69	231.01	233.98	268.73	255.74
Weight of cont.+ dry soil	(gr)	303.53	332.29	218.72	196.73	257.75	243.07
Weight of container	(gr)	11.20	11.68	11.86	11.50	11.01	11.32
Weight of water	(gr)	6.97	4.40	12.29	37.25	10.98	12.67
Weight of dry soil	(gr)	292.33	320.61	206.86	185.23	246.74	231.75
Moisture Content	**(%)**	**2.4**	**1.4**	**5.9**	**20.1**	**4.5**	**5.5**

HUSHMAND ASSOCIATES, INC.
Geotechnical and Earthquake Engineers

MOISTURE CONTENT OF BULK SAMPLES

Client: JMD
Project Name: Hahamongna Watershed Park
Location.: Site 2 - Foothill Drain

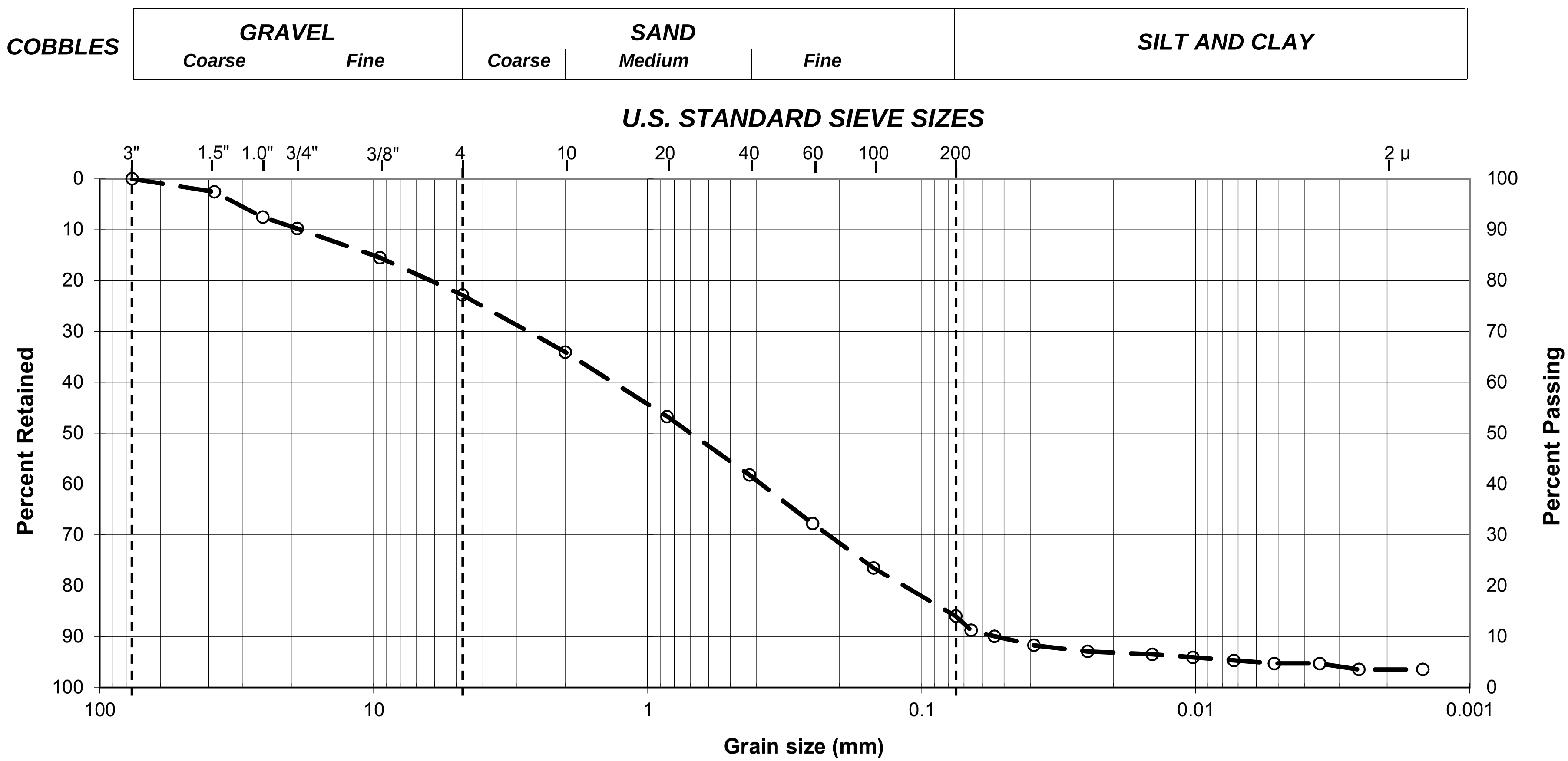
HAI Project No.: JMD-16-001
Performed by: SE/KL
Checked by: JT
Date: 1/5/2016

Boring No.		**HB-1**	**HB-2**	**HB-3**	**HB-4**	**HB-5**	**HB-6**
Sample No.		**Bulk**	**Bulk**	**Bulk**	**Bulk**	**Bulk**	**Bulk**
Depth (inches)		**0-30**	**0-64**	**0-57**	**0-24**	**0-32**	**0-18**
Container No.		P8	P10	P16	P21	P35	P90
Weight of cont.+ wet soil	(gr)	264.96	265.27	274.14	273.89	275.62	283.89
Weight of cont.+ dry soil	(gr)	250.72	254.00	259.99	256.86	262.88	270.78
Weight of container	(gr)	11.70	11.94	10.80	10.65	11.28	11.26
Weight of water	(gr)	14.24	11.27	14.15	17.03	12.74	13.11
Weight of dry soil	(gr)	239.02	242.06	249.19	246.21	251.60	259.52
Moisture Content	**(%)**	**6.0**	**4.7**	**5.7**	**6.9**	**5.1**	**5.1**

PARTICLE-SIZE ANALYSIS OF SOILS

(ASTM D422)

Client:	JMD	**HAI Project No.:**	JMD-16-001
Project Name:	Hahamongna Watershed Park	**Tested by:**	SE/KL
Location:	Site 1 - Berkshire Drain	**Checked by:**	JT
		Date:	1/5/2016

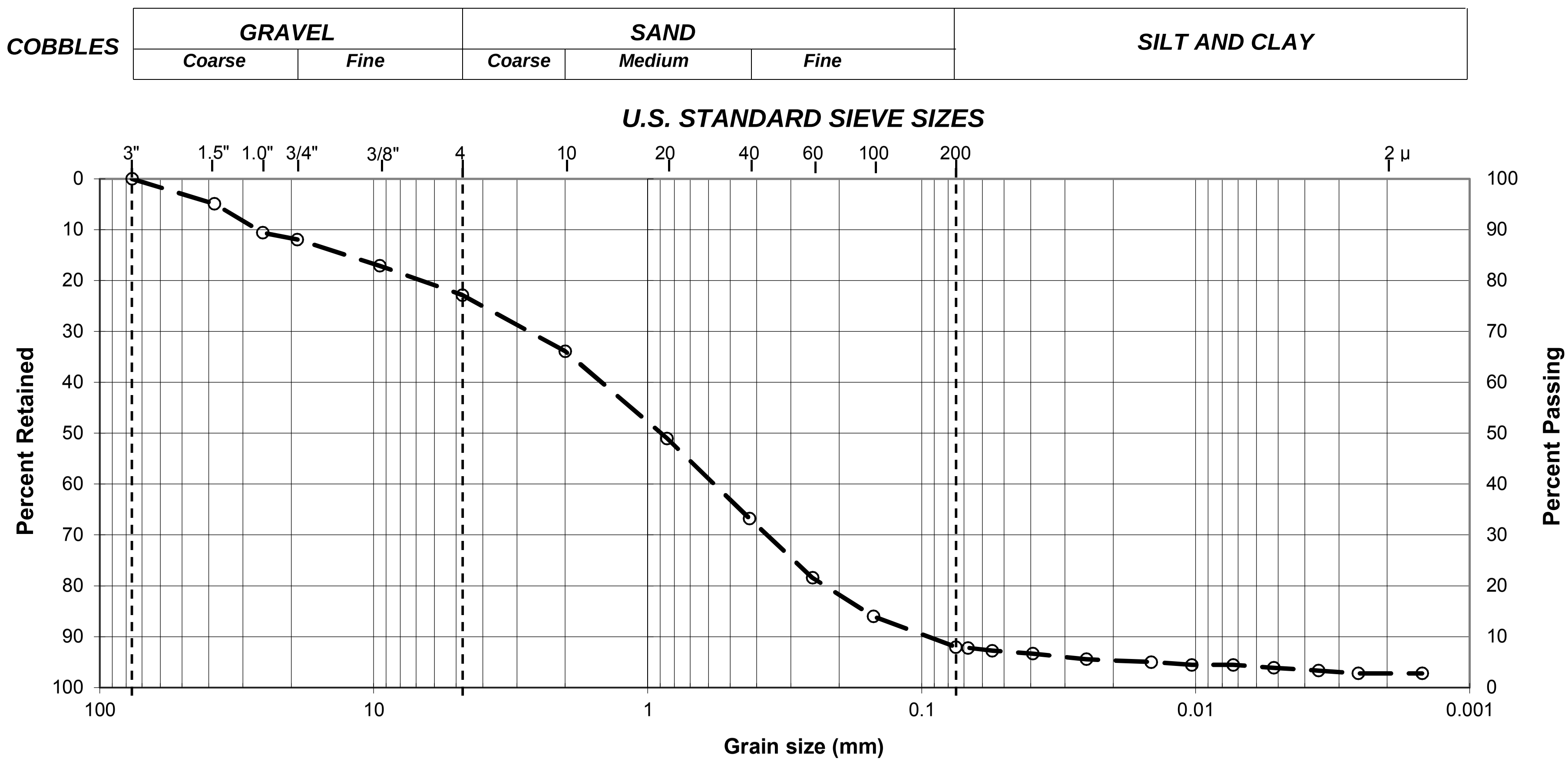


Boring No.	Sample No.	Symbol	USCS	% Gravel	% Sand	% Fines	2µ
HB-1	BULK @ 0-26"	○	Light Olive Brown, Silty Sand with Gravel (SM)	22.8	63.1	14.0	3.6

HUSHMAND ASSOCIATES, INC.
Geotechnical and Earthquake Engineers

PARTICLE-SIZE ANALYSIS OF SOILS
(ASTM D422)

Client:	JMD	**HAI Project No.:**	JMD-16-001
Project Name:	Hahamongna Watershed Park	**Tested by:**	SE/KL
Location:	Site 1 - Berkshire Drain	**Checked by:**	JT
		Date:	1/5/2016



Boring No.	Sample No.	Symbol	USCS	% Gravel	% Sand	% Fines	2μ
HB-2	BULK @ 0-36"	○	Light Olive Brown, Well-Graded Sand with Silt and Gravel (SW-SM)	22.9	69.2	7.9	2.8

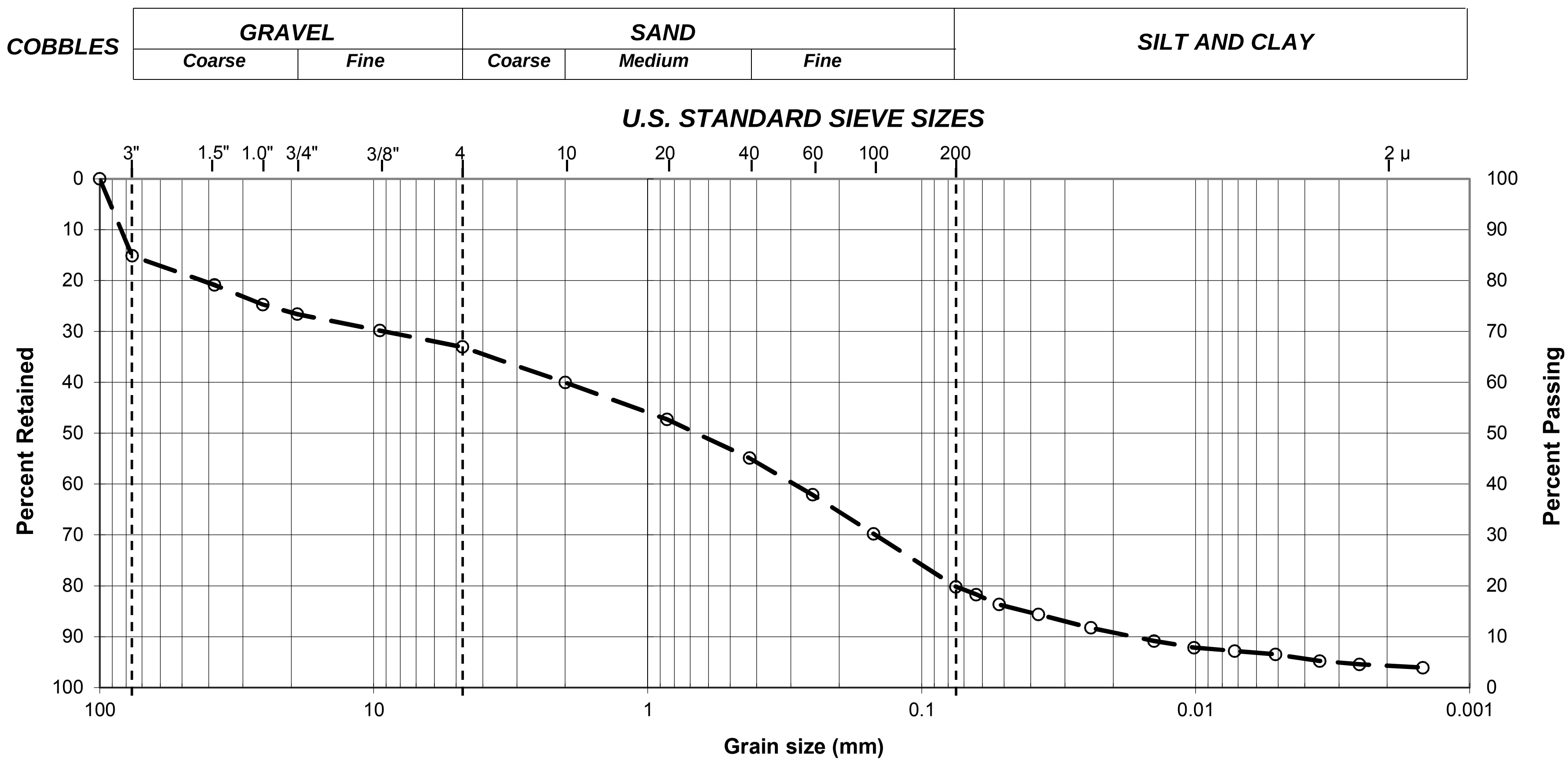
HUSHMAND ASSOCIATES, INC.
Geotechnical and Earthquake Engineers

PARTICLE-SIZE ANALYSIS OF SOILS

(ASTM D422)

Client: JMD
Project Name: Hahamongna Watershed Park
Location: Site 1 - Berkshire Drain

HAI Project No.: JMD-16-001
Tested by: SE/KL
Checked by: JT
Date: 1/5/2016



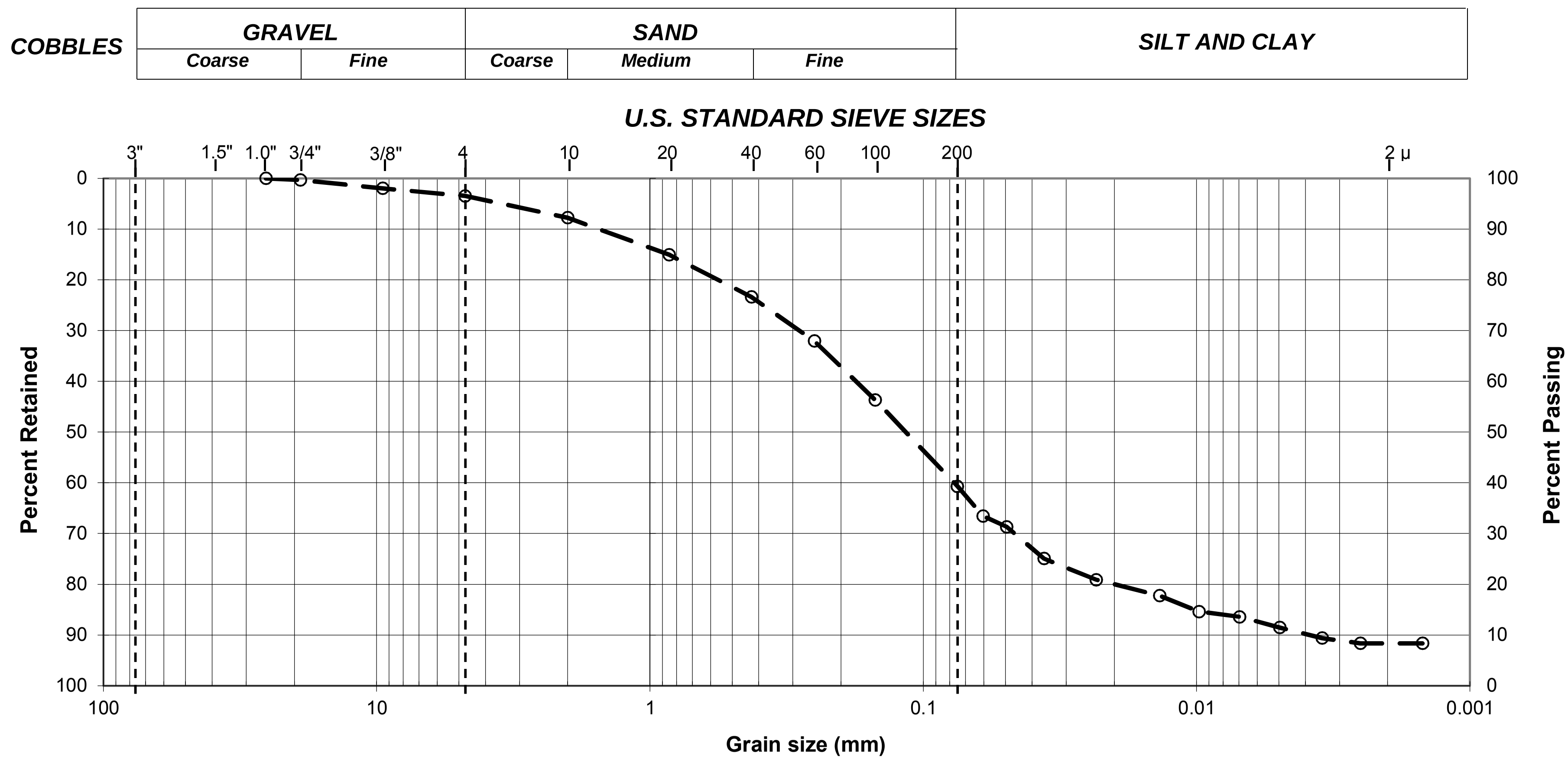
Boring No.	Sample No.	Symbol	USCS	% Gravel	% Sand	% Fines	2µ
HB-3	BULK @ 0-36"	○	Olive Brown, Silty Sand with Gravel (SM)	17.9	47.2	19.8	4.2

PARTICLE-SIZE ANALYSIS OF SOILS

(ASTM D422)

HUSHMAND ASSOCIATES, INC.
Geotechnical and Earthquake Engineers

Client:	JMD	***HAI Project No.:***	JMD-16-001
Project Name:	Hahamongna Watershed Park	***Tested by:***	SE/KL
Location:	Site 1 - Berkshire Drain	***Checked by:***	JT
		Date:	1/5/2016

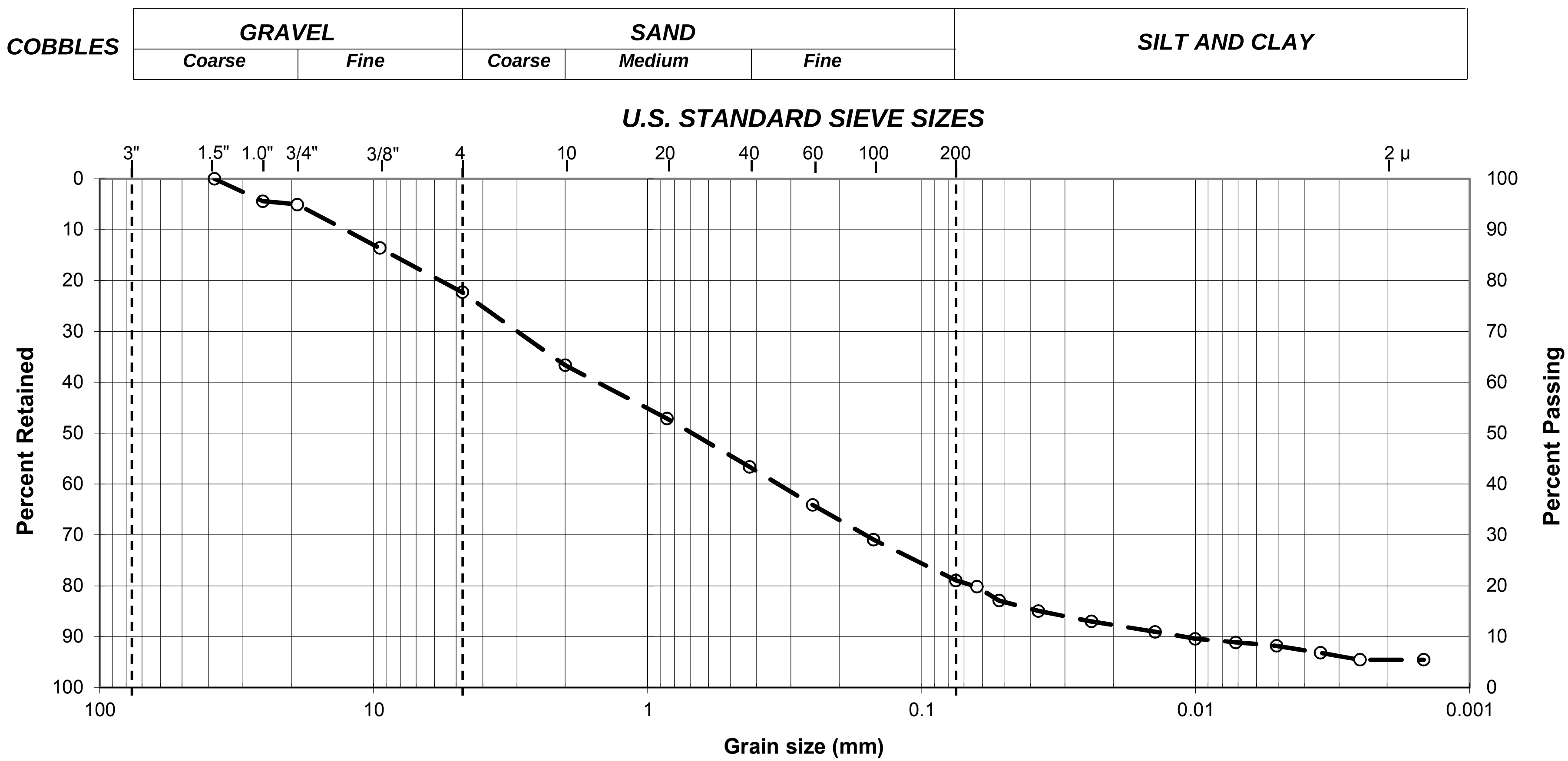


Boring No.	Sample No.	Symbol	USCS	% Gravel	% Sand	% Fines	2μ
HB-4	BULK @ 0-60"	○	Olive Brown, Silty Sand (SM)	3.5	57.2	39.3	8.4

PARTICLE-SIZE ANALYSIS OF SOILS

(ASTM D422)

Client:	JMD	***HAI Project No.:***	JMD-16-001
Project Name:	Hahamongna Watershed Park	***Tested by:***	SE/KL
Location:	Site 1 - Berkshire Drain	***Checked by:***	JT
		Date:	1/5/2016



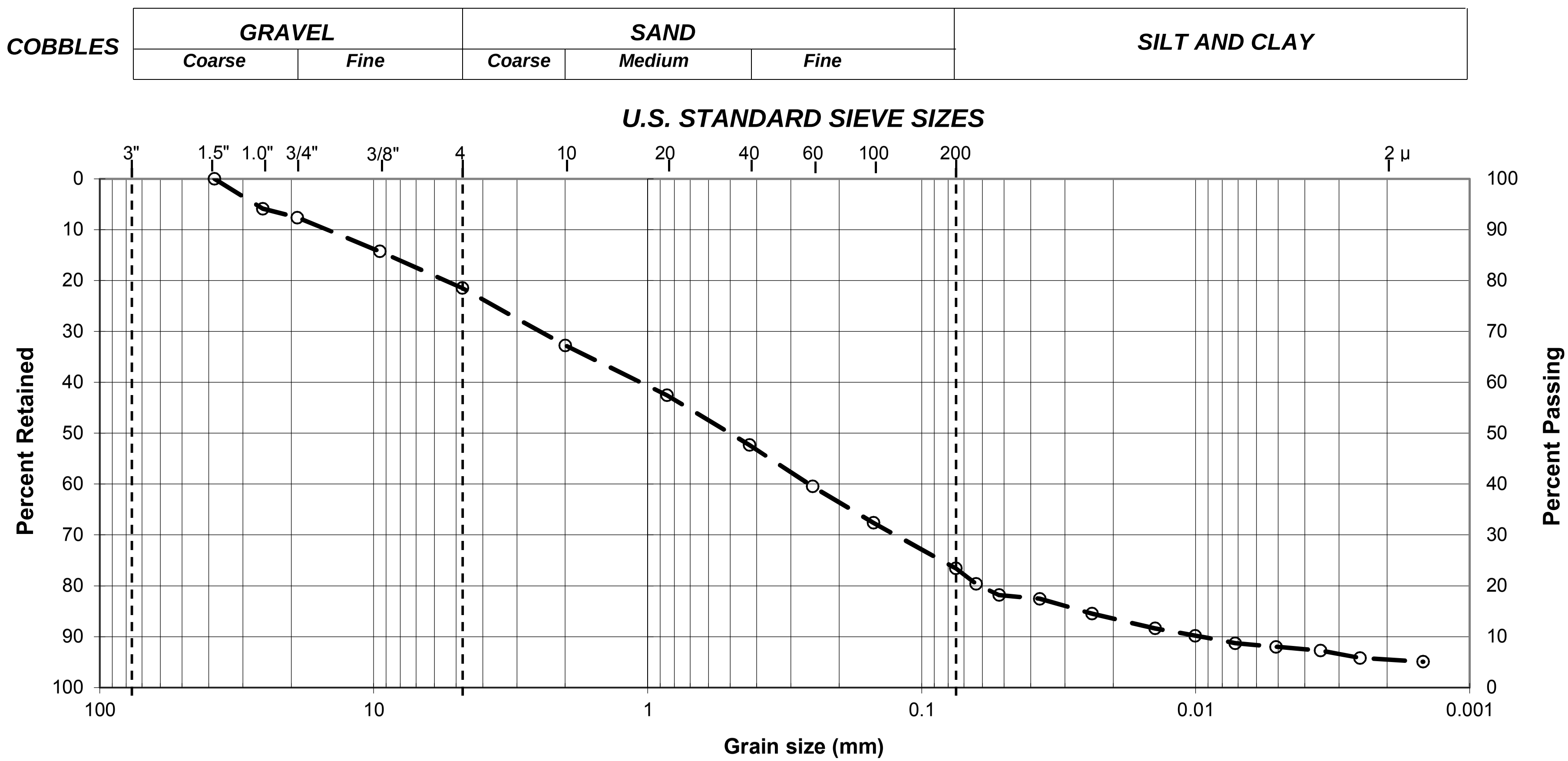
Boring No.	Sample No.	Symbol	USCS	% Gravel	% Sand	% Fines	2µ
HB-5	BULK @ 0-15"	○	Olive Brown, Silty Sand with Gravel (SM)	22.3	56.6	21.1	5.5

PARTICLE-SIZE ANALYSIS OF SOILS

(ASTM D422)

HUSHMAND ASSOCIATES, INC.
Geotechnical and Earthquake Engineers

Client:	JMD	***HAI Project No.:***	JMD-16-001
Project Name:	Hahamongna Watershed Park	***Tested by:***	SE/KL
Location:	Site 1 - Berkshire Drain	***Checked by:***	JT
		Date:	1/5/2016



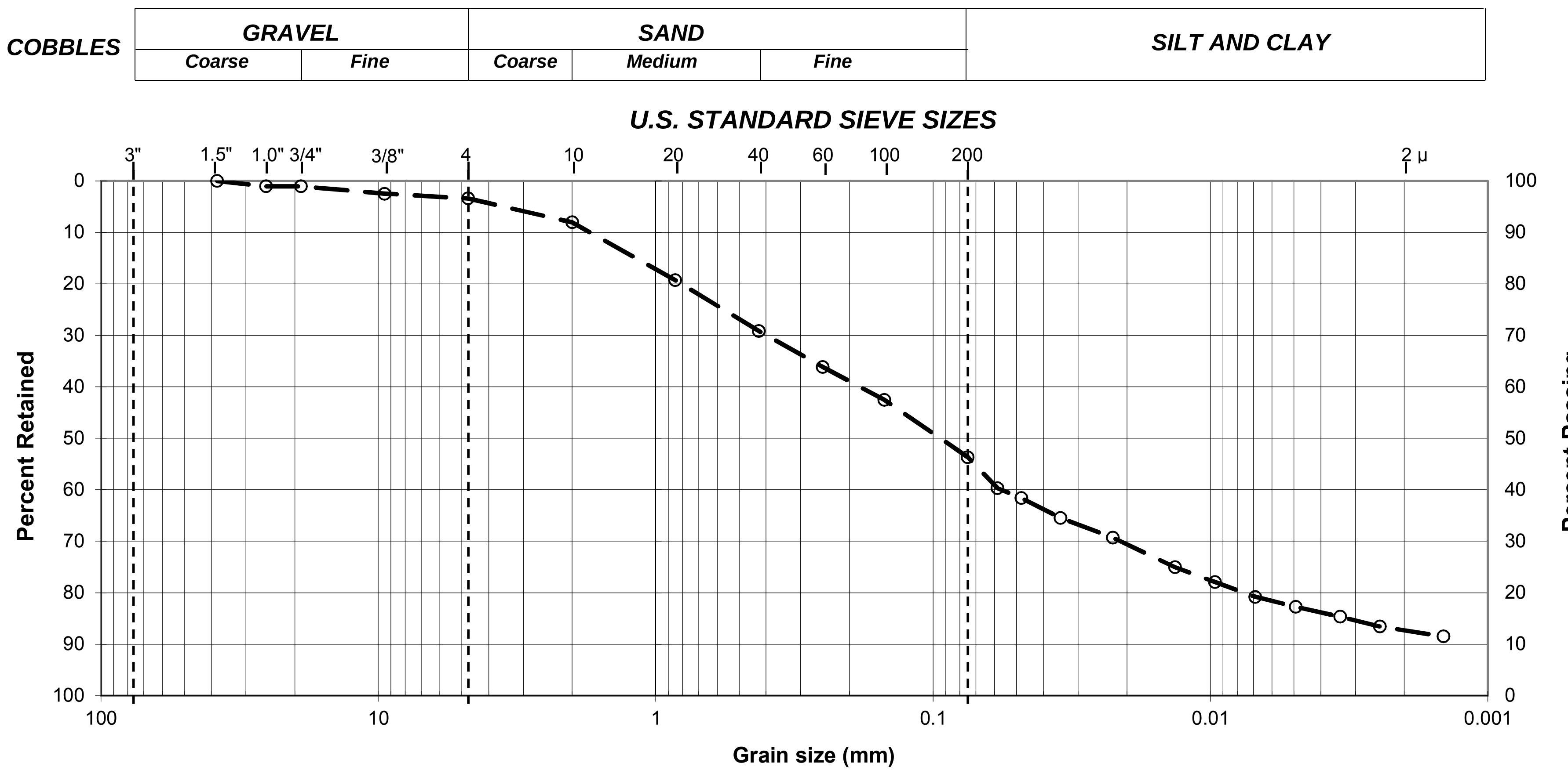
Boring No.	Sample No.	Symbol	USCS	% Gravel	% Sand	% Fines	2µ
HB-6	BULK @ 0-20"	○	Olive Brown, Silty Sand with Gravel (SM)	21.5	55.1	23.4	5.5

HUSHMAND ASSOCIATES, INC.
Geotechnical and Earthquake Engineers

PARTICLE-SIZE ANALYSIS OF SOILS

(ASTM D422)

Client:	JMD	**HAI Project No.:**	JMD-16-001
Project Name:	Hahamongna Watershed Park	**Tested by:**	SE/KL
Location:	Site 2 - Foothill Drain	**Checked by:**	JT
		Date:	1/5/2016



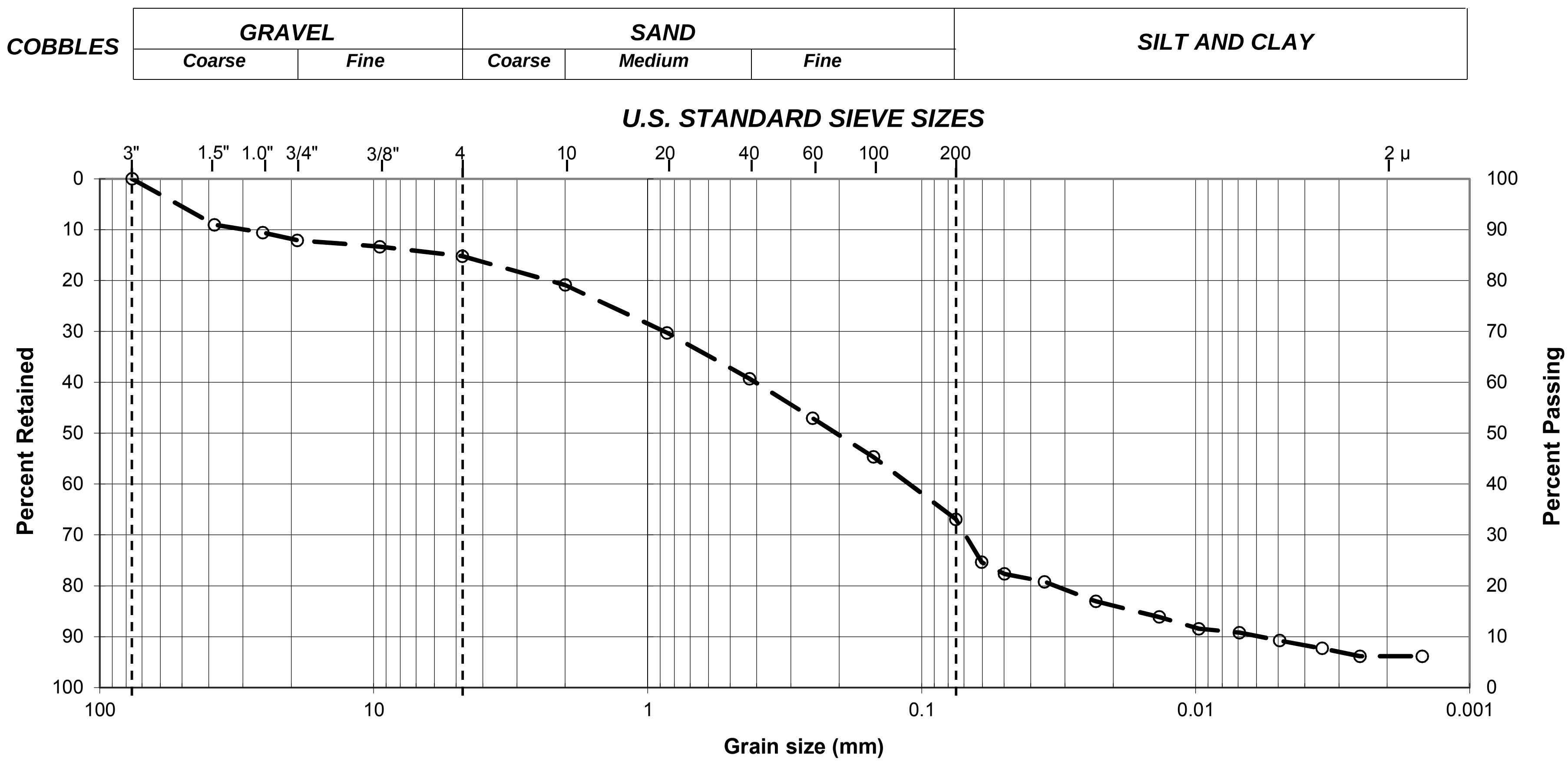
Boring No.	Sample No.	Symbol	USCS	% Gravel	% Sand	% Fines	2μ
HB-1	BULK @ 0-30"	○	Dark Yellowish Brown, Silty Sand (SM)	3.4	50.2	46.4	12.5

PARTICLE-SIZE ANALYSIS OF SOILS

(ASTM D422)

HUSHMAND ASSOCIATES, INC.
Geotechnical and Earthquake Engineers

Client:	JMD	***HAI Project No.:***	JMD-16-001
Project Name:	Hahamongna Watershed Park	***Tested by:***	SE/KL
Location:	Site 2 - Foothill Drain	***Checked by:***	JT
		Date:	1/5/2016

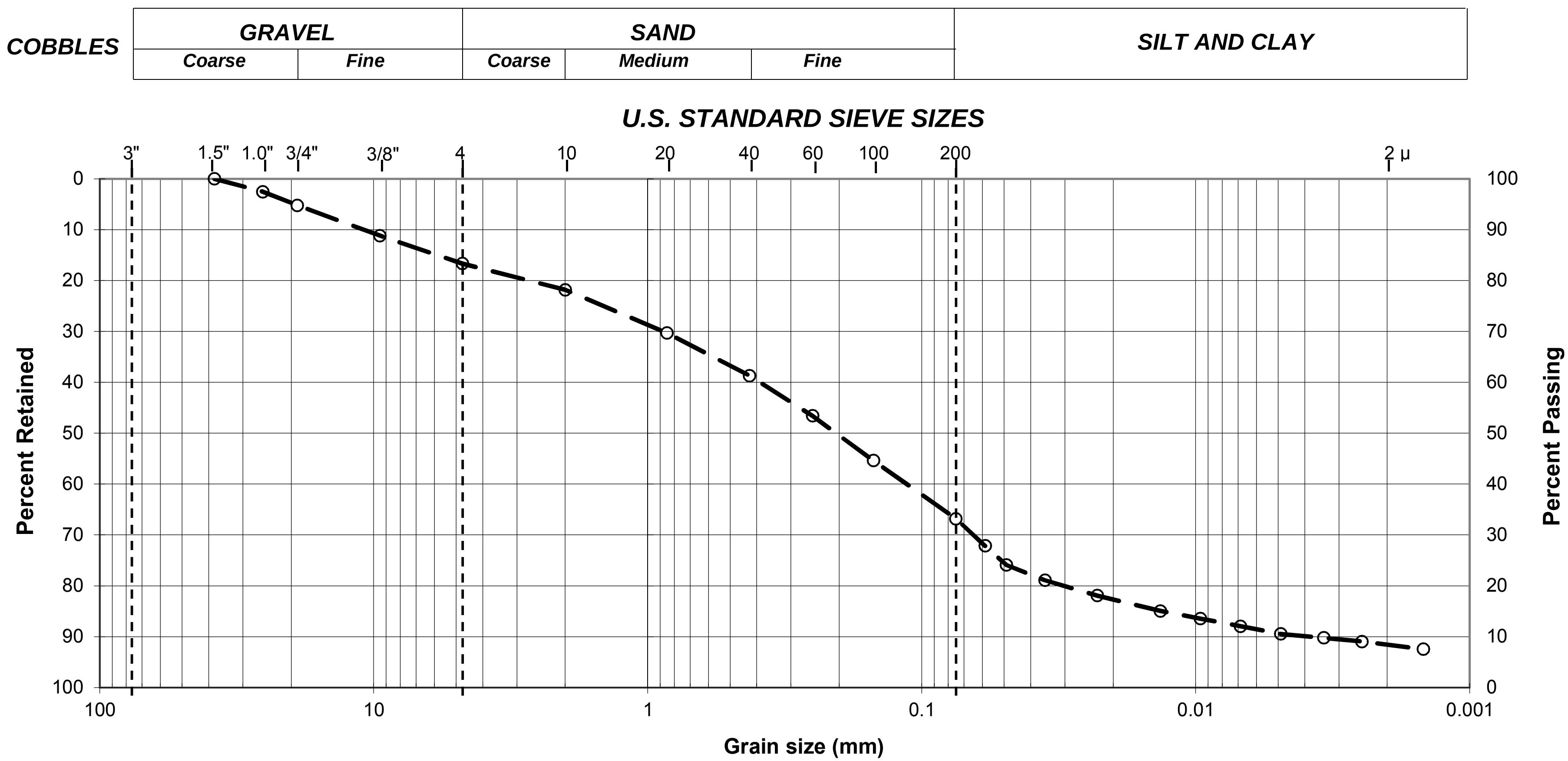


Boring No.	Sample No.	Symbol	USCS	% Gravel	% Sand	% Fines	2μ
HB-2	BULK @ 0-64"	○	Light Olive Brown and Olive Yellow, Silty Sand with Gravel (SM)	15.2	51.7	33.1	6.2

HUSHMAND ASSOCIATES, INC.
Geotechnical and Earthquake Engineers

PARTICLE-SIZE ANALYSIS OF SOILS
(ASTM D422)

Client:	JMD	***HAI Project No.:***	JMD-16-001
Project Name:	Hahamongna Watershed Park	***Tested by:***	SE/KL
Location:	Site 2 - Foothill Drain	***Checked by:***	JT
		Date:	1/5/2016

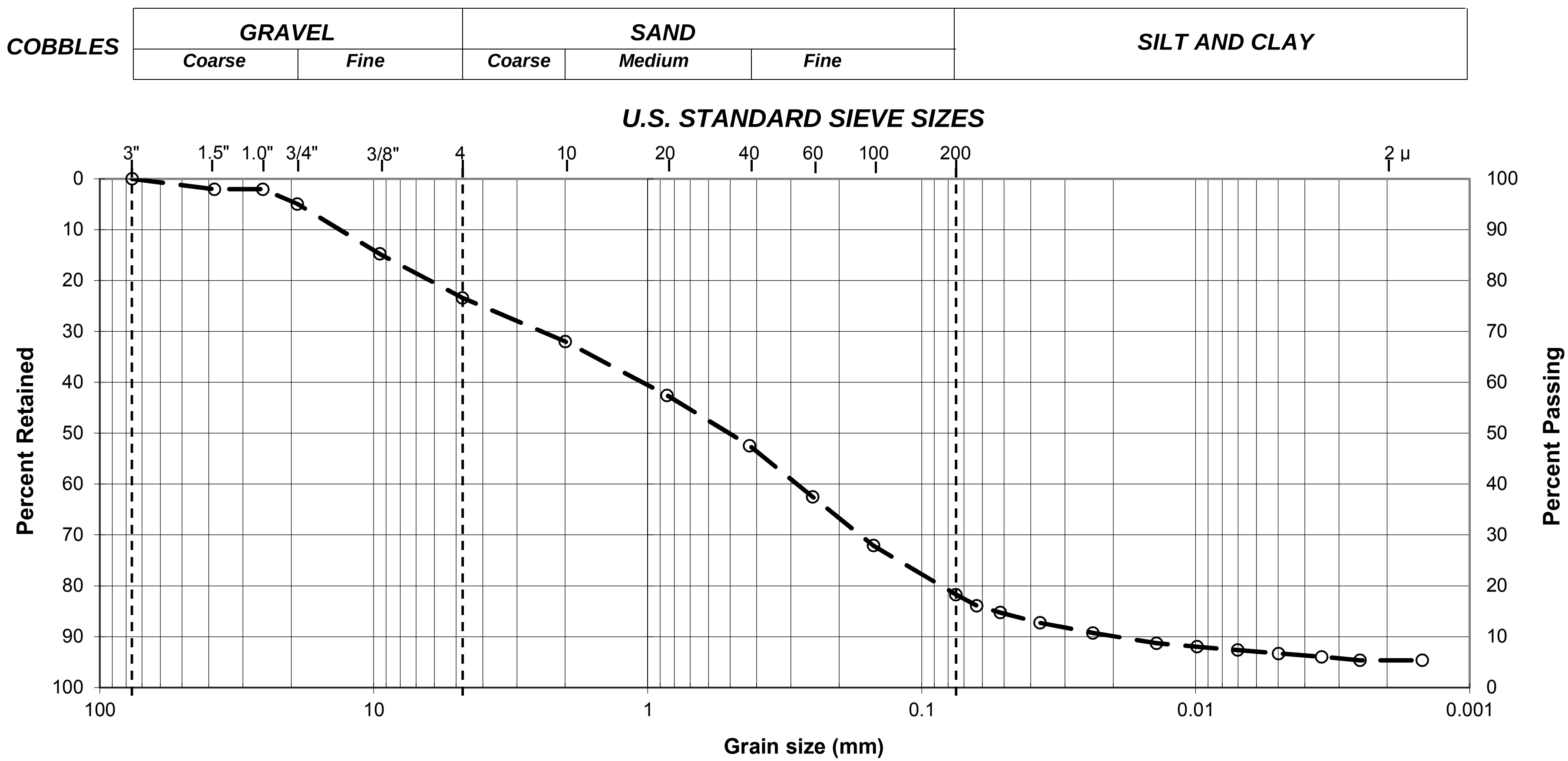


Boring No.	Sample No.	Symbol	USCS	% Gravel	% Sand	% Fines	2µ
HB-3	BULK @ 0-57"	○	Dark Brown to Brown and Light Olive Brown, Silty Sand with Gravel (SM)	16.7	50.2	33.2	8.3

PARTICLE-SIZE ANALYSIS OF SOILS

(ASTM D422)

Client:	JMD	***HAI Project No.:***	JMD-16-001
Project Name:	Hahamongna Watershed Park	***Tested by:***	SE/KL
Location:	Site 2 - Foothill Drain	***Checked by:***	JT
		Date:	1/5/2016



Boring No.	Sample No.	Symbol	USCS	% Gravel	% Sand	% Fines	2µ
HB-4	BULK @ 0-24"	○	Dark Yellowish Brown, Silty Sand with Gravel (SM)	23.4	58.3	18.3	5.4

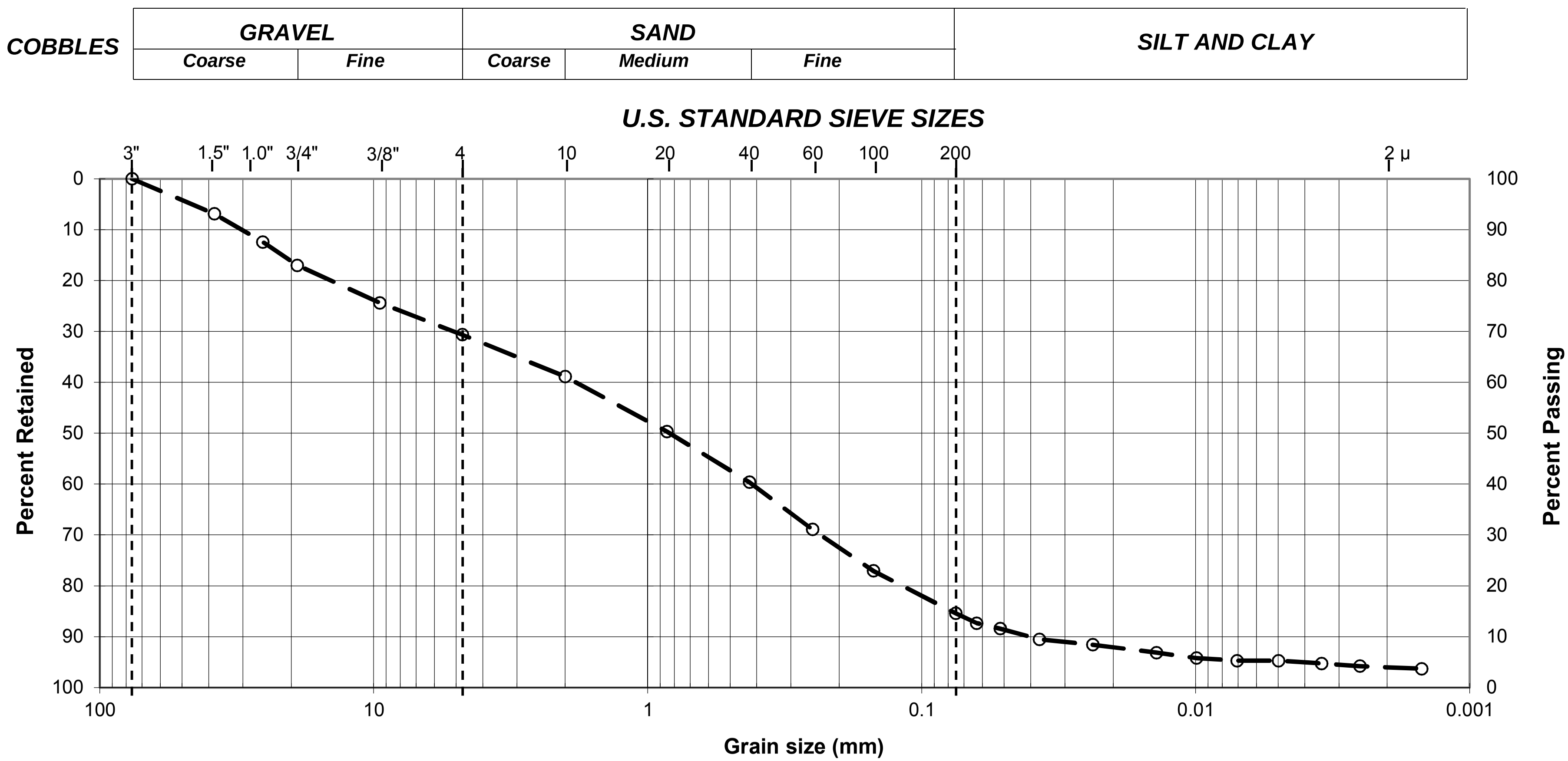
PARTICLE-SIZE ANALYSIS OF SOILS

(ASTM D422)

HUSHMAND ASSOCIATES, INC.
Geotechnical and Earthquake Engineers

Client: JMD
Project Name: Hahamongna Watershed Park
Location: Site 2 - Foothill Drain

HAI Project No.: JMD-16-001
Tested by: SE/KL
Checked by: JT
Date: 1/5/2016

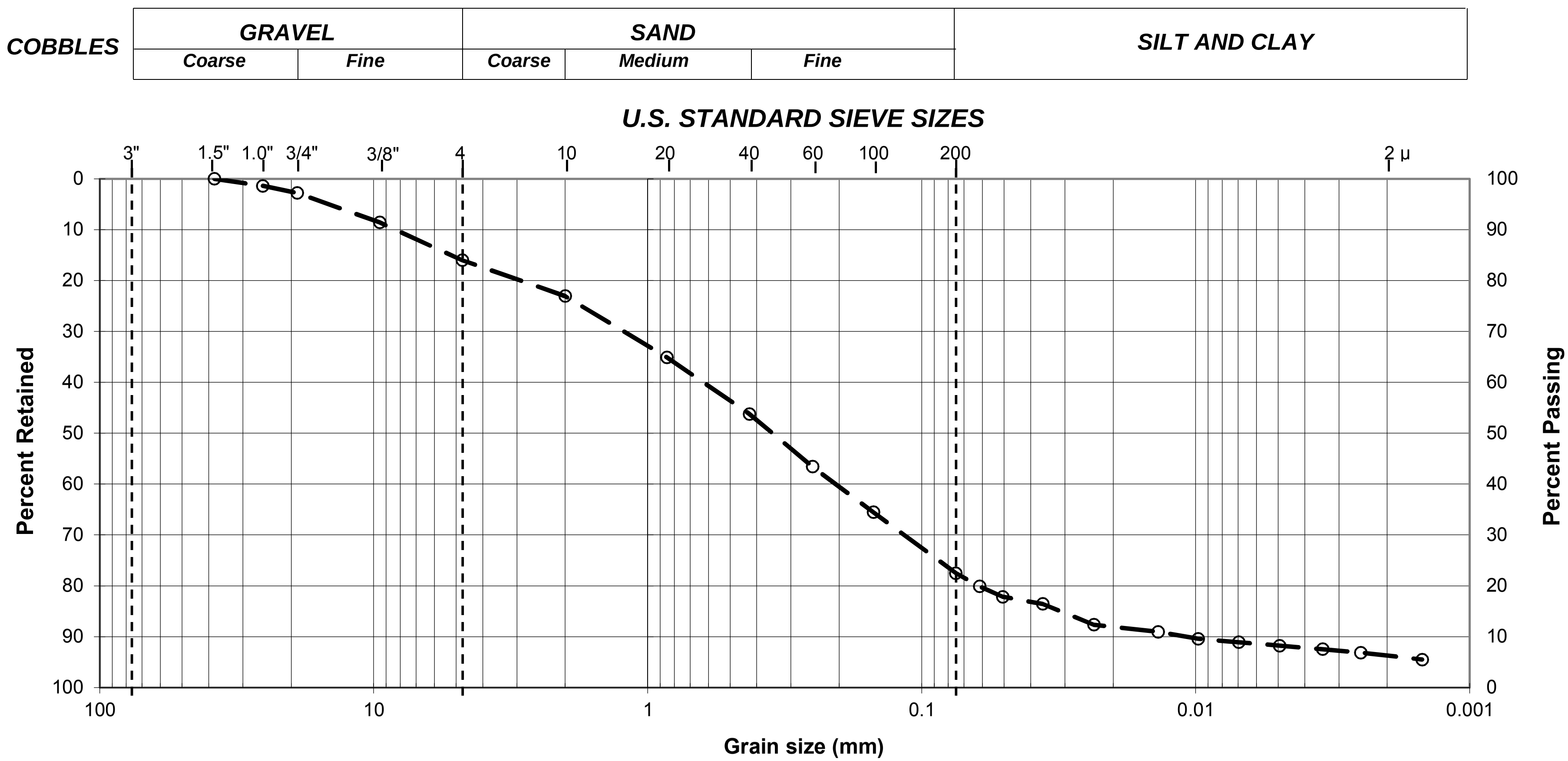


Boring No.	Sample No.	Symbol	USCS	% Gravel	% Sand	% Fines	2μ
HB-5	BULK @ 0-32"	○	Dark Brown, Silty Sand with Gravel (SM)	30.6	54.8	14.6	4.0

PARTICLE-SIZE ANALYSIS OF SOILS

(ASTM D422)

Client:	JMD	**HAI Project No.:**	JMD-16-001
Project Name:	Hahamongna Watershed Park	**Tested by:**	SE/KL
Location:	Site 2 - Foothill Drain	**Checked by:**	JT
		Date:	1/5/2016



Boring No.	Sample No.	Symbol	USCS	% Gravel	% Sand	% Fines	2μ
HB-6	BULK @ 0-18"	○	Dark Yellowish Brown, Silty Sand with Gravel (SM)	16.0	61.5	22.5	6.2

January 8, 2016

Jorge Turbay
Hushmand Associates, Inc.
250 Goddard
Irvine, California 92618

Project No. 40932

Attention Jorge Turbay:

Testing of the bulk sample delivered to our laboratory on 1/4/2016 has been completed.

Project No.:	***JMD-15-002***
Reference:	***Hahamongha Watershed Park***
Sample:	***B-2 @ 0"-36"***

Data sheets are attached for your use and file. Any untested portion of the sample will be retained for a period of 60 days prior to disposal. The opportunity to be of service is sincerely appreciated and should you have any questions, kindly call.

Respectfully Submitted,

REGISTERED PROFESSIONAL ENGINEER
STEVEN R. MARVIN
NO. 30659
CIVIL
STATE OF CALIFORNIA

Steven R. Marvin
RCE 30659

SRM:tw

LaBelle Marvin

R - VALUE DATA SHEET

PROJECT No. 40932

DATE: 1/8/2016

BORING NO. B-2 @ 0"-36"

Hahamongha

P.N. JMD-15-002

SAMPLE DESCRIPTION: Brown Slightly Silty Coarse Sand

R-VALUE TESTING DATA | CA TEST 301

	SPECIMEN ID		
	a	b	c
Mold ID Number	1	2	3
Water added, grams	100	110	91
Initial Test Water, %	9.8	10.6	9.0
Compact Gage Pressure,psi	210	120	290
Exudation Pressure, psi	371	228	606
Height Sample, Inches	2.69	2.66	2.65
Gross Weight Mold, grams	3142	3127	3127
Tare Weight Mold, grams	1965	1969	1977
Sample Wet Weight, grams	1177	1158	1150
Expansion, Inches x 10exp-4	3	3	5
Stability 2,000 lbs (160psi)	12 / 22	12 / 23	10 / 18
Turns Displacement	7.00	7.87	6.91
R-Value Uncorrected	69	65	74
R-Value Corrected	73	68	76
Dry Density, pcf	120.7	119.2	120.6

DESIGN CALCULATION DATA

Traffic Index Assumed:	4.0	4.0	4.0
G.E. by Stability	0.28	0.33	0.25
G. E. by Expansion	0.10	0.10	0.17

Equilibrium R-Value	**71** by EXUDATION	Examined & Checked: 1 /8/ 16
REMARKS:	Gf = 1.25 13.5% Retained on the 3/4" Sieve. Partial Free Drainage.	REGISTERED PROFESSIONAL ENGINEER STEVEN R. MARVIN C 30659 CIVIL STATE OF CALIFORNIA Steven R. Marvin, RCE 30659

The data above is based upon processing and testing samples as received from the field. Test procedures in accordance with latest revisions to Department of Transportation, State of California, Materials & Research Test Method No. 301.

R-VALUE GRAPHICAL PRESENTATION

LaBelle Marvin

PROJECT NO. 40932

DATE: 1 /8/ 16

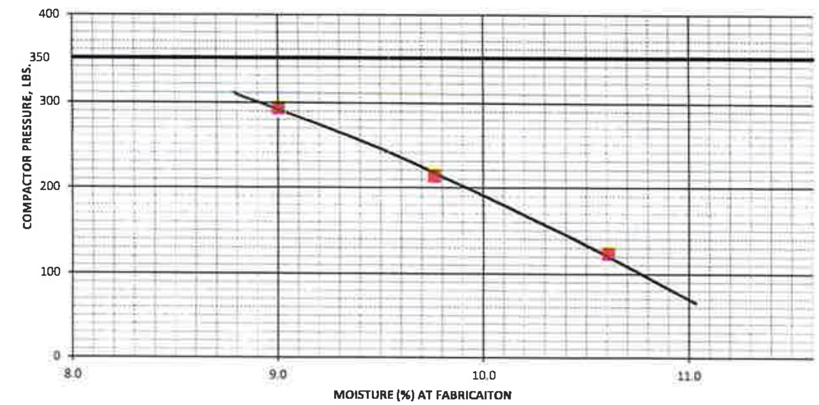
REMARKS:

BORING NO. B-2 @ 0"-36"

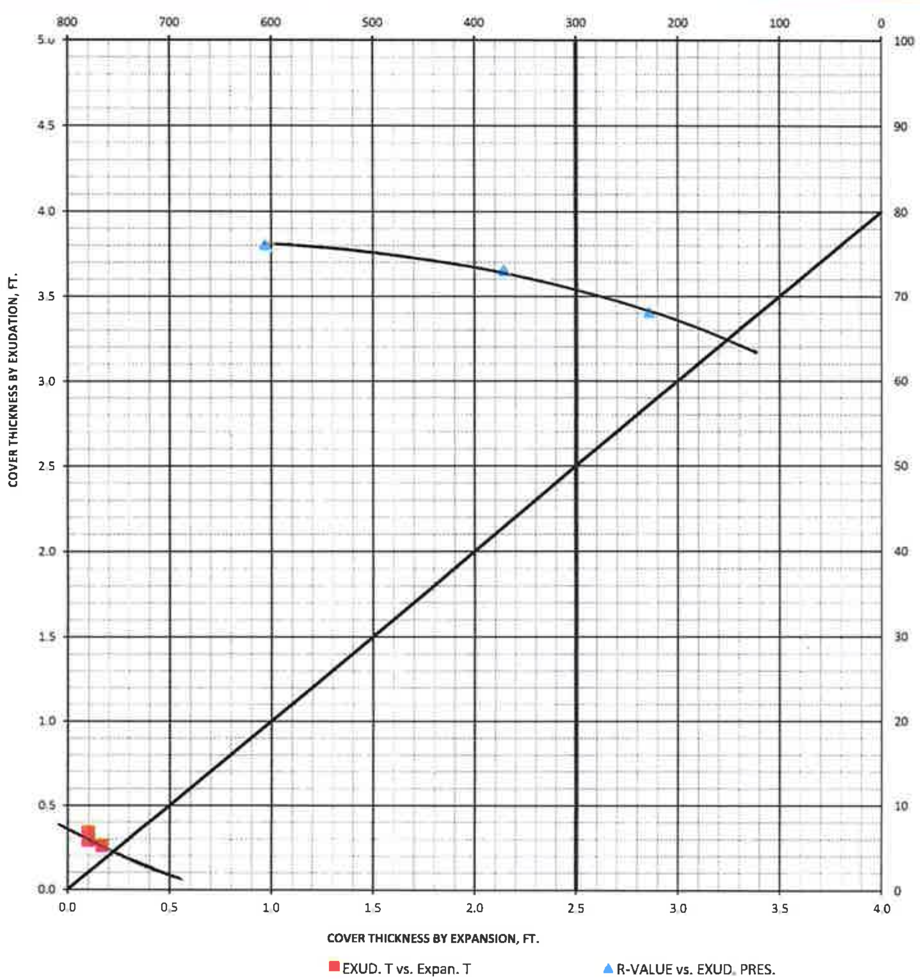
Hahamongha

P.N. JMD-15-002

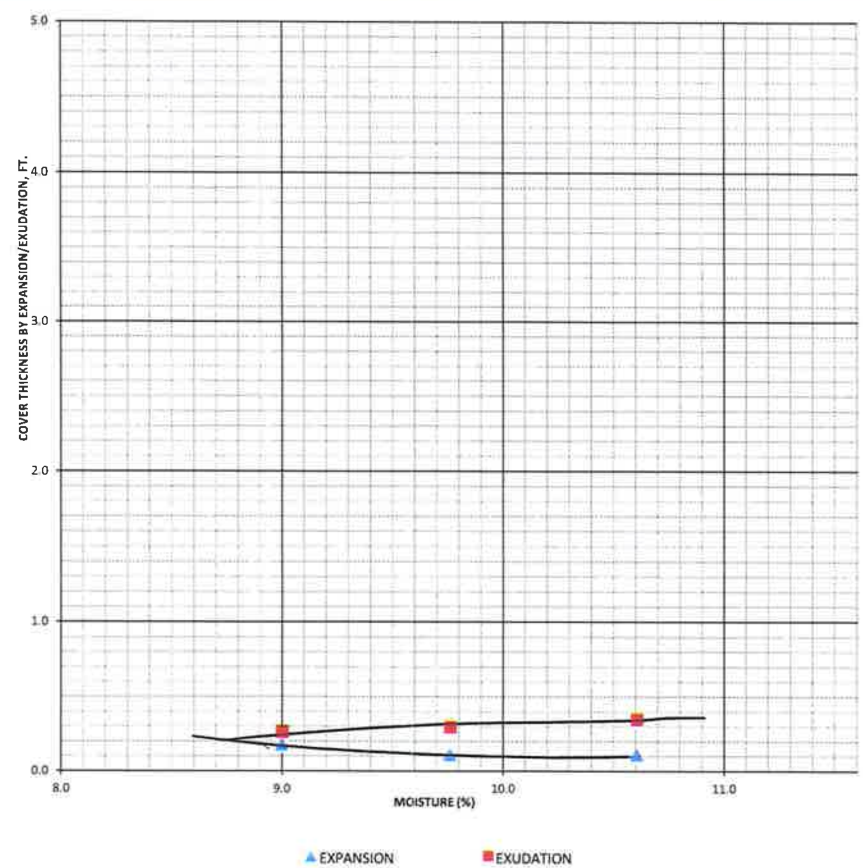
COMPACTOR PRESSURE vs MOISTURE %



COVER THICKNESS BY EXUDATION vs COVER THICKNESS BY EXPANSION



COVER THICKNESS vs MOISTURE %



DIRECT SHEAR TEST

(ASTM D3080)

HAI Pr No.: JMD-16-001
Tested by: SE/KL
Checked by: JT
Date: 1/6/2016

Client: JMD
Project Name: Hahamongna Watershed Park
Project No. ---

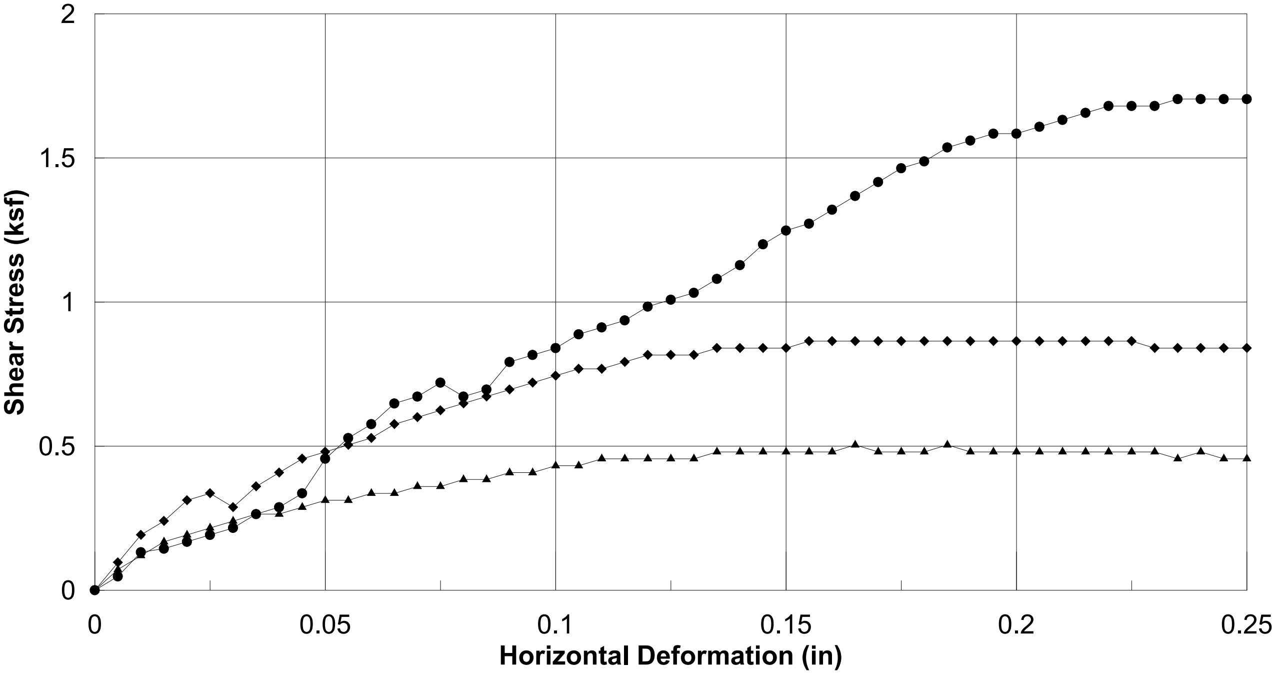
Boring No.: B-1
Sample No.: 1
Depth (ft): 2-3.5

Location: Site 1 - Berkshire Drain

Soil Description: Dark Yellowish Brown, Silty Sand with Gravel (SM)

Sample type: Undisturbed Ring

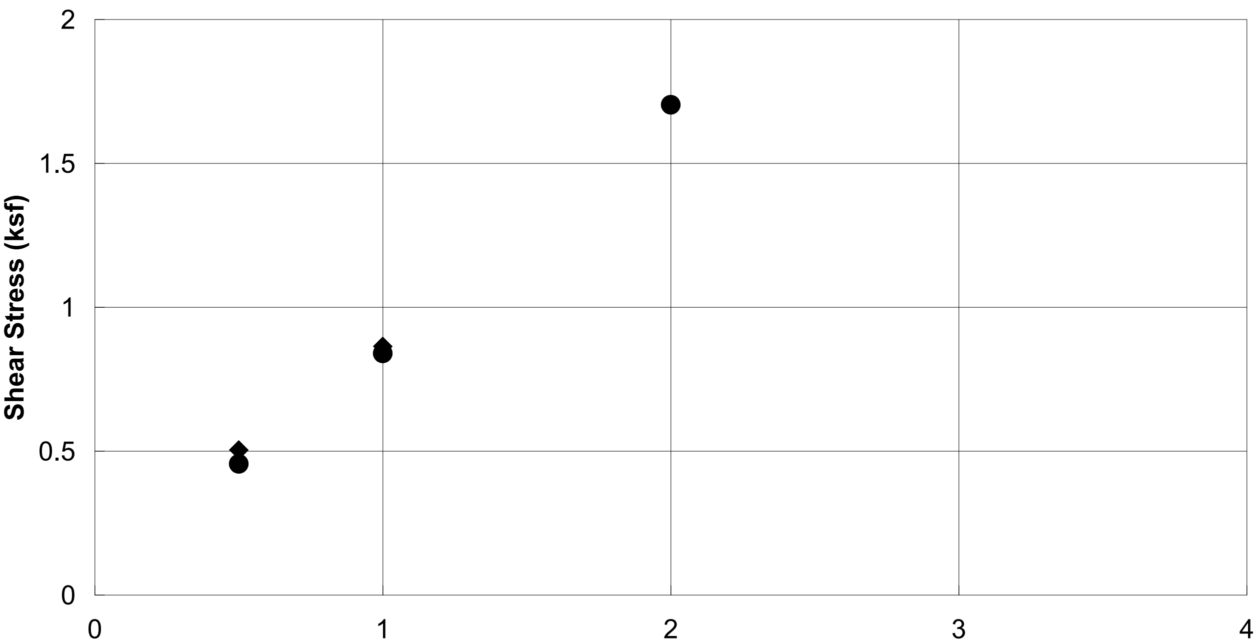
Type of test: Consolidated, Drained



	▲	◆	●
Normal Stress (ksf)	**0.5**	**1**	**2**
Deformation Rate (in/min)		**0.002**	

Peak Shear Stress (ksf) ◆	**0.50**	**0.86**	**1.70**
Shear stress @ end of test (ksf) ●	**0.46**	**0.84**	**1.70**

Initial height of sample (in)	**1**	**1**	**1**
Height of sample before shear (in)	**0.9748**	**0.9573**	**0.9375**
Diameter of sample (in)	**2.42**	**2.42**	**2.42**
Initial Moisture Content (%)	**2.8**	**2.8**	**2.8**
Final Moisture Content (%)	**16.5**	**14.7**	**13.9**
Dry Density (pcf)	**104.5**	**108.5**	**108.8**
Final Saturation (%)	**77.9**	**81.4**	**82.8**



TRANSMITTAL LETTER

DATE: January 13, 2016

ATTENTION: **Ben Hushmand**

TO: Hushmand Associates
250 Goddard
Irvine, CA 92618

SUBJECT: Laboratory Test Data
Hahamongha Watershed Park
Your #JMD-15-002, HDR Lab #16-0004LAB

COMMENTS: Enclosed are the results for the subject project.

James T. Keegan
Laboratory Services Manager

Table 1 - Laboratory Tests on Soil Samples

Hushmand Associates
Hahamongha Watershed Park
Your #JMD-15-002, HDR Lab #16-0004LAB
4-Jan-16

Sample ID			HB-3 (Berkshire Drain) @ 0-36" SM
Resistivity		**Units**	
as-received		ohm-cm	80,000
saturated		ohm-cm	14,500
pH			5.3
Electrical Conductivity		mS/cm	0.04
Chemical Analyses			
Cations			
calcium	Ca^{2+}	mg/kg	23
magnesium	Mg^{2+}	mg/kg	3.5
sodium	Na^{1+}	mg/kg	13
potassium	K^{1+}	mg/kg	ND
Anions			
carbonate	CO_3^{2-}	mg/kg	ND
bicarbonate	HCO_3^{1-}	mg/kg	61
fluoride	F^{1-}	mg/kg	0.3
chloride	Cl^{1-}	mg/kg	5.5
sulfate	SO_4^{2-}	mg/kg	13
phosphate	PO_4^{3-}	mg/kg	5.4
Other Tests			
ammonium	NH_4^{1+}	mg/kg	ND
nitrate	NO_3^{1-}	mg/kg	8.2
sulfide	S^{2-}	qual	na
Redox		mV	na

Electrical conductivity in millisiemens/cm and chemical analysis were made on a 1:5 soil-to-water extract.
mg/kg = milligrams per kilogram (parts per million) of dry soil.
Redox = oxidation-reduction potential in millivolts
ND = not detected
na = not analyzed

SWELL/COLLAPSE
(ASTM D4546)

HUSHMAND ASSOCIATES, INC.
Geotechnical and Earthquake Engineers

Client :	JMD	***HAI Project No.:***	JMD-16-001
Project Name:	Hahamongna Watershed Park	***Tested by:***	KL/SE
Location:.	Site 1 - Berkshire Drain	***Checked by:***	JT
		Date:	1/19/2016

Boring No.:	**B-1**	***Sample No.:***	3	***Depth:***	10'
Soil Description:	Light Olive Brown, Silty Sand (SM)				
Type of Sample:	Undisturbed Ring				

Initial Total Weight (g)	Final Total Weight (g)	Final Dry Weight (g)
132.56	148.23	128.90

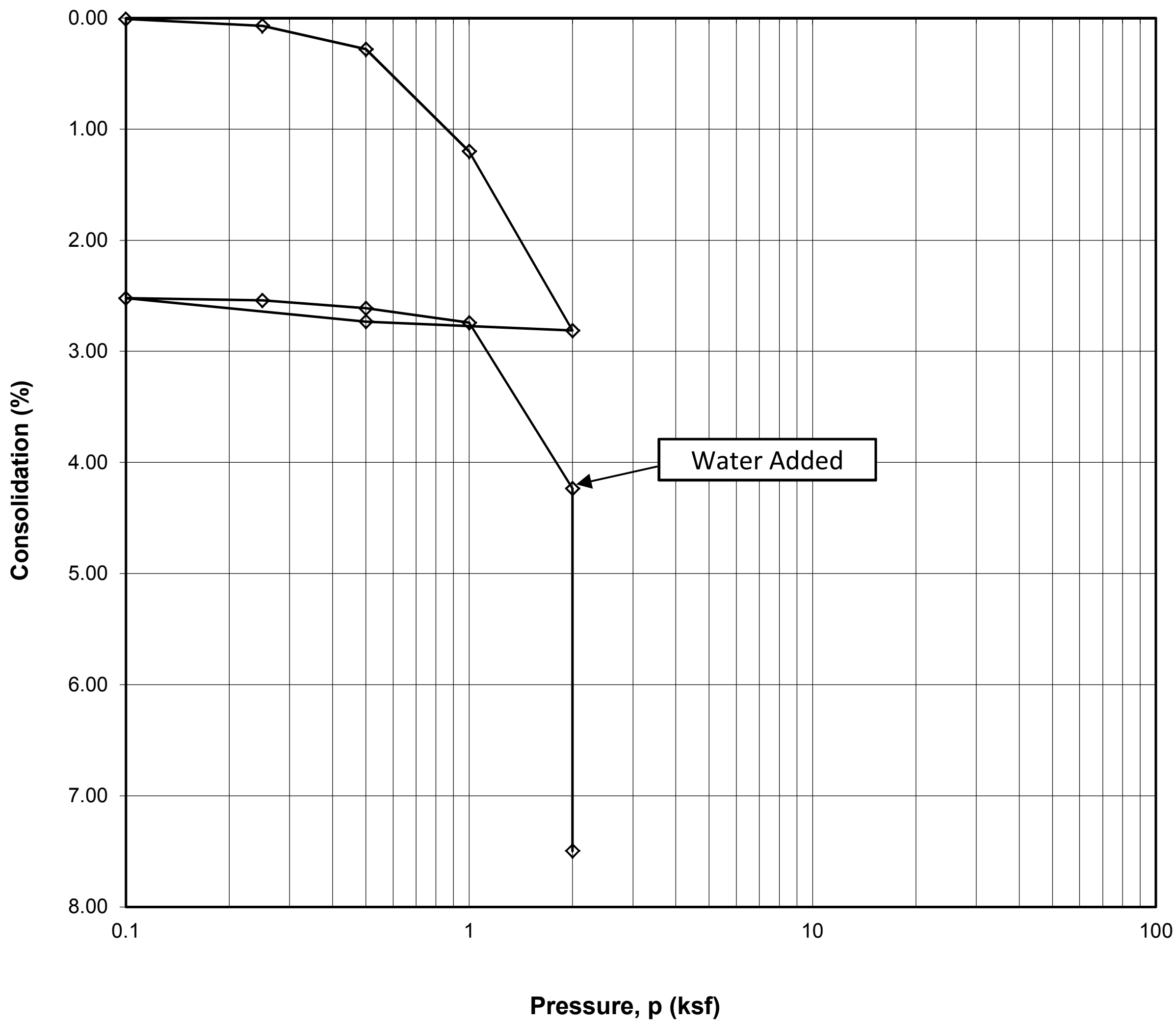
			Initial Conditions	Unload
Height	**H**	**(in)**	0.9991	0.9242
Height of Solids	**Hs**	**(in)**	0.647	0.647
Height of Water	**Hw**	**(in)**	0.049	0.257
Height of Air	**Ha**	**(in)**	0.303	0.019
Dry Density		**(pcf)**	**107.2**	**116.0**
Water Content		**(%)**	**2.8**	**15.0**
Saturation		**(%)**	**13.9**	**93.0**

Load (ksf)	δH (in)	H (in)	Voids (in)	e	Consol. (%)	t_{50} (sec)	a_v (1/ksf)	M_v (1/ksf)	
0.01	-------	0.9991	0.352	0.543	0.00				
0.1	0.0001	0.9990	0.352	0.543	0.01				
0.25	0.0007	0.9984	0.351	0.542	0.07				
0.5	0.0028	0.9963	0.349	0.539	0.28				
1	0.0120	0.9871	0.340	0.525	1.20				
2	0.0281	0.9710	0.324	0.500	2.81				
0.5	0.0273	0.9718	0.324	0.501	2.73				
0.1	0.0252	0.9739	0.326	0.504	2.52				
0.25	0.0254	0.9737	0.326	0.504	2.54				
0.5	0.0261	0.9730	0.326	0.503	2.61				
1	0.0274	0.9717	0.324	0.501	2.74				
2	0.0423	0.9568	0.309	0.478	4.23				
2	0.0749	0.9242	0.277	0.427	7.50	**Water Added**			

SWELL/COLLAPSE
(ASTM D4546)

HUSHMAND ASSOCIATES, INC.
Geotechnical and Earthquake Engineers

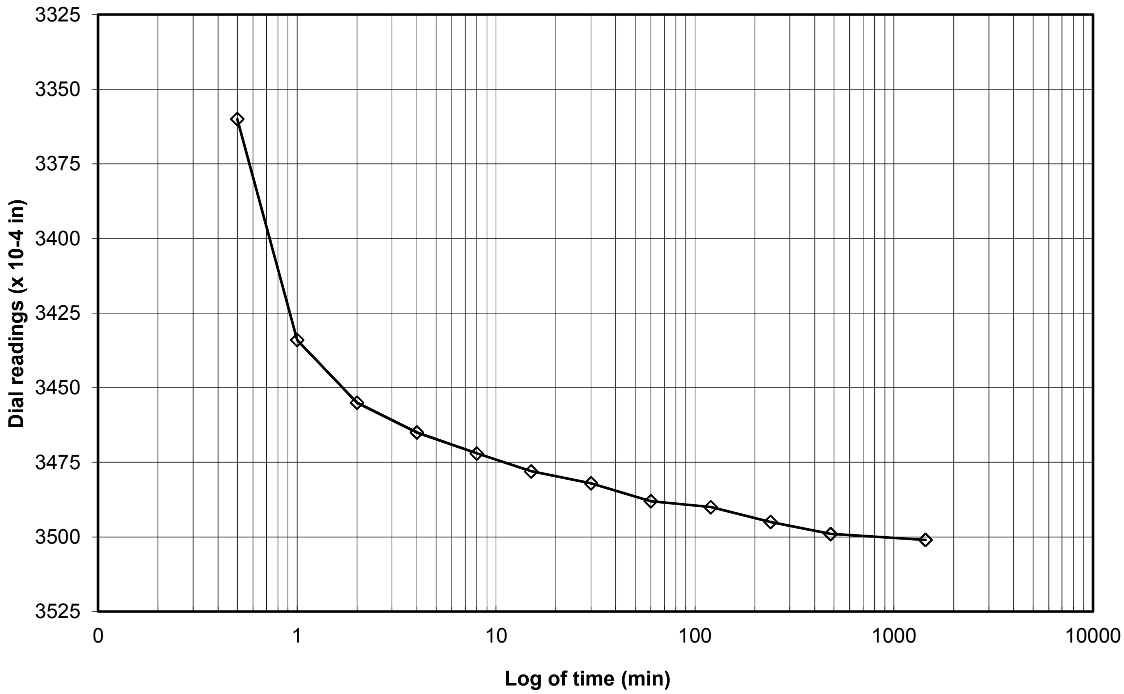
Client: JMD
Project Name: Hahamongna Watershed Park
Project No.: Site 1 - Berkshire Drain
Boring No.: **B-1** ***Sample No.:*** 3 ***Depth:*** 10'
Soil Description: Light Olive Brown, Silty Sand (SM)
Type of Sample: Undisturbed Ring

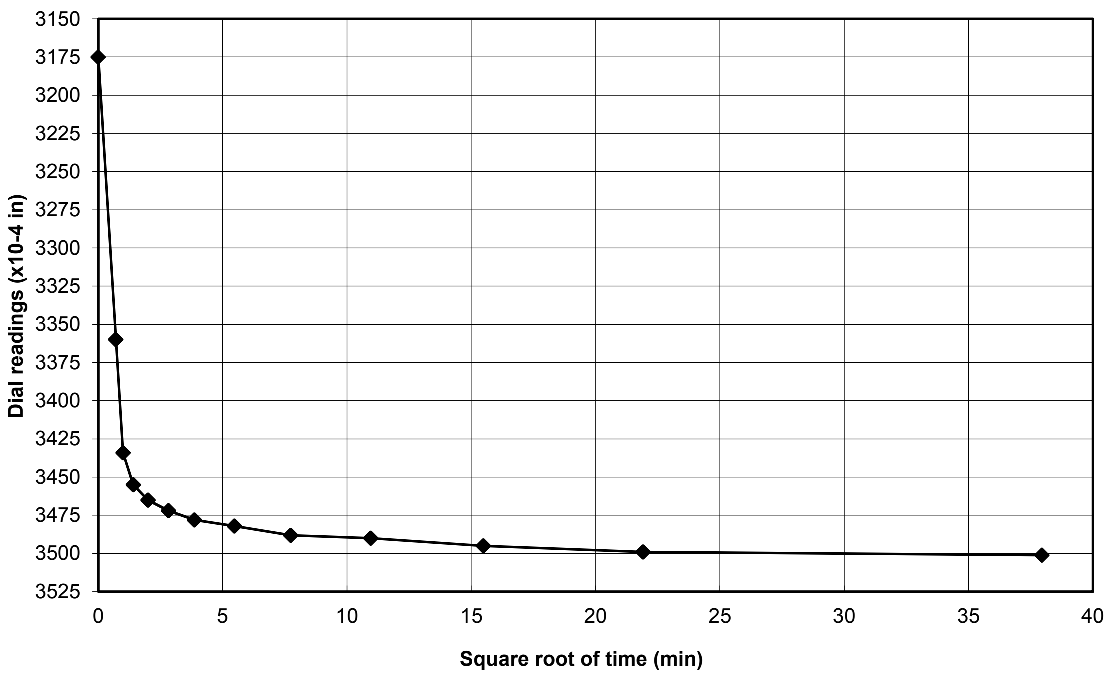


SWELL/COLLAPSE
(ASTM D4546)

Client:	JMD				
Project Name:	Hahamongna Watershed Park				
Location:.	Site 1 - Berkshire Drain				
Boring No.:	**B-1**	***Sample No.:***	3	***Depth:***	10'
Soil Description:	Light Olive Brown, Silty Sand (SM)				
Type of Sample:	Undisturbed Ring				

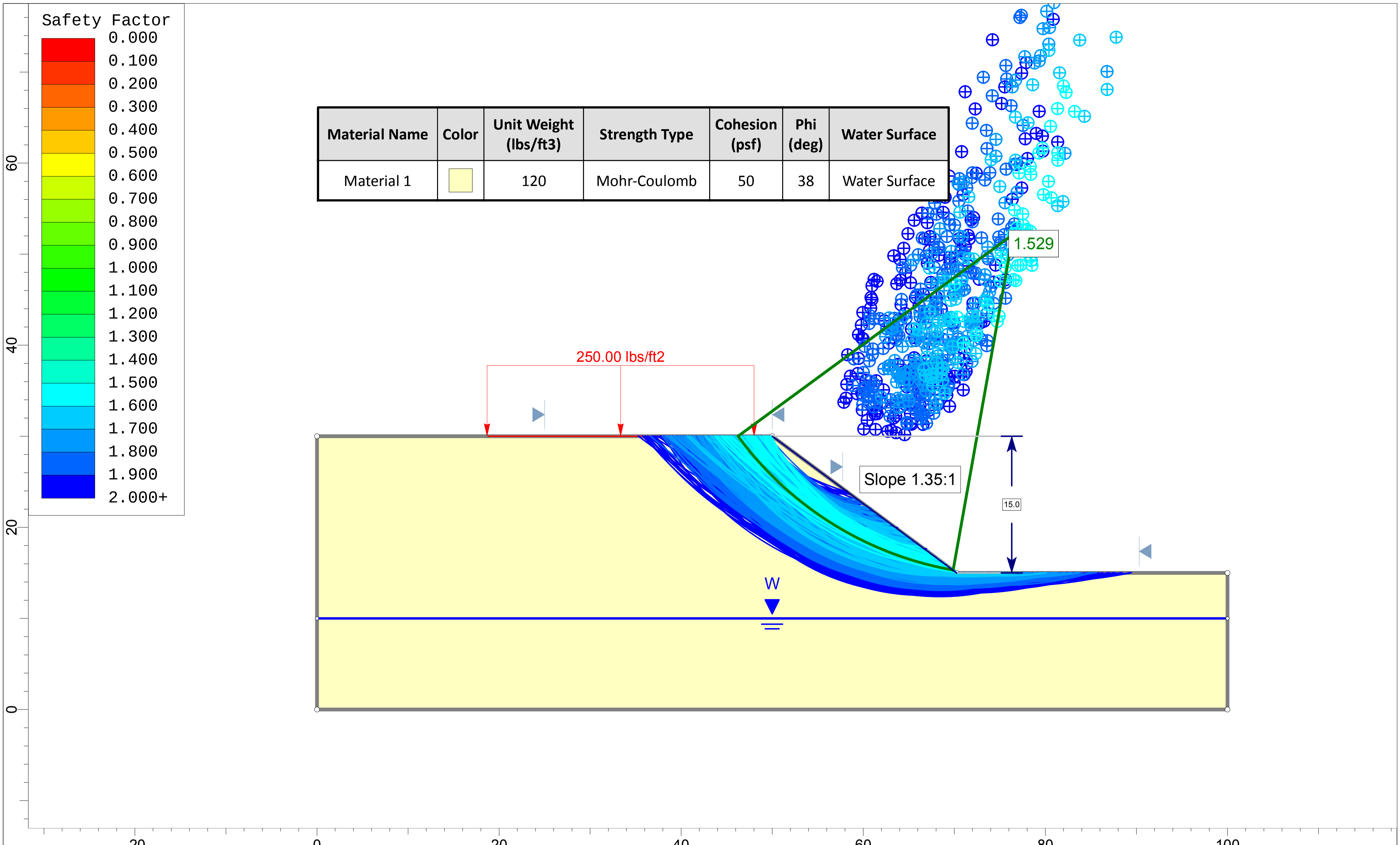
Load: **2.0 (ksf)**





APPENDIX C

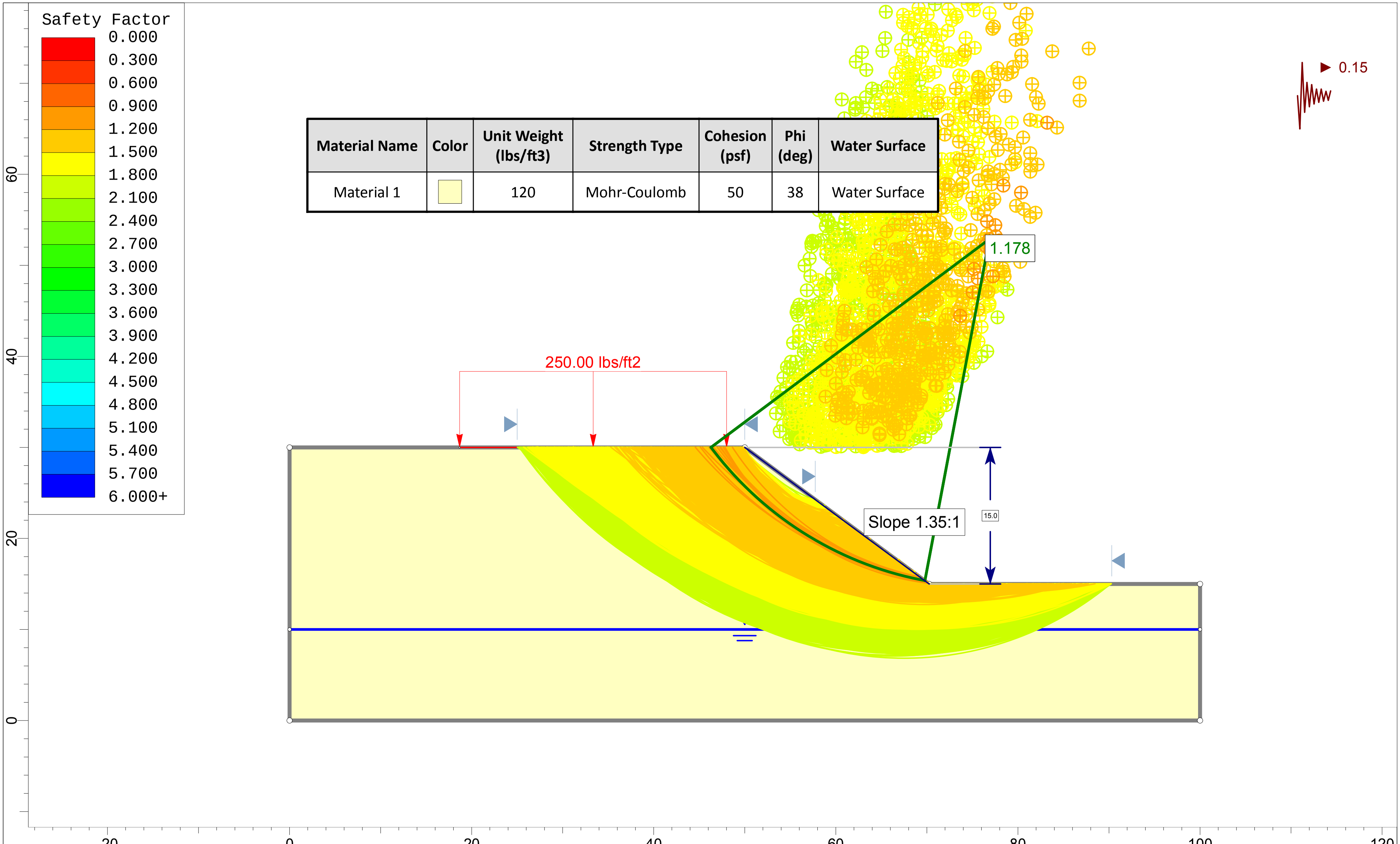
SLOPE STABILITY ANALYSIS RESULTS



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Material 1		120	Mohr-Coulomb	50	38	Water Surface

HUSHMAND ASSOCIATES, INC.
Geotechnical and Earthquake Engineers
SLIDEINTERPRET 6.036

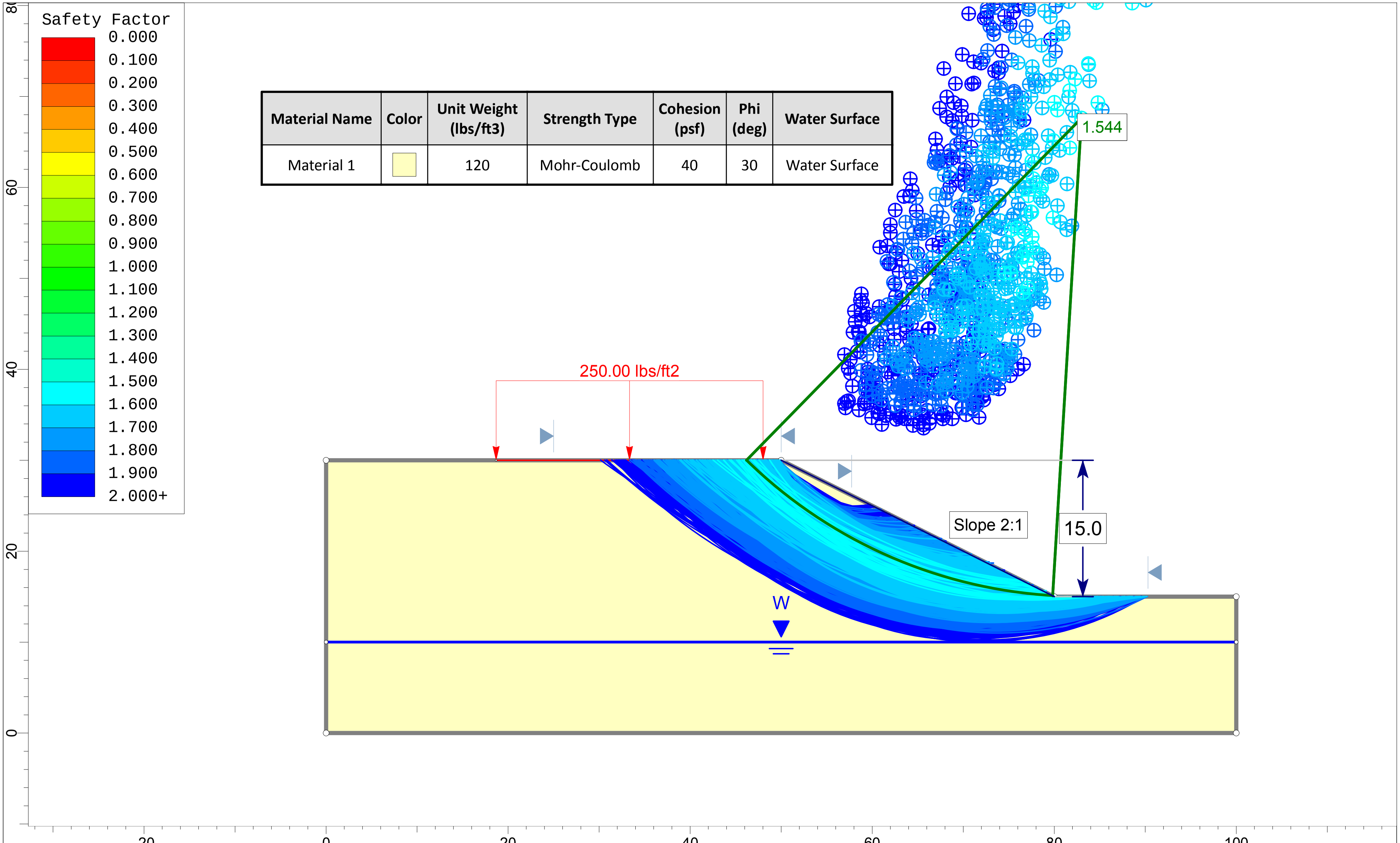
Project Hahamongna Watershed Park				*Project No.* JMD-16-001
Analysis Method Static		*Analysis Description* Site 1 - Berkshire Drain (Gabion Design)		
Analyzed By RN	*Unit*	*Scale* 1:175	*Date Analyzed*	*File Name* Sec 1 (15ft-36deg).slim



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Material 1		120	Mohr-Coulomb	50	38	Water Surface

HUSHMAND ASSOCIATES, INC.
Geotechnical and Earthquake Engineers
SLIDEINTERPRET 6.036

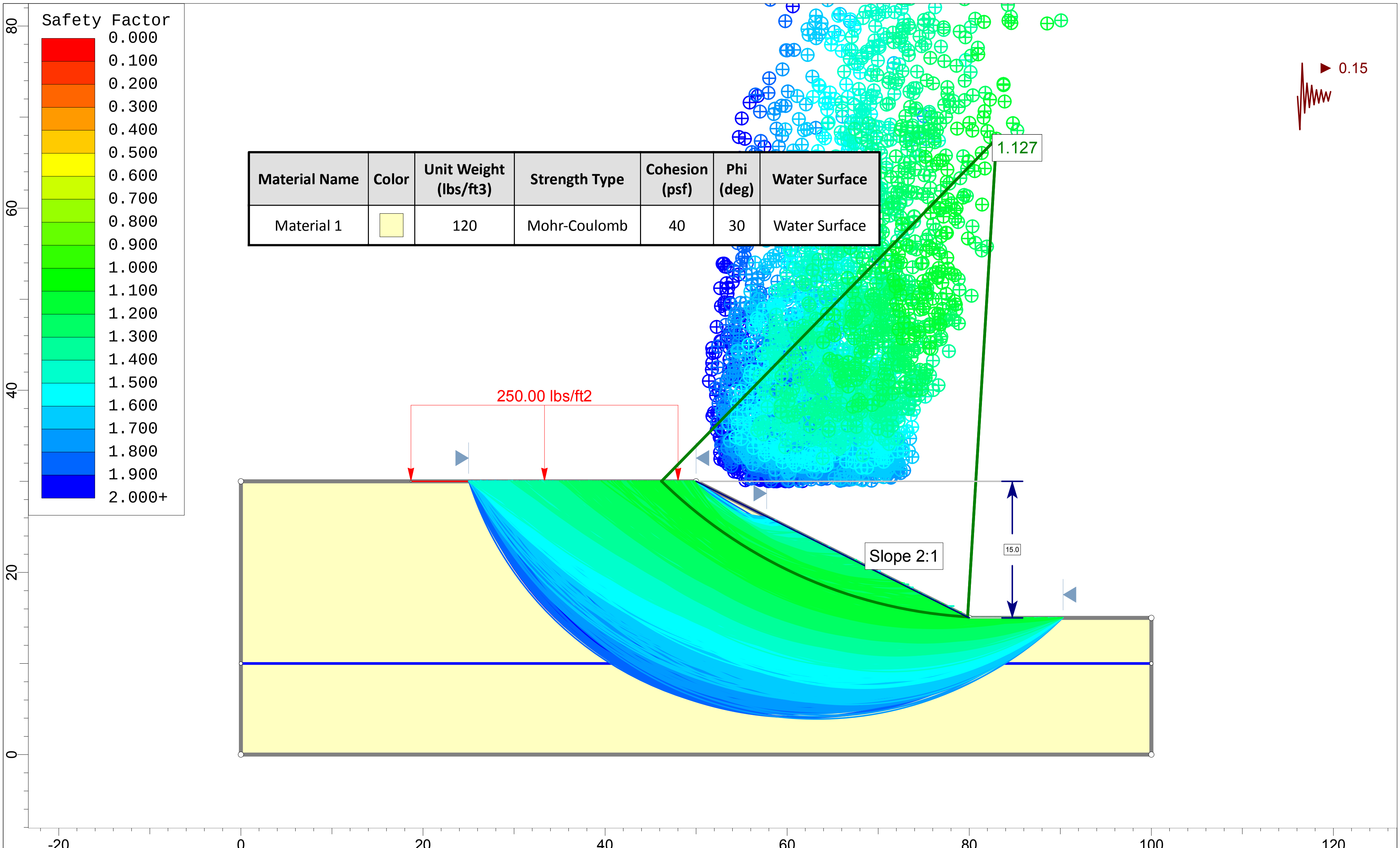
Project **Hahamongna Watershed Park**			*Project No.* **JMD-16-001**
Analysis Method **Pseudostatic**	*Analysis Description* **Site 1 - Berkshire Drain (Gabion Design)**		
Analyzed By **RN**	*Unit*	*Scale* **1:175**	*Date Analyzed*
File Name **Sec 1 (15ft-36deg)-p.slim**			



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Material 1		120	Mohr-Coulomb	40	30	Water Surface

HUSHMAND ASSOCIATES, INC.
Geotechnical and Earthquake Engineers
SLIDEINTERPRET 6.036

Project Hahamongna Watershed Park				*Project No.* JMD-16-001
Analysis Method Static		*Analysis Description* Site 1 - Berkshire Drain (Existing Trail Grade Raise)		
Analyzed By RN	*Unit*	*Scale* 1:175	*Date Analyzed*	*File Name* Sec 2 (15ft-26 deg).slim



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Material 1		120	Mohr-Coulomb	40	30	Water Surface

HUSHMAND ASSOCIATES, INC.
Geotechnical and Earthquake Engineers
SLIDEINTERPRET 6.036

Project: Hahamongna Watershed Park			Project No.: JMD-16-001
Analysis Method: Pseudostatic	Analysis Description: Site 1 - Berkshire Drain (Existing Trail Grade Raise)		
Analyzed By: RN	Unit:	Scale: 1:175	Date Analyzed:
File Name: Sec 2 (15ft-26 deg)-p.slim			

Appendix F

Noise Data

Construction Generated Noise

Building Type	Office, Hotel, Hospital, School, Public Works		Distance (ft)
Construction Noise at 50 Feet (dBA Leq)			50
Construction Phase	**All Applicable Equipment in Use[1]**	**Minimum Required Equipment in Use[1]**	
Ground Clearing/Demolition	84	84	
Excavation	89	79	
Foundation Construction	78	78	
Building Construction	87	75	
Finishing and Site Cleanup	89	75	

School West of the Project Site

Maximum Construction Noise (dBA Leq)			105
Construction Phase	**All Applicable Equipment in Use[1]**	**Minimum Required Equipment in Use[1]**	
Ground Clearing/Demolition	78	78	
Excavation (Site Preparation)	83	73	
Paving	83	69	
Average Construction Noise (dBA Leq)			235
Construction Phase	**All Applicable Equipment in Use[1]**	**Minimum Required Equipment in Use[1]**	
Ground Clearing/Demolition	71	71	
Excavation (Site Preparation)	76	66	
Paving	76	62	

Religious Use to the Northwest of the Project Site

Maximum Construction Noise (dBA Leq)			115
Construction Phase	**All Applicable Equipment in Use[1]**	**Minimum Required Equipment in Use[1]**	
Ground Clearing/Demolition	77	77	
Excavation (Site Preparation)	82	72	
Paving	82	68	
Average Construction Noise (dBA Leq)			205
Construction Phase	**All Applicable Equipment in Use[1]**	**Minimum Required Equipment in Use[1]**	
Ground Clearing/Demolition	72	72	
Excavation (Site Preparation)	77	67	
Paving	77	63	

Residential Uses to the South of the Project Site

Maximum Construction Noise (dBA Leq)			700
Construction Phase	**All Applicable Equipment in Use[1]**	**Minimum Required Equipment in Use[1]**	
Ground Clearing/Demolition	61	61	
Excavation (Site Preparation)	66	56	
Paving	66	52	
Average Construction Noise (dBA Leq)			1,400
Construction Phase	**All Applicable Equipment in Use[1]**	**Minimum Required Equipment in Use[1]**	
Ground Clearing/Demolition	55	55	
Excavation (Site Preparation)	60	50	
Paving	60	46	

Oak Grove Park

Maximum Construction Noise (dBA Leq)			100
Construction Phase	**All Applicable Equipment in Use[1]**	**Minimum Required Equipment in Use[1]**	
Ground Clearing/Demolition	78	78	
Excavation (Site Preparation)	83	73	
Paving	83	69	
Average Construction Noise (dBA Leq)			2,300
Construction Phase	**All Applicable Equipment in Use[1]**	**Minimum Required Equipment in Use[1]**	
Ground Clearing/Demolition	51	51	
Excavation (Site Preparation)	56	46	
Paving	56	42	

Source: Bolt, Beranek and Newman, "Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances," prepared for the USEPA, December 31, 1971. Based on analysis for Office Building, Hotel, Hospital, School, and Public Works.

Construction Generated Vibration

School West of the Project Site		Closest Distance (feet):	150
	Approximate RMS a Velocity at 25 ft,	Approximate RMS Velocity Level,	
Equipment	inch/second	inch/second	
Vibratory roller	0.21	0.01	
Small bulldozer	0.003	0.00	
Jackhammer	0.035	0.00	
Loaded trucks	0.076	0.01	
	Criteria	0.30	
Religious Use to the Northwest of the Project Site		Closest Distance (feet):	270
	Approximate RMS a Velocity at 25 ft,	Approximate RMS Velocity Level,	
Equipment	inch/second	inch/second	
Vibratory roller	0.21	0.01	
Small bulldozer	0.003	0.00	
Jackhammer	0.035	0.00	
Loaded trucks	0.076	0.00	
	Criteria	0.30	
Residential Uses to the South of the Project Site		Closest Distance (feet):	760
	Approximate RMS a Velocity at 25 ft,	Approximate RMS Velocity Level,	
Equipment	inch/second	inch/second	
Vibratory roller	0.21	0.00	
Small bulldozer	0.003	0.00	
Jackhammer	0.035	0.00	
Loaded trucks	0.076	0.00	
	Criteria	0.30	

Based on distance to nearest structure

[1.] Determined based on use of jackhammers or pneumatic hammers that may be used for pavement demolition at a distance of 25 feet

Notes: RMS velocity calculated from vibration level (VdB) using the reference of one microinch/second.

Source: Based on methodology from the United States Department of Transportation Federal Transit Administration, *Transit Noise and Vibration Impact Assessment* (2006).

Appendix G

Traffic Evaluation Memorandum

MEMORANDUM

To: Jillian Neary

From: Darlene Danehy, T.E., PTOE, RSP

Date: April 22, 2019

Subject: Berkshire Creek Area Improvements Project
Traffic Evaluation

Introduction

This memorandum provides an evaluation of construction traffic expected to be generated by the Berkshire Creek Area Improvements Project (Project). The Project will improve the ecological, hydrological, and recreational conditions throughout the lower third portion of Oak Grove Area but is not expected to generate any new permanent trips. Because the Project is not expected to result in a change in the permanent trip generation of the site, a traffic analysis is not required. However, this memorandum provides a discussion of the anticipated construction traffic generated by the Project as well as how it relates to the nearby County of Los Angeles Public Works (Public Works) Devil's Gate Reservoir Restoration project. Figure 1 shows the project area as well as the anticipated access points for this Project and the Devil's Gate project.

Project Construction Traffic

Construction Trip Generation

The Project is expected to include activities at Berkshire Creek, the equestrian picnic area and trail connection, Sunrise Overlook, and oak woodland areas throughout the Project site. Each Project activity is expected to include truck trips and worker trips, and each has a specified duration. It was also assumed that an initial delivery of materials would occur on the first work day, assumed to occur in Fall 2019. On each work day, construction activities are expected to occur during an eight hour period. It was assumed that truck trips would be evenly spaced throughout the workday, and that all workers would arrive during the same hour in the morning and would depart in the same hour in the afternoon/evening. Table 1 shows the total construction trips anticipated for the Project along with the duration of each activity.

Although the various components of the Project are expected to begin at different times, this evaluation is based on a conservative assumption that each component, along with the initial materials delivery, would begin on the same date. Table 2 shows the peak day construction traffic along with the peak hour (on the peak day) construction traffic. As seen in the table, this conservative assumption would result in 99 daily construction trips, including 33 in the peak hour. It should be noted that the peak construction traffic volumes would occur for a few work days, at most. For the majority of the Project, the only daily traffic would be generated by the workers (approximately 50 total trips per day).

Figure 1. Site Plan

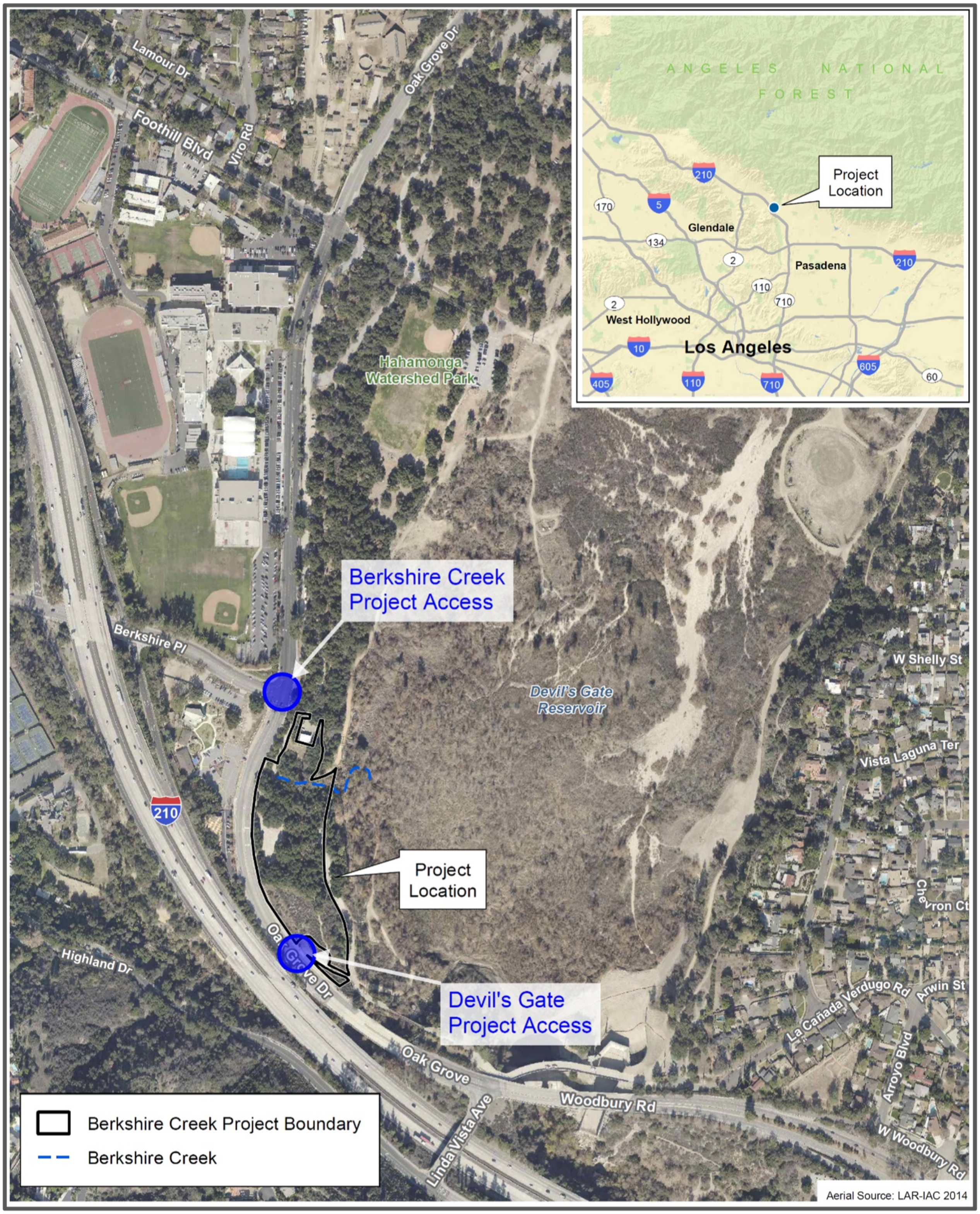


Table 1. Total Construction Trips

Components	Activity	Total Trips	Work Days	Daily Trips	Peak Hour Trips
Berkshire Creek	Demolition	42	2	21	3
	Install storm water infrastructure, place fill	152	30	6	1
	Road Paving	12	1	12	2
	Construction Worker Trips - Per Day Rates Only			16	8
Equestrian Picnic Area and Trail Connection	Demolition	36	2	18	3
	Reconstruction	90	4	23	3
	Construction Worker Trips - Per Day Rates Only			10	5
Oak Woodland and Coastal Sage Scrub Restoration	Habitat Restoration	Negligible			
	Construction Worker Trips - Per Day Rates Only			24	12
Initial Materials Delivery		10	1	10	2

Table 2. Peak Day Construction Trips

Components	Activity	Total Trips	Work Days	Daily Trips	Peak Hour Trips
Berkshire Creek	Demolition	42	2	21	3
	Construction Worker Trips - Per Day Rates Only			16	8
Equestrian Picnic Area and Trail Connection	Demolition	36	2	18	3
	Construction Worker Trips - Per Day Rates Only			10	5
Oak Woodland and Coastal Sage Scrub Restoration	Construction Worker Trips - Per Day Rates Only			24	12
Initial Materials Delivery		10	1	10	2
			PEAK DAY	**99**	**33**

Per the Pasadena Department of Transportation's *Transportation Impact Analysis Current Practice and Guidelines (2015)*, any project which is expected to generate fewer than 300 new permanent daily trips is considered exempt, is not expected to generate any impacts, and does not require a full traffic analysis. Therefore, even with conservative assumptions about construction traffic for this Project, it is not expected to have a significant traffic impact. The City does not require analysis of construction traffic.

<u>*Construction Trip Distribution*</u>
Construction debris and soil will be disposed at Scholl Canyon Landfill, approximately eight miles from the Project site. As shown in Figure 1, both worker and truck traffic for this Project is expected to access the site from Oak Grove Drive at the intersection with Berkshire Place. Trucks have access to Interstate 210 less than 1,000 feet from the park access location, so no construction truck trips are expected to travel through any residential areas near the Project.

Cumulative Conditions
The City of Pasadena does not require evaluation of construction traffic. However, the Devil's Gate project construction traffic is included in this evaluation for reference, with information taken from the *Devil's Gate Reservoir Sediment Removal and Management Project Final Environmental Impact Report* (Chambers Group, October 2014), the *Recirculated Portions of the Final Environmental Impact Report and Mitigation Monitoring and Reporting Program for Devil's Gate Reservoir Sediment Removal and Management Project* (ECORP Consulting, Inc., July 2017), and the *Devil's Gate Reservoir Sediment Removal and Management Project Reduced Sediment Removal Alternative Environmental Review* (ECORP Consulting, Inc., November 2017). Per those documents, the Devil's Gate project will be accessed from Oak Grove Drive and the truck haul routes have been laid out to avoid residential areas; steps have also been taken for truck trips to avoid La Cañada High School during school drop off hours to minimize impacts. However, even with the mitigation measures proposed in the EIR, the Devil's Gate project is expected to have temporary significant and unavoidable impacts at five intersections, including two which are expected to be used by the Berkshire Creek Project (Berkshire Place/I-210 eastbound ramps and Figueroa Street/Scholl Canyon Road/I-134 westbound ramps).

As previously discussed, the Devil's Gate Reservoir Restoration project is expected to occur concurrently with the Berkshire Creek Area Improvements Project. The Devil's Gate project is expected to generate a maximum of approximately 425 truck trips each day. Therefore, the combination of the Devil's Gate and Berkshire Creek projects is expected to generate approximately 525 daily trips on the peak days of the Berkshire Creek construction traffic. For the majority of the Project, the cumulative Project and Devil's Gate traffic volumes would be approximately 475 daily trips.

Although this Project would contribute traffic to intersections which are expected to have a significant impact from the Devil's Gate project, the trips for both projects are temporary. Further, the Berkshire Creek Project would only contribute truck traffic to those locations for a few work days; recall that for much of the Project duration, the off-site trips would be mostly/all worker trips (not truck trips). Once both projects are complete, the temporary traffic impacts will cease. Therefore, the traffic impact for this Project can be considered less than significant.

Conclusion
As outlined in this memorandum, the Berkshire Creek Area Improvements Project is not expected to generate any new permanent traffic. Further, a conservative estimate of the construction traffic indicates that the Project will generate 99 trips on the peak day, far below the City of Pasadena threshold for requiring a traffic analysis. Therefore, the Project is expected to have a less than significant traffic impact.