Initial Study and Mitigated Negative Declaration

Explorer Well Project

Prepared for
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TABLE OF CONTENTS

TABLES

EXHIBITS

APPENDICES

Appendix

SECTION 1.0 INTRODUCTION

1.1 PURPOSE OF INITIAL STUDY/MITIGATED NEGATIVE DECLARATION

The California Environmental Quality Act (CEQA) (*California Public Resources Code* §21000 et seq.) and the State CEQA Guidelines (*California Code of Regulations,* Title 14, §15000 et seq.) require that local government agencies, prior to taking action on projects requiring discretionary approval, consider the environmental consequences of such projects. In accordance with CEQA, this Initial Study (IS) has been prepared as documentation to support a Mitigated Negative Declaration (MND) for the Explorer Well Project (hereinafter referred to as the "Project") proposed by the City of Pasadena (City). This IS/MND includes a description of the Project; the location of the Project site; an evaluation of the potential environmental impacts of Project implementation; and recommended mitigation measures to lessen or avoid impacts on the environment.

Pursuant to Section 15367 of the State CEQA Guidelines, the City is the Lead Agency for the Project. This Project is being implemented under a partnership between the City and the National Aeronautics and Space Administration's (NASA) Jet Propulsion Laboratory (JPL) campus. However, the City is the Lead Agency, as it has the principal responsibility for carrying out the Project and has the authority for approving the Project and its accompanying environmental documentation.

In addition to addressing the potential environmental impacts that would result from the Project, this IS/MND serves as the primary environmental document for future activities associated with the Project, including discretionary approvals requested or required for Project implementation. The Project proposes to install a new extraction well to enhance the removal of contaminants from the groundwater. Pasadena Water and Power (PWP) operates four existing water production wells associated with a contaminant plume cleanup as part of the Monk Hill Treatment System (MHTS). Adding a fifth well will further reduce levels of perchlorate and volatile organic compounds (VOCs) in the groundwater plume that originated from historic operations at JPL.

As part of the evaluation of potential environmental impacts associated with Project implementation, the IS/MND identifies regulatory requirements (RR) applicable to the Project and sets forth mitigation measures (MM) that would lessen or avoid significant impacts on the environment. The IS/MND concludes that, while implementation of the Project would have environmental impacts, MMs have been incorporated that would reduce all identified impacts to levels considered less than significant (Section 15070 of the State CEQA Guidelines). Therefore, an MND is the appropriate CEQA documentation. The reader is referred to the full text of this IS/MND and the technical appendices for a complete discussion and analysis of the Project's potential environmental effects.

As the Lead Agency, the City has commissioned the preparation of this IS/MND and has reviewed and revised, as necessary, all submitted drafts and technical studies to reflect its independent judgment, including reliance on City staff for the review of all technical subconsultant reports. Data for this IS/MND was obtained from on-site field observations; discussions with affected agencies; review of available technical studies, reports, guidelines, and data; and review of specialized environmental assessments prepared for the Project.

1.2 PROJECT SUMMARY

The Project proposes the construction and operation of two primary components as noted below.

1. **Explorer Well:** The Explorer Well would be constructed to draw groundwater that is contaminated with perchlorate and VOCs from the aquifer. The water would be pumped from the Explorer Well to the Monk Hill Water Treatment Plant (MHWTP) for treatment.
2. **Pipeline:** A 12-inch raw water pipeline would be constructed that would connect the Explorer Well to the MHTS. The Project would also include a tee on the pipeline that would outlet water that is produced during the well startup process into an existing spreading basin to the west of Arroyo Well.

1.3 SUMMARY OF ENVIRONMENTAL IMPACTS

The Project would have no impacts related to agriculture and forest resources.

The Project would have less than significant impacts related to aesthetics; air quality; energy; greenhouse gas emissions; hydrology and water quality; land use and planning; mineral resources; population and housing; public services; recreation; transportation; utilities and service systems; and wildfire.

The Project would have less than significant impacts with implementation of mitigation measures related to biological resources; cultural resources; geology and soils; hazards and hazardous materials; noise; and tribal cultural resources.

The following regulatory requirements and mitigation measures would be implemented by the Project.

Air Quality

RR AQ-1 Construction activities must be conducted in compliance with the South Coast Air Quality Management District's (SCAQMD's) Rule 403, Fugitive Dust, which requires the implementation of best available control measures (BACM) for any activity or man-made condition capable of generating fugitive dust including, but not limited to, earth-moving activities, construction/demolition activities, disturbed surface area, or heavy- and light-duty vehicular movement. The BACMs include stabilizing soil; watering surface soils and crushed materials; covering hauls or providing freeboard; preventing track-out; and limiting vehicle speeds and wind barriers, among others.

RR AQ-2 In accordance with the City's Climate Action Plan, construction equipment and vehicles are required to limit idling times to no more than three consecutive minutes.

Biological Resources

MM BIO-1 Prior to the start of construction of the Explorer Well portion of the Project, an exclusionary fence shall be installed to prevent coastal whiptail from entering the work area. The fence shall be installed along the eastern edge of the project disturbance limits at the Explorer Well, which is located at the toe of the vegetated slope. The exclusionary fencing shall consist of silt fencing, buried six inches deep where feasible and installed with no gaps in the fencing. Fencing shall be installed

under the supervision of a qualified Biologist to ensure that wildlife are not impacted during installation of the fence. Exclusionary fencing shall be maintained throughout construction of the Explorer Well and shall be removed upon completion of the Explorer Well construction activities.

MM BIO-2 If feasible, project construction shall be conducted between September 16 and January 31, which is outside the bird nesting season. Construction conducted within this period shall be considered in compliance with the conditions set forth in the Migratory Bird Treaty Act (MBTA) and *California Fish and Game Code* with methods approved by the U.S. Fish and Wildlife Service (USFWS) and California Department of Fish and Wildlife (CDFW) to protect active bird and raptor nests. If the nature of the proposed construction activities requires that work be conducted during the breeding season for nesting birds (March 15–September 15) or nesting raptors (February 1–June 30), to avoid direct impacts on active nests, a pre-construction survey shall be conducted by a qualified Biologist for nesting birds and/or raptors within 3 days prior to any construction or disturbance activities (i.e., within 300 feet for nesting birds and within 500 feet for nesting raptors). If the Biologist does not find any active nests within or immediately adjacent to the impact area, the construction work shall be allowed to proceed. If a lapse of more than three days occurs between outdoor disturbance activities, the nesting bird survey will need to be repeated as nesting activities may potentially occur in that time frame. Results of the surveys will be provided to the City and to CDFW.

If the Biologist finds an active nest within or immediately adjacent to the construction area and determines that the nest may be impacted or breeding activities substantially disrupted, the Biologist shall delineate an appropriate buffer zone (at a minimum of 25 feet) around the nest depending on the sensitivity of the species and the nature of the construction activity. Any nest found during survey efforts shall be mapped on the construction plans. The active nest shall be protected until nesting activity has ended. To protect any nest site, the following restrictions to construction activities shall be required until nests are no longer active, as determined by a qualified Biologist: (1) clearing limits shall be established within a buffer around any occupied nest (the buffer shall be 25–100 feet for nesting birds and 300–500 feet for nesting raptors), unless otherwise determined by a qualified Biologist and (2) access and surveying shall be restricted within the buffer of any occupied nest, unless otherwise determined by a qualified Biologist. Encroachment into the buffer area around a known nest shall only be allowed if the Biologist determines that the proposed activity would not disturb the nest occupants. Construction can proceed when the qualified Biologist has determined that fledglings have left the nest or the nest has failed.

Cultural Resources

RR CUL-1 If human remains are encountered during excavation activities, all work is required to halt in the immediate vicinity of the discovery and the County Coroner must be notified (*California Public Resources Code* §5097.98). The Coroner is required to determine whether the remains are of forensic interest. If the Coroner, with the aid of an archaeologist, determines that the remains are prehistoric, they are required to contact the Native American Heritage Commission (NAHC). The NAHC is responsible for designating the most likely descendant (MLD), who is responsible for the ultimate disposition of the remains, as required by Section 7050.5 of the *California Health and Safety Code.* The MLD is required to make their recommendation within 48 hours of being granted access to the site. The MLD's

recommendation is required to be followed, if determined by the landowner to be feasible, and may include scientific removal and non-destructive analysis of the human remains and any items associated with Native American burials (*California Health and Safety Code* §7050.5). If the landowner rejects the MLD's recommendations, at a minimum the landowner is required to rebury the remains with appropriate dignity on the property in a location that will not be subject to further subsurface disturbance (*California Public Resources Code* §5097.98).

MM CUL-1 Prior to commencement of earthmoving activities, the City shall retain a qualified Archaeologist meeting the Secretary of the Interior's Professional Qualification Standards for Archaeology. The Archaeologist shall be present at the pre-grade conference; shall establish procedures for archaeological resource surveillance; and shall establish, in cooperation with the Contractor, procedures for temporarily halting or redirecting work to permit the sampling, identification, and evaluation of the artifacts, as appropriate. At a minimum, in the event archaeological resources are exposed during construction activities, all construction work occurring within 100 feet of the find shall immediately stop until a qualified archaeologist can evaluate the significance of the find and determine whether additional study is warranted. The Archaeologist shall first determine whether it is a "unique archaeological resource" pursuant to the California Environmental Quality Act (CEQA, i.e., Section 21083.2[g] of the California Public Resources Code) or a "historical resource" pursuant to Section 15064.5(a) of the State CEQA Guidelines. If the archaeological resource is determined to be a "unique archaeological resource" or a "historical resource", the Archaeologist shall formulate a mitigation plan in consultation with the City of Pasadena that satisfies the requirements of the above-referenced sections. The Archaeologist shall prepare a report of the results of any study prepared as part of a testing or mitigation plan, following guidelines of the California Office of Historic Preservation, and they shall record the site and submit the recordation form to the City of Pasadena and the California Historic Resources Information System (CHRIS) at the South Central Coastal Information Center (SCCIC) at California State University, Fullerton. Work may proceed in other areas of the site, subject to the direction of the Archaeologist.

Geology and Soils

RR GEO-1 Grading, excavation, and construction is required to comply with the City's Building Code (Title 14 of the Pasadena Municipal Code, which incorporates the California Building Code), as they relate to site preparation and construction; alteration; moving; demolition; repair; use and occupancy of buildings; structures and building service equipment within the City. The California Building Code requires the preparation of engineering geologic reports, supplemental ground-response reports, and/or geotechnical reports for all new construction; new structures on existing sites; and alterations to existing buildings. It also includes seismic design criteria and requirements for use in the structural design of buildings (i.e., based on seismic hazard maps and the seismic design category) and specifies building components that require special seismic certification.

MM GEO-1 Prior to commencement of earthmoving activities, the City shall retain a qualified Paleontologist, for on-call services in the event of a discovery of paleontologically sensitive rock formations (i.e., Quaternary older alluvial sediments) during ground disturbance activities. The Paleontologist shall be present at the pre-grade conference; and shall establish, in cooperation with the Contractor, procedures for temporarily halting or redirecting work to permit the sampling, identification, and

evaluation of any discovered paleontological resources. Should these resources be found during ground-disturbing activities for the Project, the Paleontologist shall first determine whether it is a significant paleontologically sensitive fossil locality or rock formation. If the above-mentioned resources are found during earthmoving activities, the Paleontologist shall formulate a report and a mitigation plan in consultation with the City of Pasadena. For paleontological resources, the disposition of the resources shall be subject to approval by the City. All recovered paleontologically sensitive fossils and rock formations shall be deposited in an accredited institution or museum, such as the Natural History Museum of Los Angeles County. If resources are discovered, work may proceed in other areas of the Project site, subject to the direction of the Paleontologist.

Hazards and Hazardous Materials

RR HAZ-1 Construction activities are required to comply with existing federal, State, and local regulations regarding hazardous material use, storage, disposal, and transport to prevent risks to public health and safety, including but not limited to regulations set forth by the U.S. Environmental Protection Agency; U.S. Department of Transportation (CFR Title 49, Hazardous Materials Transportation Act; and Title 40 261.31, 261.21, and 261.24); Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (40 CFR parts 300, 311, 355, 370, and 373); Resource Conservation and Recovery Act (RCRA) (40 CFR parts 240-299); Toxic Substances Control Act (40 CFR parts 745, 761 and 763); California Department of Toxic Substances Control (DTSC); California Department of Transportation (Caltrans) ; California Division of Drinking Water; and the California Occupational Safety and Health Administration (CalOSHA). All onsite generated waste during both construction and operation that meets hazardous waste criteria will be stored, manifested, transported, and disposed of in accordance with applicable regulations and in a manner to the satisfaction of the local Certified Unified Program Agency (CUPA).

MM HAZ-1 During the drilling of the Explorer Well, the drill cuttings and mud shall be placed directly into California Department of Transportation-approved soil bins and the bins would be temporarily stored on site. Waste samples from these containers shall be analyzed for the “medium-specific parameters” presented in the Sampling and Analysis Plan in NASA’s 2009 Final Remedial Design/Remedial Action (RD/RA) Work Plan, prepared in accordance with CERCLA requirements. Based on the laboratory results, the waste shall be classified as hazardous or non-hazardous and waste profiles and manifests for the waste shall be prepared. The City shall coordinate with NASA to ensure the selection of a U.S. Environmental Protection Agency (EPA)-certified waste disposal facility and a licensed transporter to haul off the waste.

MM HAZ-2 During all earthmoving and construction activities, the City shall require the Contractors to implement the following measures:

- Trucks and equipment entering the site shall be inspected to be free from oil, gasoline, or other vehicle fluid leaks.
- Equipment fueling areas shall be located outside of the spreading basins and any jurisdictional waters as identified by the United States Army Corps of Engineers (USACE) and the California Department of Fish and Wildlife (CDFW).

- Any hazardous material spills and/or contaminated soils shall be excavated immediately upon discovery and tested prior to disposal to ensure proper handling and transport in compliance with applicable federal, State, and local regulations governing the handling of hazardous materials.
- The Contractor shall maintain hazardous materials spill control, containment, and cleanup kits of adequate size and materials for potential accidental spills and releases.

Hydrology and Water Quality

RR HYD-1 The Explorer Well would be operated in compliance with Section 64560 of the California Code of Regulations, which provides requirements associated with installation of new drinking water production wells and is administered by the California Division of Drinking Water (DDW). The new well must also comply with DDW-specified minimum horizontal distances to sanitary hazards. Additionally, the proposed well is required to comply with the community water system well requirements in the California Department of Water Resources Bulletins 74-81 and 74-90 and the American Water Works Associated Standard A100-06 (Water Wells).

RR HYD-2 The Project is required to comply with the Statewide National Pollutant Discharge Elimination System (NPDES) Permit for Drinking Water System Discharges to Waters of the United States (Order WQ 2014-0194-DWQ, General Order No. CAG14001).

Noise

RR NOI-1 In accordance with Section 9.36.080 of the City of Pasadena Municipal Code, 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 A-weighted decibels (dBA) when measured within a radius of 100 feet from such equipment.

MM NOI-1 The Construction Contractor shall implement the following noise reduction measures during all construction activities:

a. All stationary or mobile construction equipment shall be equipped with properly operating and maintained mufflers and engine enclosures, compliant with or exceeding manufacturers' standards.

b. All construction equipment engine enclosures and covers, as provided by manufacturers, shall be in place during construction activities.

c. All construction equipment shall be shut down when not in use. Construction equipment shall not be allowed to idle for more than 3 minutes.

d. During Project construction, export of drill cuttings via trucks shall be limited to the hours of 7 AM through 7 PM.

e. For nighttime activities, construction-standard high-pitch backup alarms for construction equipment and vehicles shall not be used during construction of the Project. Construction equipment and vehicles shall use low-impact backup alarms, including, but not limited to, the following: manually adjustable alarms, self-adjusting alarms, and broadband (white noise)

alarms. These alarms shall conform to the safety requirements established by the Occupational Safety and Health Administration (OSHA).

MM NOI-2 During nighttime construction activity (i.e., from 7 PM to 7 AM), the Construction Contractor shall ensure that the following best management practices for sound barriers are implemented:

a. Sound barrier enclosures of a minimum height of 12 feet shall enclose all stationary equipment sources of noise on four sides. These enclosures shall be constructed of either ¾-inch plywood or greater thickness or sound blankets with a minimum sound transmission class (STC) rating of 25 and cover all sides as well as the top of the equipment. Minimal gaps in the enclosure are acceptable to ensure adequate air intake, exhaust ventilation, and heat dissipation for proper equipment functioning.

b. Temporary sediment settling tanks (i.e., Baker tanks) shall be strategically placed between the circulation tank motor and the nearest residential use.

MM NOI-3 Prior to commencement of nighttime Project construction, the City of Pasadena shall establish a designated phone hotline and email address for Project-related information and complaints from the surrounding neighborhood. The City shall designate a Noise Complaint Manager to monitor this phone hotline and email. Fliers or posters must be posted and visible at the Project boundary at least one week prior to commencement of nighttime construction activity and continue throughout the nighttime construction duration. These posters must provide the following information: nighttime construction duration and other related details and contact information for the phone hotline and email address.

MM NOI-4 Prior to commencement of nighttime construction activities, the City shall retain a Noise Monitor to monitor noise levels during nighttime construction activities (i.e., from 7 PM to 7 AM). The Noise Monitor shall monitor and record noise at the property line for the nearest residential uses (west and east of the Project site) to ensure that noise levels from the Project construction site do not exceed 50 A-weighted decibels (dBA) at night. If Project-related noise levels exceed 50 dBA during nighttime activities, additional noise reduction measures shall be implemented to further reduce construction noise at the Project site to a level at or below 50 dBA, such as additional vertical and horizontal sound barriers.

MM NOI-5 Once the Project is operational, the City of Pasadena shall conduct a post-construction noise survey to ensure the operation of the well equipment is compliant with the City's noise ordinances.

Public Services

RR PS-1 The Project shall be designed and constructed in accordance with the Pasadena Fire Prevention Code (Chapter 14.28 of the City's Municipal Code), which adopts the California Fire Code with changes and additions to the adopted code.

Transportation

RR TRA-1 Construction activities will be conducted in accordance with the Standard Specifications for Public Works Construction (Greenbook) and the City's Supplements and Modifications to the Greenbook to maintain access to all parcels in and near the construction sites. This includes notification of residents and

businesses affected by the road work; utility agencies with facilities in the area; the Pasadena Fire and Police Departments; and other emergency service providers. The Greenbook also requires that access be made available at the end of each workday.

RR TRA-2 Temporary traffic control devices and methods used during construction are required to conform to the requirements of the latest edition of the Manual on Uniform Traffic Control Devices (MUTCD) and the California Supplement to the MUTCD. The contractor shall provide traffic tapers, traffic control devices, barricading, and signs necessary to ensure driver awareness and safety in construction areas and to assist fire and law enforcement personnel.

Tribal Cultural Resources

MM TCR-1 **Retain a Native American Monitor Prior to Commencement of Ground Disturbing Activities**: Prior to commencement of ground-disturbing activities, the City of Pasadena (City) shall retain a Native American Monitor (NAM) from or approved by the Gabrieleno Band of Mission Indians – Kizh Nation (the "Tribe" or "Kizh") to observe ground-disturbing activities, which may include, but are not limited to, pavement removal, pot-holing or augering, grubbing, tree removals, boring, grading, excavation, drilling, and trenching, within the Project site. Monitoring by the NAM is only to occur onsite when well drilling is scheduled within 50 feet below the ground surface (bgs) and is not to exceed five consecutive working days. The NAM shall complete daily monitoring logs providing descriptions of the day's activities including construction activities, locations, soil, and any cultural materials identified. All discovered tribal cultural resources found during ground-disturbing activities for the Project within 50 feet bgs, shall be temporarily curated in a secure location on site by the Project Archaeologist (refer to MM-CUL-1). If removal of artifacts from the Project site is necessary, each artifact shall be catalogued by the Project Archaeologist, and an inventory will be provided to the NAM upon each addition.

Additionally, a tribal cultural specialist from the Kizh Nation will assess the significance of any Tribal Cultural Resource (TCR) under Assembly Bill 52 of the California Environmental Quality Act (CEQA). While there is significant overlap between archaeological resources and Tribal Cultural Resource, they are different protected resources under CEQA. Provenience is important for determining "significance" for an archaeological resource in order to establish whether it meets the California Register of Historical Resources eligibility criteria, however the same is not true for TCRs. The objects, features, sites, sacred spaces, and landscapes are cosmologically considered living things and are considered significant to the descendants of those People that left them behind. Therefore, both levels of significance assessments shall be made by both an archaeologist and the Kizh tribal monitor.

Following the completion of the Project, all tribal cultural resources shall be returned to the Tribe. Following a discovery, at the completion of all ground-disturbing activities, the Project Archaeologist shall formulate a Monitoring Report (refer to MM CUL-1) and submit said report to the City of Pasadena and the South-Central Coastal Information Center (SCCIC) located at California State University, Fullerton and the Gabrieleño Band of Mission Indians-Kizh Nation Tribal Government. The report will document all monitoring efforts and involvement of the NAM. The report shall be completed within 60 days of conclusion of all Project

ground-disturbing activities. The disposition of the resources shall be subject to review and approval by the City. If tribal cultural resources are discovered, work may proceed in other areas of the site, subject to the direction of the Project Archaeologist or NAM.

MM TCR-2 **Unanticipated Discovery of Tribal Cultural Resource Objects (Non-Funerary/Non-Ceremonial)**: Upon discovery of a tribal cultural resource within the Project site during Project construction, all construction activities shall cease in the immediate vicinity of the discovery (not less than the surrounding 50 feet) and shall not resume until the find can be assessed. All tribal cultural resources unearthed by Project activities shall be evaluated by the Project Archaeologist and the NAM. If the resources are Native American in origin, the consulting tribe will retain it/them in the form and/or manner the tribe deems appropriate, for educational, cultural, and/or historic purposes.

MM TCR-3 **Unanticipated Discovery of Native American Human Remains and Associated Funerary or Ceremonial Objects:** If human remains and/or grave goods are discovered or recognized at the project sites, all ground disturbance shall immediately cease, and the county coroner shall be notified per Public Resources Code Section 5097.98, and Health & Safety Code Section 7050.5. Human remains and grave/burial goods shall be treated alike per California Public Resources Code section 5097.98(d)(1) and (2). Work may continue in other parts of the project sites while evaluation and, if necessary, mitigation takes place (CEQA Guidelines Section 15064.5[f]). Preservation in place (i.e., avoidance) is the preferred manner of treatment for human remains and/or burial goods. If preservation in place is not feasible, treatment may include implementation of archaeological data recovery excavations to remove the resource along with subsequent laboratory processing and analysis. Any discovery of human remains/burial goods that are Native American in origin shall be kept confidential to prevent further disturbance.

Utilities and Service Systems

RR UTIL-1 The Contractor is required to comply with the City's Construction and Demolition Waste Management Ordinance (Chapter 8.62 of the Pasadena Municipal Code), which requires preparation and implementation of a Waste Management Plan that shows how at least 75 percent of construction and demolition debris would be diverted away from landfills. The Waste Management Plan is subject to City approval prior to the start of construction activities, and the Contractor shall provide monthly reports to demonstrate compliance during the construction phase.

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SECTION 2.0 ENVIRONMENTAL SETTING

2.1 PROJECT LOCATION

The Project site is in the City of Pasadena on land owned by the City in the Hahamongna Watershed of the Arroyo Seco, a 24.9-mile-long tributary to the Los Angeles River. The Project site is located approximately 200 feet east of the Arroyo Seco, approximately 215 feet west of properties that are within unincorporated Los Angeles County, and approximately 520 feet east of the JPL property, which is located at 4800 Oak Grove Drive in Pasadena. The Project site is located on and near the former JPL East Parking Lot, which was removed by NASA in 2015 as part of a separate project. The Project site's location is depicted on Exhibit 2-1, Regional Location Map and Exhibit 2-2, Aerial Photograph.

The Project site can be accessed via Interstate 210 freeway (I-210) by exiting Windsor Avenue and traveling northward for approximately 0.9 miles to its intersection with Ventura Street. From this intersection, the Project site is accessed by traveling approximately 0.5 miles along the northbound Explorer Road, which then continues to the east entrance of the JPL campus. A portion of the Project is also located along Explorer Road and its intersection with Karl Johnson Parkway, a gated access road, approximately a quarter of a mile north of the Windsor Avenue and Ventura Street intersection.

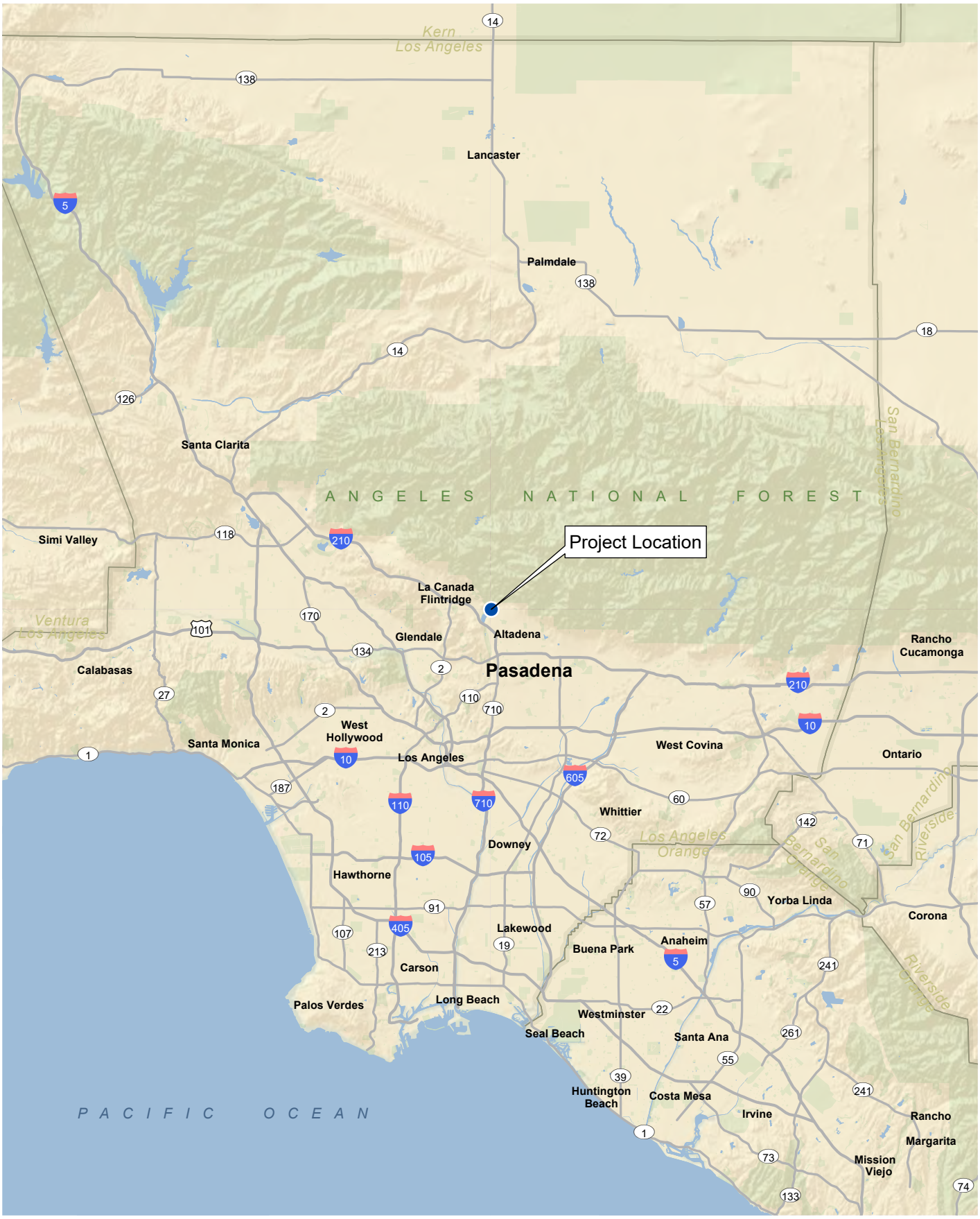
2.2 PROJECT BACKGROUND AND NEED

Since the mid-1980s, NASA has investigated and subsequently taken action to clean up groundwater contamination associated with historic waste management practices at the JPL, which was listed by the United States Environmental Protection Agency (USEPA) on the National Priority List of the Comprehensive Environmental Response and Liability Act (CERCLA). The groundwater beneath the JPL and surrounding areas is known to contain contaminants, primarily perchlorate and carbon tetrachloride (CTC), a VOC.

In 2010, the City amended its existing water supply permit with the California Department of Water Resources, Division of Drinking Water (DDW) to include the Monk Hill Treatment System (MHTS) to provide for the treatment of contaminated groundwater from the Monk Hill subbasin of the Raymond Groundwater Basin and the distribution of the treated water for domestic purposes (Pasadena 2011b). The MHTS includes the MHWTP, which can treat up to 7,000 gallons per minute (gpm) of contaminated water.

Currently, groundwater from the Arroyo Well, Well 52, and Ventura Well is pumped to the equalization sump in the Ventura Booster Station at the site of the Ventura Well. From there, the water is boosted to the MHWTP for treatment. Windsor Well is also connected to the MHTS but is currently non-operational. After treatment, the water flows into the adjacent Windsor Reservoir, which is where the City conducts blending of water supplies in compliance with the City's drinking water permit, prior to its distribution to PWP's customers. Water leaving the MHTS cannot exceed any maximum contaminant levels (MCLs) or Notification Levels (NLs) established by the State Water Resources Control Board (SWRCB) and the MHTS must achieve the treatment goal of non-detect for perchlorate and VOCs (Pasadena 2011b).

In 2014, NASA estimated that the MHTS would need to operate for a minimum of 18 years at an annual cost of approximately 3.5 million dollars to reduce the concentration of contaminants in the aquifer to below then current MCLs. Based on NASA's *Final Optimization Work Plan*, dated May 2014 (Optimization Plan), a 40 percent increase in perchlorate and VOC removal is projected with the addition of the proposed Project when including Arroyo, Well 52, and Ventura wells. The



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Regional Location

Exhibit 2-1

Explorer Well Project

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PSOMAS

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Aerial Source: NearMap 2023

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Aerial Photograph

Exhibit 2-2

Explorer Well Project

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600 300 0 600 Feet

PSOMAS

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objectives of the Optimization Plan, which included both the Project and a new well by Lincoln Avenue Water Company (LAWC) (since completed), include:

- Reduce life-cycle costs associated with the MHTS and LAWC system;
- Optimize system operations and increase mass removal;
- Provide flexibility to treatment system operations;
- Improve system reliability and operability; and
- Ensure three-dimensional capture and containment of the plume (NASA 2014).

2.3 EXISTING CONDITIONS

GROUNDWATER BASIN

The Raymond Basin is a groundwater aquifer situated on an alluvial valley that covers approximately 40 square miles and that is bordered by the San Gabriel Mountains on the north; the San Rafael Hills on the west; and the Raymond Fault on the south and east. The Raymond Basin is divided into the Monk Hill subbasin to the west (beneath the Project site), the Santa Anita Subbasin to the east, and the Pasadena subbasin in the central portion. These designations are based on differences in elevation and groundwater flow.

The City's water supplies consist of local groundwater pumped from the Raymond Basin and purchases of imported water. Allocations for the extraction of groundwater supplies are detailed in the Raymond Basin Judgment and include Pasadena's decreed rights to the Monk Hill subbasin and the Pasadena subbasin of the Raymond Basin. The Raymond Basin Management Board administers the provisions of the adjudication decree.

In addition to its decreed groundwater pumping rights, the City owns the right to divert surface water, which is currently used for groundwater recharge allowing for pumping credits. PWP diverts its water right from the Arroyo Seco to recharge the underlying Monk Hill subbasin through spreading basins. These basins are located along the east side of the Devil's Gate Reservoir, upstream of Devil's Gate Dam. PWP may then pump a portion of the recharged volume through spreading credits, in addition to its decreed groundwater pumping rights. The Project site is located to the east of the northernmost of these basins.

In the Monk Hill subbasin, concentrations of perchlorate, CTC, and several other contaminants resulted in shutdown of four of PWP's wells between 1997 and 2002: the Arroyo Well, Well 52, Ventura Well, and Windsor Well, operated by PWP (Pasadena 2016). In 2011, the MHTS was constructed to treat groundwater from these four wells. The PWP wells, Wells #3, #5 (operated by LAWC), Wells #4 and #7 (operated by Rubio Cañon Land and Water Association) and Well #2 (operated by the Las Flores Water Company), are all within the Monk Hill subbasin, and this source water meets the criteria of an "extremely impaired source", as defined in Process Memo 97-005-R2020 (State Water Board 2020).

The Arroyo Seco Canyon Project is a separate project (also to be completed by PWP) with proposed components near the Project site. The Project is designed to be compatible with the Arroyo Seco Canyon Project in both the short-term and the long-term. However, the Project has independent utility and is not reliant on the future spreading basins or other aspects of the Arroyo Seco Canyon Project to function or operate.

LAND USE

The Project site is surrounded by the Arroyo Seco Canyon and Angeles National Forest (ANF) to the north, which are heavily used passive recreation resources; primarily residential uses, with some commercial and public-serving uses, to the east and south; and the spreading basins, Arroyo Seco drainage, and NASA JPL campus, respectively, to the west. The trailhead for the Gabrielino Trail is located at the Explorer Road/Windsor Avenue/Ventura Street intersection; this trail begins as a paved fire road and extends northward for approximately 1.5 miles into the Arroyo Seco Canyon and the ANF.

The Project site is also located within the Hahamongna Watershed Park. This 300 acres of land is designated as open space and extends from Devil's Gate Dam north into the Arroyo Seco Canyon.

The Explorer Well is located on the former JPL Parking Lot, which was removed by NASA after the construction of their parking structure within the JPL campus. The location where the Explorer Well would be built is previously graded and currently unpaved land except for the paving remaining for the two-lane Explorer Road. An approximate 400-foot segment of the Explorer Road would be relocated around the Explorer Well site as part of the Project to maintain access to the JPL east entrance. The pipeline component of the Project is located primarily in paved sections of the Explorer Road and Karl Johnson Parkway.

The Project site is located on a parcel of land that has several existing utilities and other infrastructure related to PWP's water system. These include existing subterranean pipelines located primarily in the roadways, groundwater production wells (Arroyo Well, Well 52, and the Ventura Well), booster stations (Arroyo Booster Station and Ventura Booster Station), spreading basins for groundwater infiltration, and the currently non-operational Behner Water Treatment Plant.

Applicable Land Use Plans

City of Pasadena General Plan and Zoning Code

The Project site is on land designated and zoned as Open Space (OS) on the City's Land Use Plan and Zoning Map (Pasadena 2019, 2023a).

Hahamongna Watershed Park Master Plan

The Project site is located within the Hahamongna Watershed Park (HWP), which encompasses approximately 1,300 acres in the Arroyo Seco and extends from Devil's Gate Dam north to the San Gabriel Mountains. The Hahamongna Watershed Park Master Plan (HWPMP) provides a framework for managing the recreation, surface water, habitat resources, and cultural resources in the 300 acres of the HWP extending north from Devil's Gate Dam and into the Arroyo Seco Canyon for the use and enjoyment of the public. Because the Project consists solely of public works infrastructure facilities and does not affect the public parkland within the HWP or develop any structures/facilities that would be publicly accessible, the requirements of the HWPMP are not applicable to the Project.

2.4 CEQA REVIEW PROCESS

This IS/MND has been prepared to analyze the impacts associated with construction and operation of the Project. As the CEQA Lead Agency, the City of Pasadena sent a Notice of Intent to Adopt an MND (NOI) to responsible and trustee agencies, interested organizations and individuals, as well as to the State Clearinghouse and the Los Angeles County Registrar-Recorder/County Clerk. The IS/MND and associated technical reports can be viewed online at the City's website at https://ww5.cityofpasadena.net/planning/category/environmental-notices/. Notices were also posted at the site and in the surrounding neighborhood.

The public review period for this IS/MND has been set from **Monday, February 5, 2024 to Monday, March 4, 2024.**

SECTION 3.0 PROJECT DESCRIPTION

The Project involves construction of a new groundwater production well, herein referred to as the Explorer Well, and its connection to the MHTS to optimize removal of perchlorate and VOCs from what is referred to as the "mid-plume" area of contamination in the underlying aquifer. The Project includes a new well, an 800-foot segment of raw water pipeline, and outlet pipes to existing basins. The Project site and its location relative to the MHTS is depicted in Exhibit 3-1, General Site Plan.

3.1 PROJECT COMPONENTS

EXPLORER WELL

Contamination of groundwater in the Monk Hill subbasin is the result of JPL's past practice of disposing chemicals into on-site pits. In 2011, the MHWTP was constructed and began treating contaminated groundwater pumped from four rehabilitated wells operated by PWP (Pasadena 2011b). In 2014, the NASA Optimization Plan recommended construction of two additional groundwater wells to better intercept the perchlorate and VOCs in the groundwater contamination plume. Since then, one of these wells has been constructed at the LAWC property. The other well is the Explorer Well. The Explorer Well would provide mid-plume treatment by withdrawing groundwater from the aquifer and sending it to the existing MHWTP for the removal of contaminants. Treated water is then distributed to PWP's water system for potable use.

The proposed Explorer Well is shown in detail in Exhibit 3-2, Explorer Well Site Plan. A chain-link fence would be constructed around the well site enclosing the well building and transformer. Because the proposed well site would be situated within the current alignment of Explorer Road, an approximate 400-foot segment of the road would be realigned as part of the Project and would tie into the existing road so that access to the JPL east gate is maintained. The portion of Explorer Road that would be realigned by the Project is depicted in Exhibit 3-3, Explorer Road Realignment.

The proposed well head, pump and motor, electrical equipment, above-ground piping, fittings, and instruments would be housed in an approximately 36-foot by 16-foot (or approximately 600-square-foot) building as shown in Exhibit 3-4, Building Elevations. The well building and pad-mounted transformer would be enclosed within chain-link fencing. The enclosed area would be approximately 70 feet by 96 feet in size. The enclosed area would be paved and would have gates for entry/exit. Access to the Explorer Well would be provided from Explorer Road via new all-weather driveways that would provide access to the two proposed access gates. The gates and fencing proposed for the Project are depicted in Exhibit 3-5, General Slide and Gate Details.

Utilities for the Project would include both water and power service. A new water service will connect to an existing potable water line that traverses the site and will include the installation of a meter and backflow prevention device to protect the potable water supply. Power will be extended from an approved underground power line to a transformer proposed within the Project site.

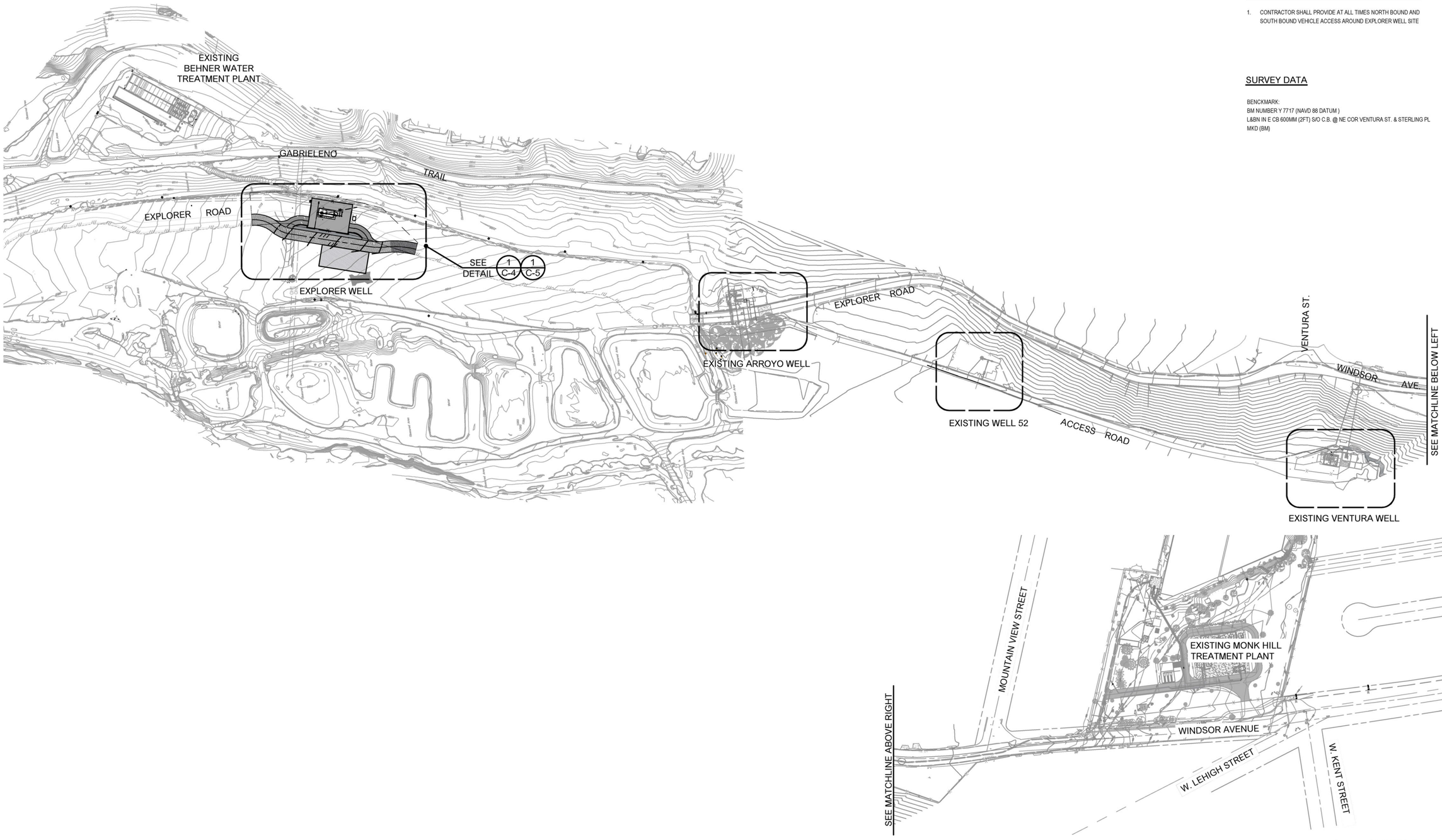
The preliminary design for the Explorer Well was recommended in the NASA Optimization Plan and includes a well depth of 675 feet, a casing diameter of 16 inches within a 26-inch borehole, and an estimated pumping capacity of 1,600 gpm. Final well design would occur after the well has been drilled and lithologic logging, geophysical logging, and formation sieve analysis have been completed by a qualified hydrogeologist. The well would be constructed of steel casing; a well motor, pump, and pump assembly; a gravel feed tube, sounding tube (for water level measurement), and air vent; and materials placed in layers within the annular space between the

GENERAL NOTES:

1. CONTRACTOR SHALL PROVIDE AT ALL TIMES NORTH BOUND AND SOUTH BOUND VEHICLE ACCESS AROUND EXPLORER WELL SITE

SURVEY DATA

BENCKMARK:
BM NUMBER Y 7717 (NAVD 88 DATUM)
L&BN IN E CB 600MM (2FT) S/O C.B. @ NE COR VENTURA ST. & STERLING PL
MKD (BM)



Source: CIVILTEC Engineering Inc. 2023

General Site Plan

Exhibit 3-1

Explorer Well Project

Map not to scale

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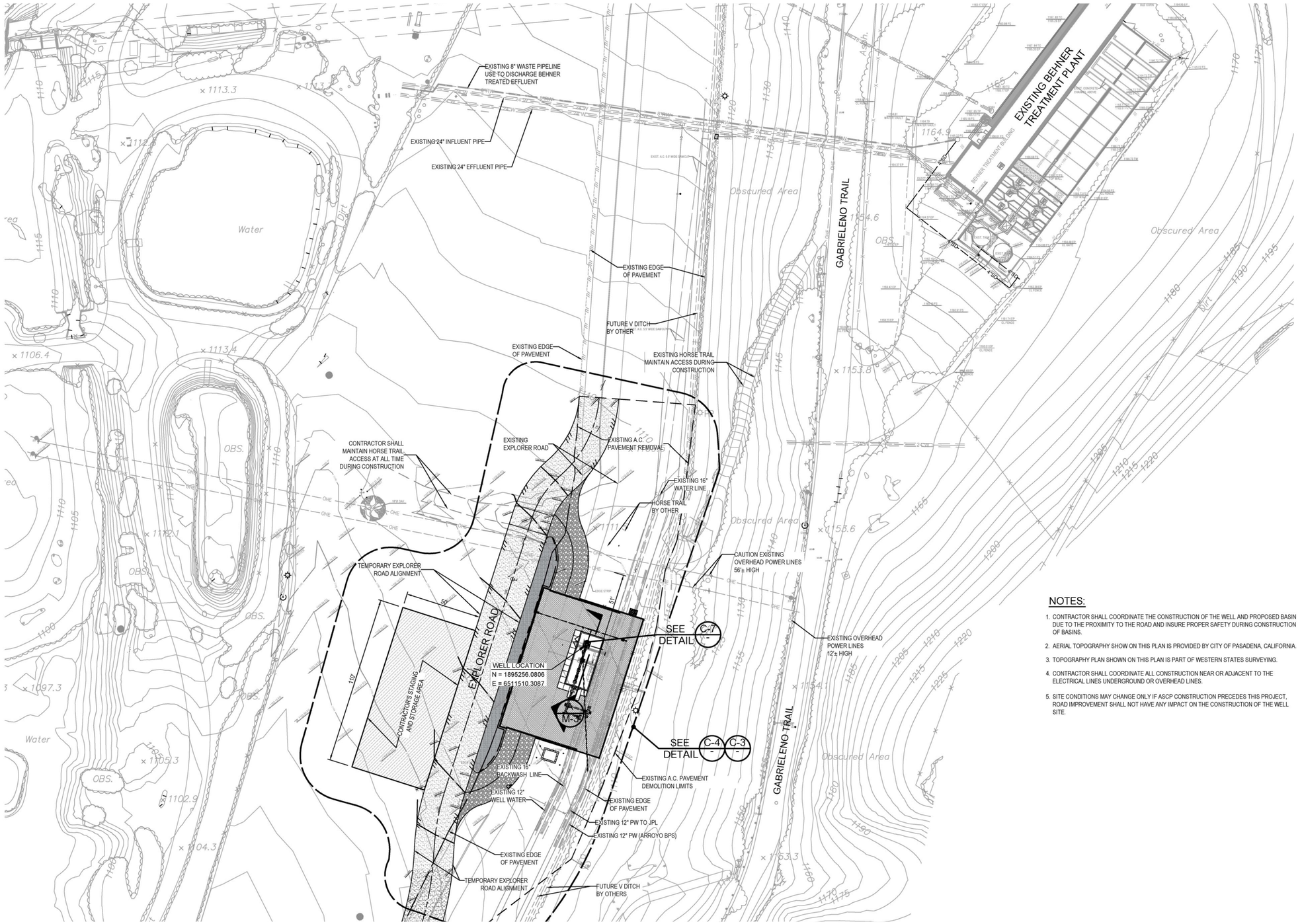

NOTES:

1. CONTRACTOR SHALL COORDINATE THE CONSTRUCTION OF THE WELL AND PROPOSED BASIN DUE TO THE PROXIMITY TO THE ROAD AND INSURE PROPER SAFETY DURING CONSTRUCTION OF BASINS.
2. AERIAL TOPOGRAPHY SHOW ON THIS PLAN IS PROVIDED BY CITY OF PASADENA, CALIFORNIA.
3. TOPOGRAPHY PLAN SHOWN ON THIS PLAN IS PART OF WESTERN STATES SURVEYING.
4. CONTRACTOR SHALL COORDINATE ALL CONSTRUCTION NEAR OR ADJACENT TO THE ELECTRICAL LINES UNDERGROUND OR OVERHEAD LINES.
5. SITE CONDITIONS MAY CHANGE ONLY IF ASCP CONSTRUCTION PRECEDES THIS PROJECT, ROAD IMPROVEMENT SHALL NOT HAVE ANY IMPACT ON THE CONSTRUCTION OF THE WELL SITE.

Source: CIVILTEC Engineering Inc. 2023

Explorer Well Site Plan

Exhibit 3-2

Explorer Well Project

N W E S

Map not to scale

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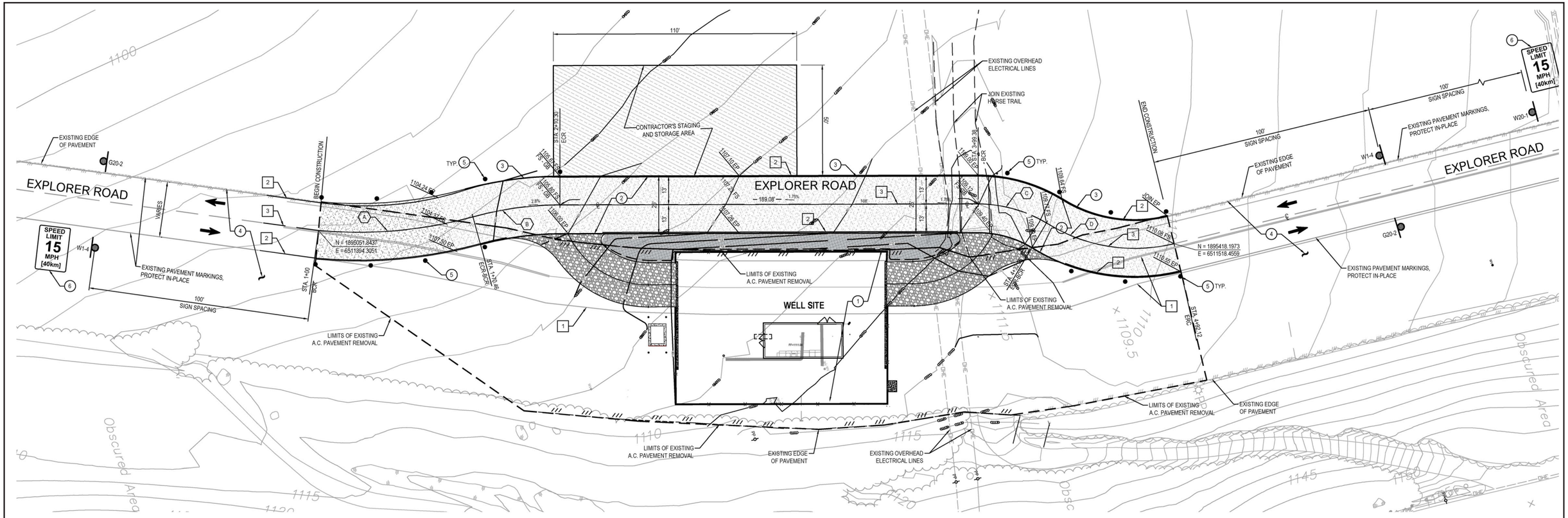

TRAFFIC CONTROL NOTES:

1. IT IS THE RESPONSIBILITY OF THE CONTRACTOR PERFORMING WORK ON A PUBLIC STREET TO INSTALL AND MAINTAIN THE TRAFFIC CONTROL DEVICES ACCORDING TO THE LATEST CALIFORNIA MUTCD TO INSURE THE SAFE MOVEMENT OF TRAFFIC AND PEDESTRIANS THROUGH OR AROUND THE WORK AREA AND PROVIDE MAXIMUM PROTECTION AND SAFETY TO CONSTRUCTION WORKERS. THE CONTRACTOR SHALL SUBMIT A TRAFFIC CONTROL PLAN FOR APPROVAL PRIOR TO START OF WORK FOR ANY CONDITIONS NOT COVERED BY THE WATCH.
2. ALL OPEN TRENCHES SHALL BE COVERED WITH NON-SKID STEEL PLATES OR TEMPORARY ASPHALT PAVEMENT BEFORE AND AFTER WORK HOURS. WORK AREA SHALL BE ENCLOSED WITH TEMPORARY FENCE.
3. ALL SIGNS DELINEATORS, BARRICADES, ETC., SHALL CONFORM TO THE STATE OF CALIFORNIA STANDARD SPECIFICATIONS LATEST EDITION, THE CALIFORNIA DEPARTMENT OF TRANSPORTATION MUTCD PART 6, AND THE "WATCH", LATEST EDITION, ALL BARRICADES SHALL BE EQUIPPED WITH FLASHING/STEADY BURN WARNING LAMPS AT NIGHT. ALL CONES, DELINEATORS, BARRICADES, AND "K" RAIL SHALL BE REFLECTORIZED. ALL TRAFFIC CONTROL SHALL BE KEPT IN THEIR PROPER POSITION AT ALL TIMES, AND SHALL BE REPAIRED, REPLACED, OR CLEANED AS NECESSARY TO PRESERVE THEIR APPEARANCE AND CONTINUITY. ANY DEVICES NOT PART OF THE REQUIRED TRAFFIC CONTROL OR DETOURS SHALL BE REMOVED FROM THE VIEW OF THE TRAVELING PUBLIC IMMEDIATELY.
4. NOTIFY PUBLIC WORKS DEPARTMENT AT LEAST 72 HOURS PRIOR TO ANY WORK IN THE RIGHT-OF-WAY.
5. ANY REVISIONS TO THE TRAFFIC CONTROL PLANS OR REQUIREMENTS SHALL BE APPROVED BY THE ENGINEER AND CITY.
6. NO MORE THAN 500 FEET OF ROADWAY SHALL BE CLOSED AT A TIME.
7. ALL LANE CLOSURE OR REALIGN SIGNS SHALL BE REMOVED OR COVERED WHEN NEW LANES ARE OPEN.
8. TEMPORARY SIGNING MAY BE MOUNTED ON WOODEN POSTS OR PORTABLE SUPPORTS UNLESS OTHERWISE INDICATED ON THE PLAN.
9. FIVE FOOT CLEARANCE SHALL BE MAINTAINED BETWEEN OPEN EXCAVATION AND ADJACENT MOVING TRAFFIC LANE. OPEN TRENCH WITH LESS THAN FIVE FEET OF CLEARANCE SHALL BE STEEL-PLATED OR BACK FILLED IMMEDIATELY AFTER EXCAVATION.
10. G-20-2 "END ROAD WORK" SIGN, AS APPROPRIATE, SHALL BE PLACED AT THE END OF THE WORK ZONE.
11. ALL BARRICADES SHALL BE TYPE II OR TYPE III.
13. ALL SIGNS AND TRAFFIC CONTROL DEVICES SHALL CONFORM TO THE WORK AREA TRAFFIC CONTROL HANDBOOK (WATCH MANUAL), LATEST EDITION.
14. THE CITY AND THE STATE PERMIT INSPECTOR RESERVE THE RIGHT TO REVISE THESE TRAFFIC CONTROL PLANS IN USE AND TO MAKE ANY NECESSARY CHANGES AS FIELD CONDITIONS WARRANT.
15. CONTRACTOR SHALL OBTAIN LANE CLOSURE PERMITS FOR ANY WORK IN THE CITY TO CLOSE ROAD.
16. ALL TEMPORARY TRAFFIC CONTROL MARKINGS SHALL BE PER CALTRANS STANDARD SPECIFICATIONS.
17. DURING NON WORKING HOURS ALL TRENCHES WILL BE PAVED OR PLATED AND ALL TRAFFIC WILL BE RETURNED TO NORMAL PATTERNS AND ALL SIGNS AND BARRICADES WILL BE REMOVED.

CHANNELIZER SPACING FOR 25 MPH [40km]

25' IN TAPER	[7.62M]
50' IN TANGENT	[15.24M]

LEGEND:

- SIGN POST
- DIRECTION OF TRAVEL
- OBJECT MARKER AND POST TYPE 3
- SPEED LIMIT 15 MPH [40km] — POSTED SPEED LIMIT
- ROAD IMPROVEMENT

SIGNS:

ROAD WORK AHEAD — W20-1 | W1-4 | END ROAD WORK — G20-2

CENTER LINE CURVE DATA

	RADIUS	DELTA	LENGTH	
A	R = 195.71'	21° 0' 0"	70.46'	
B	R = 150.00'	16° 0' 0"	39.84'	
C	R = 60.38'	31° 0' 0"	32.67'	
D	R = 74.51'	46° 0' 0"	60.07'	

ROAD CONSTRUCTION NOTES:

1. DEMOLISH AND REMOVE EXISTING PORTION OF EXISTING PAVEMENT AS SHOW.
2. CONSTRUCT 4" ASPHALT CONCRETE PAVEMENT OVER 6" AGGREGATE BASE, SEE SECTION 2 ON DRAWING C-10.
3. INSTALL REDWOOD HEADER AT EDGE OF PAVEMENT PER DETAIL 2 ON DRAWING C-15.
4. EXISTING A.C. PAVEMENT, PROTECT IN PLACE
5. INSTALL OBJECT MARKER, TYPE 3, FIGURE 3C-1 PER MUTCD. TYP.
6. INSTALL SPEED LIMIT 15 TRAFFIC SIGN, MUTCD CODE R2-1

ROAD STRIPING CONSTRUCTION NOTES:

1. REMOVE EXISTING ROAD STRIPING AS NECESSARY.
2. PROVIDE 4" WHITE EDGE LINE STRIP, DETAIL 24 PER SPPWC STANDARD PLAN 170-0.
3. PROVIDE 4" YELLOW CENTER LINE STRIP, DETAIL 1 PER SPPWC STANDARD PLAN 170-0.

NOTE TO CONTRACTOR

1. CONTRACTOR SHALL NOT PLACE ANY CONSTRUCTION MATERIAL ON HORSE TRAIL AND MAINTAIN ACCESS ALL THE TIME.

Source: CIVILTEC Engineering Inc. 2023

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Explorer Road Realignment

Explorer Well Project

Exhibit 3-3

Map not to scale

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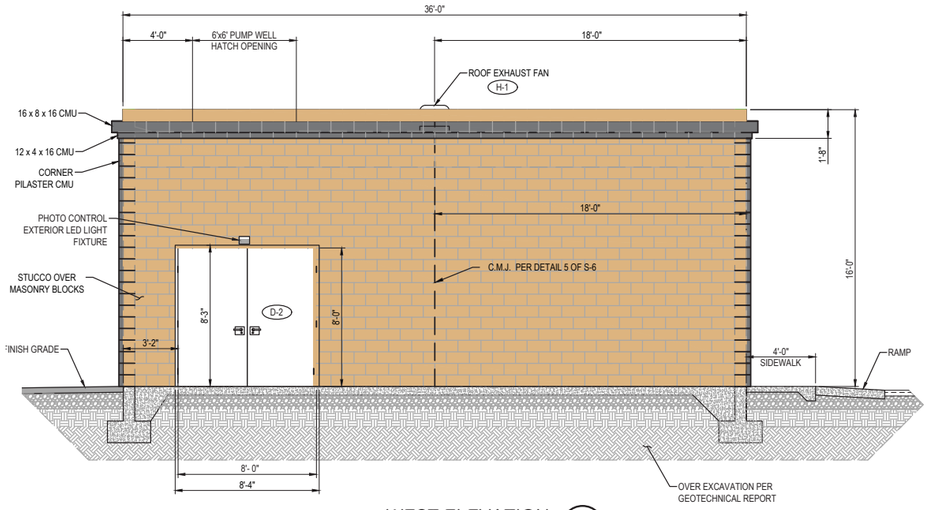
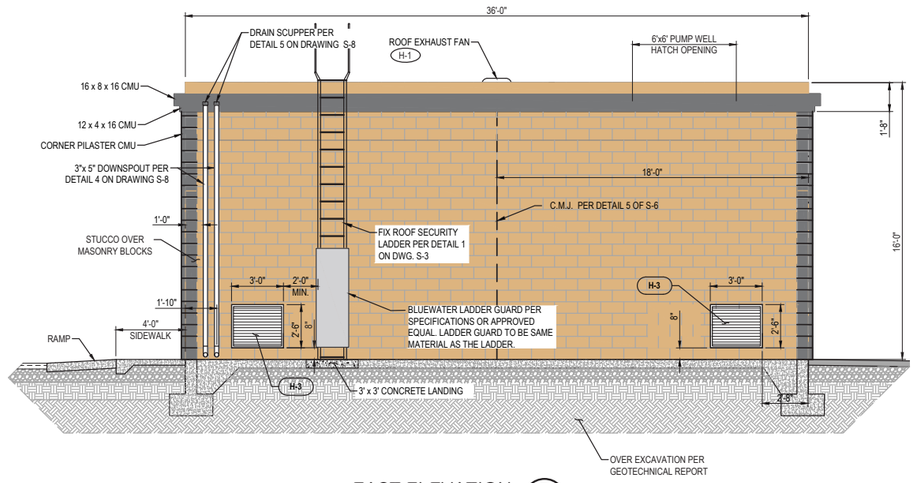


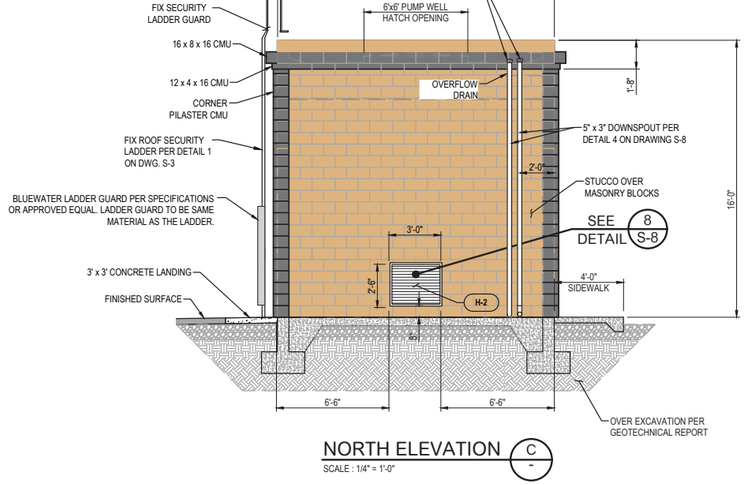
WEST ELEVATION (A)

SCALE : 1/4" = 1'-0"



EAST ELEVATION (B)

SCALE : 1/4" = 1'-0"



NORTH ELEVATION (C)

SCALE : 1/4" = 1'-0"

GENERAL NOTES

OCCUPANCY CLASSIFICATION - U

CONSTRUCTION TYPE - VB

BUILDING HEIGHT - 16 FT.

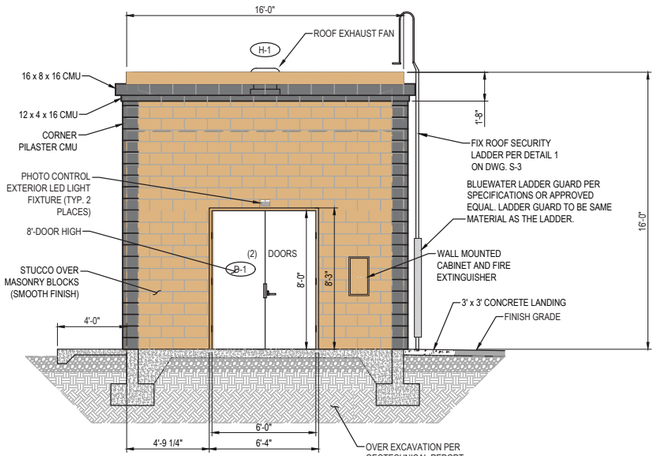
BUILDING AREA - 576 SQ.FT.

ZONE - NON SPRINKLERED

ROOF HATCH OPENING - 6'x6'

COLOR - 945 MINNESOTA PINES FOR TRIM

STUCCO - 414 CREME BRULEE FOR WALLS



SOUTH ELEVATION (D)

SCALE : 1/4" = 1'-0"

ARCHITECTURAL GENERAL NOTES

1. ALL WORKMANSHIP SHALL BE PERFORMED BY SKILLED MECHANICS USING THE BEST STANDARD PRACTICES AND SHALL CONFORM TO THE APPLICABLE BUILDING CODES.
2. THE GENERAL CONTRACTOR SHALL VERIFY ALL CONDITIONS AND DIMENSIONS AT THE PROJECT SITE AS DESCRIBED IN THE CONTRACT DOCUMENTS PRIOR TO STARTING CONSTRUCTION. ALL TRADES SHALL VERIFY AT THE PROJECT SITE CONDITIONS AND MEASUREMENTS RELATED TO THEIR WORK.
3. DETAILS MARKED TYPICAL SHALL APPLY IN ALL CASES UNLESS SPECIFICALLY DETAILED OTHERWISE. WHERE NO DETAIL IS SHOWN, CONSTRUCTION SHALL BE AS SHOWN FOR OTHER SIMILAR WORK.
4. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY ALL DIMENSIONS AND CONDITIONS AT THE JOB SITE AND TO CROSS-CHECK DETAILS AND DIMENSIONS ON THE ARCHITECTURAL STRUCTURAL, MECH. AND ELEC DRAWGS.(AS APPLICABLE) ANY DISCREPANCIES SHALL BE REPORTED TO THE PWP REPRESENTATIVE PRIOR TO THE CONSTRUCTION.
5. DAMAGE DONE TO ADJOINING PROPERTY AND/OR EXISTING STRUCTURES NOT INCLUDED IN THE CONTRACT SHALL BE RESTORED TO EXISTING CONDITIONS BY THE CONTRACTOR.
6. PROVIDE BARRICADES APPROVED BY THE CITY FOR PEDESTRIAN PROTECTION PRIOR TO COMMENCING ANY WORK.
7. CONTRACTOR SHALL PROVIDE & MAINTAIN A CENTRAL POINT OF OPERATION W/ A PHONE @ THE SITE. AN UP TO DATE, MARKED UP SET OF PROJECT DWGS. & SPECIFICATIONS W/ ALL AS BUILT CHANGES INDICATED, SHALL BE RECORDED BY THE CONTRACTOR, & SHALL BE AVAILABLE FOR REFERENCE, IN THE SITE "OFFICE" AT ALL TIMES. LOCATION OF THE POINT OF OPERATION SHALL BE ACCEPTABLE TO OWNER.
8. UPON COMPLETION OF WORK, ALL CONSTRUCTION AREAS SHALL BE LEFT CLEAN IN ACCORDANCE W/ THE CRITERIA AND PROTOCOLS INDICATED IN THE SPEC'S. & SHALL BE LEFT COMPLETELY FREE FROM DEBRIS.
9. WHEN IT IS NECESSARY TO INTERRUPT ANY EXISTING UTILITY SERVICE TO MAKE CORRECTIONS, A MINIMUM OF 48 HOURS ADVANCE NOTICE SHALL BE GIVEN THE OWNER. INTERRUPTIONS IN UTILITY SERVICES SHALL BE OF THE SHORTEST POSSIBLE DURATION FOR THE WORK AT HAND AND SHALL BE APPROVED IN ADVANCE BY THE OWNER. (AS APPLICABLE) ALL EXISTING VALVES TO BE OPERATED BY CITY PERSONNEL ONLY.
10. IN THE EVENT THE UTILITY SERVICE IS INTERRUPTED WITHOUT THE REQUIRED 48 HOURS NOTICE, THEN THE CONTRACTOR SHALL BE FINANCIALLY LIABLE FOR ALL DAMAGES SUFFERED BY THE OWNER DUE TO THE UNAUTHORIZED INTERRUPTION. RECONNECTION SHALL BE MADE IMMEDIATELY.
11. IF THE CONTRACTOR ASCERTAINS AT ANY TIME THAT REQUIREMENTS OF THIS CONTRACT CONFLICT WITH, OR ARE IN VIOLATION OF, APPLICABLE LAWS, CODES, REGULATIONS AND ORDINANCES, HE SHALL NOT PROCEED WITH WORK IN QUESTION, EXCEPT AT HIS OWN RISK, UNTIL CIVILTEC AND PWP HAS BEEN NOTIFIED IN WRITING AND WRITTEN DETERMINATION IS MADE BY CIVILTEC AND PWP. WHERE COMPLETED OR PARTIALLY COMPLETED WORK IS DISCOVERED TO BE IN VIOLATION WITH APPLICABLE LAWS, CODES, REGULATIONS AND ORDINANCES, CONTRACTOR SHALL BE REQUIRED TO REMOVE THAT WORK FROM THE PROJECT AND REPLACE SUCH WORK WITH ALL NEW COMPLYING WORK AT NO ADDITIONAL COST TO THE OWNER.
12. DRAWINGS ARE NOT TO BE SCALED, WRITTEN DIMENSIONS TAKE PRECEDENCE, AND THIS SET OF PLANS IS INTENDED TO BE USED FOR DIAGRAMMATIC PURPOSES ONLY, UNLESS NOTED OTHERWISE. THE GENERAL CONTRACTOR'S SCOPE OF WORK SHALL INCLUDE FURNISHING ALL MATERIALS, EQUIPMENT, LABOR, AND ANYTHING ELSE DEEMED NECESSARY TO COMPLETE INSTALLATIONS AS DESCRIBED HEREIN.
13. PRIOR TO THE SUBMISSION OF BIDS, THE CONTRACTORS INVOLVED SHALL VISIT THE JOB SITE AND FAMILIARIZE THEMSELVES WITH ALL CONDITIONS AFFECTING THE PROPOSED PROJECT, WITH THE CONSTRUCTION AND CONTRACT DOCUMENTS, & FIELD CONDITIONS AND CONFIRM THAT THE PROJECT MAY BE ACCOMPLISHED AS SHOWN PRIOR TO PROCEEDING WITH CONSTRUCTION. DISCREPANCIES BETWEEN FIELD DATA AND DATA ON PLANS AND SPECIFICATIONS SHALL BE REPORTED TO CIVILTEC. DO NOT PROCEED WITH INSTALLATION IN AREAS OF DISCREPANCIES UNTIL DISCREPANCIES HAVE BEEN RESOLVED.
14. THE CONTRACTOR SHALL RECEIVE WRITTEN AUTHORIZATION FROM OWNER TO PROCEED WITH CONSTRUCTION PRIOR TO STARTING WORK ON ANY ITEM NOT CLEARLY DEFINED BY THE CONSTRUCTION DRAWINGS/ CONTRACT DOCUMENTS.
15. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE PROJECT DESCRIBED HEREIN. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES AND PROCEDURES AND FOR COORDINATING ALL PORTIONS OF THE WORK UNDER THE CONTRACT. THE CONTRACTOR HAS SOLE RESPONSIBILITY FOR THE SAFETY AND PERFORMANCE OF THE WORK. SAFETY COMPLIANCE SHALL BE IN ACCORDANCE WITH OSHA, U. S. DEPT. OF LABOR, STATE, AND LOCAL REQUIREMENTS.
16. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS ACCORDING TO MANUFACTURER'S/ VENDOR'S WRITTEN SPECS. UNLESS NOTED OTHERWISE OR WHERE LOCAL CODES OR ORDINANCES TAKE PRECEDENCE.
17. ALL WORK PERFORMED ON PROJECT AND MATERIALS INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. CONTRACTOR SHALL GIVE ALL NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY, MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS, AND LOCAL AND STATE JURISDICTIONAL CODES BEARING ON THE PERFORMANCE OF THE CONTRACTOR.
18. CAULKING & SEALANTS WHERE REQUIRED TO WATER SEAL OR DUST SEAL ALL TRADES CONSTRUCTION JOINTS, AND TO SEAL BETWEEN SIM. AND DISSIMILAR METALS SHALL BE SIM. & EQUAL TO SIKA FLEX 1A WATERPROOF, URETHANE CAULKING SEALING COMPOUND CONFORMING TO THE OWNER'S REQ'S. ALL SEALANTS & CAULKINGS SHALL BE NON- HARDENING, WATERPROOF, TYPE FLASH'G. COMPOUNDS. ANY PROPOSED ALTERNATES TO THIS COMPOUND SHALL BE SUBMITTED FOR WRITTEN REVIEW BY OWNER'S PROJ. MGR. PRIOR TO PURCHASING OR APPLYING. COLORS SHALL BE SELECTED & SCHEDULED BY THE ARCHITECT. SEAL PENETRATIONS THROUGH FIRE-RATED WALLS WITH U.L. LISTED OR FIRE MARSHALL APPROVED 3 M PRODUCTS FIRE STOP CLASS 100 APPROVED MATERIALS AS APPLICABLE TO THIS FACILITY &/OR PROJECT SITE.
19. PROVIDE A PORTABLE FIRE EXTINGUISHER WITH A RATING OF NOT LESS THAN 2-A OR 2-A10BC WITHIN 75 FEET TRAVEL DISTANCE TO ALL PORTIONS OF THE PROJECT AREA DURING CONSTRUCTION.
21. CONTRACTOR SHALL SEE TO IT THAT THE GENERAL WORK AREA IS KEPT CLEAN AND HAZARD FREE DURING CONSTRUCTION AND FOLLOWS ALL OF THE PROTOCOL FOR CONSTRUCTION REQ'S. DISPOSE OF ALL DIRT, DEBRIS, RUBBISH & REMOVE EQUIP. NOT SPECIFIED AS REMAINING ON THE PROPERTY. PREMISES SHALL BE LEFT IN A THOROUGHLY CLEAN CONDITION, FREE FROM PAINT SPOTS, ROCK AND MORTAR DEBRIS, DUST, OR SMUDGES OF ANY NATURE. IN A CONDITION ACCEPTABLE TO THE OWNER. BURNING TRASH, BRUSH, OR WOOD AND/OR RUNNING HOSES & WATERING DEBRIS INTO THE STORM DRAINS IS STRICTLY PROHIBITED, AT ALL TIMES.
20. THE CONTRACTOR SHALL MAKE NECESSARY PROVISIONS TO PROTECT EXISTING IMPROVEMENTS, EASEMENTS, PAVING, CURBING, ETC. DURING CONSTRUCTION. UPON COMPLETION OF WORK, CONTRACTOR SHALL REPAIR ANY DAMAGE THAT MAY HAVE OCCURRED DUE TO CONSTRUCTION ON OR ABOUT THE PROPERTY, AS APPLICABLE.
22. DISSIMILAR METALS: WHERE ALUMINUM IS PLACED IN CONTACT WITH OR FASTENED TO DISSIMILAR METALS (EXCEPT STAINLESS STEEL OR ZINC) THE CONTACT SURFACES SHALL BE GIVEN A HEAVY BRUSH COAT OF SOLIDS EPOXY WALL FINISH (AS SPECIFIED UNDER COATING SYSTEMS : SOLIDS EPOXY WALL FINISH) FOLLOWED BY ONE FINISH COAT OF THE SAME SOLIDS EPOXY WALL FIN. WHERE ALUMINUM METAL IS IN CONTACT W/ CONCRETE OR MASONRY, COAT W/ TWO COATS OF SOLIDS EPOXY WALL FINISH.
23. THE CONTRACTOR IS TO USE EXTREME CAUTION AT ALL TIMES TO INSURE ADEQUATE PROTECTION TO ALL EQUIP. FROM DUST, DEBRIS, MOISTURE, VIBRATION, ETC.
24. THE WORD " REMOVE" MEANS TO REMOVE COMPLETELY, INCLUDING ALL ATTACHMENTS, FRAMES, ANCHORS, BASES, CONDUITS AND SUPPORTS, INCLUDING CAPPING BEHIND EXISTING SURFACES.

Source: CIVILTEC Engineering Inc. 2023

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Building Elevations

Explorer Well Project

Exhibit 3-4

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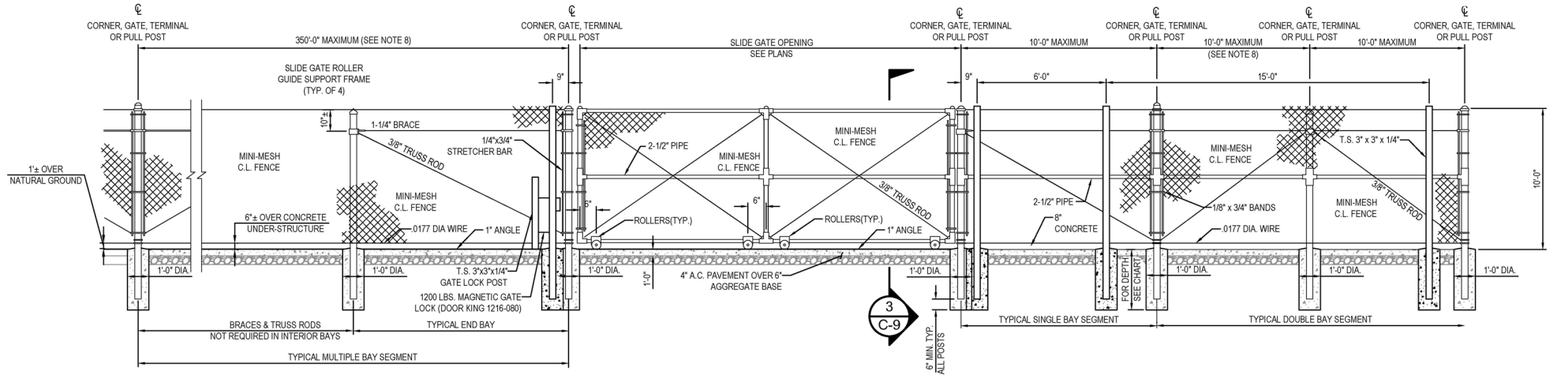
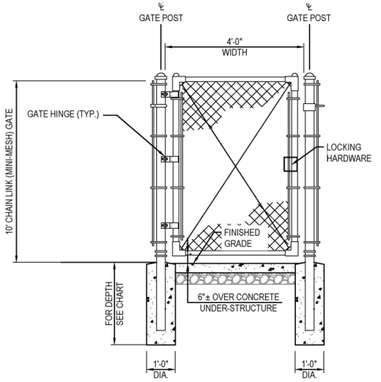
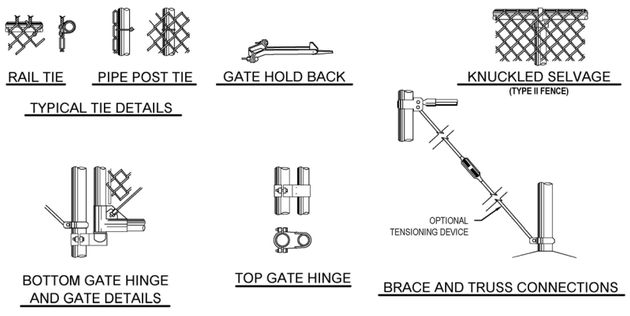




SINGLE LEAF SWING GATE DETAIL

NOT TO SCALE



TYPICAL TIE DETAILS

GATE POSTS AND GATE FRAMES			
HEIGHT	GATE OPENING	GATE POST	GATE FRAME
6 FEET AND OVER	SINGLE TO 6' OR DOUBLE TO 12'	2-1/2"	1-1/2"
	SINGLE OVER 6' TO 13' OR DOUBLE OVER 12' TO 24'	3-1/2"	
	SINGLE OVER 13' TO 18' OR DOUBLE OVER 24' TO 36'	4"	
	SINGLE OVER 18' OR DOUBLE OVER 36'	6"	

GAGE OF FABRIC	HEIGHT OF FABRIC	DEPTH OF POSTS	LENGTH OF END, CORNER OR PULL POSTS	LENGTH OF LINE POSTS	SIZE OF POSTS				
					END, CORNER & PULL		LINE POSTS (MIN SIZE)		GATE POST
					PIPE OPTION	RECTANGULAR OPTION	PIPE OPTION	H POST OPTION	
9	10'	5'	15'	14'-6"	3"	3-1/2"	2-1/2"	1-7/8" x 1-5/8"	SEE GATE POST TABLE

CHAIN LINK (MINI-MESH) FENCE DETAIL

NOT TO SCALE

1
C-4

NOTES:

(1) MATERIALS, CONSTRUCTION AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE SPECIFICATIONS.

(2) THE TYPE OF TOP SUPPORT IS SPECIFIED IN THE SPECIFICATIONS, TYPE I, TENSION WIRE AND TYPE II, TUBULAR RAIL.

(3) KNUCKLED SELVAGE, TOP AND BOTTOM SHALL BE USED ON FENCES FIVE FEET OR GREATER IN HEIGHT.

(4) KNUCKLED SELVAGE ON TOP AND TWISTED AND BARBED SELVAGE ON BOTTOM SHALL BE USED ON FENCES LESS THAN FIVE FEET IN HEIGHT.

(5) ALL STEEL PIPE MEMBERS SHALL CONFORM TO THE REQUIREMENTS OF ASTM DESIGNATION A-120, SCHEDULE 40, HOT DIPPED ZINC COATED STEEL PIPE.

(6) OPTIONS EXERCISED SHALL BE UNIFORM THROUGHOUT THE PROJECT.

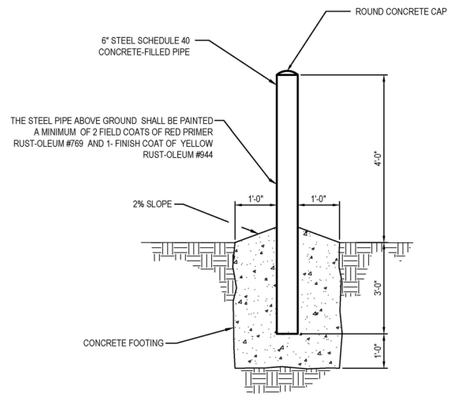
(7) LINE POSTS SHALL BE LOCATED AT EQUAL SPACING FOR EACH SEGMENT WITH MAXIMUM SPACING AS FOLLOWS:
A. TANGENT SECTIONS TO 500 FEET RADIUS - NOT MORE THAN 10 FEET.
B. UNDER 500 FEET RADIUS TO 200 FEET RADIUS - NOT MORE THAN 8 FEET.
C. UNDER 200 FEET RADIUS TO 100 FEET RADIUS - NOT MORE THAN 6 FEET.
D. UNDER 100 FEET RADIUS - NOT MORE THAN 5 FEET.

(8) THE MINIMUM HEIGHT OF FABRIC ON FENCES AND GATES SHALL BE 10 FEET.

(9) ALL CONCRETE SHALL HAVE A MINIMUM OF 5 SACKS OF CEMENT PER CUBIC YARD.

(10) FASTEN FABRIC TO TOP AND BOTTOM TENSION CABLE AT 24 INCH INTERVALS. FASTEN TO LINE POSTS AT 14 INCH INTERVALS.

(11) CHAIN LINK (MINI-MESH) FABRIC MESH SIZE SHALL BE 5/8 INCH.



STEEL BOLLARD

NOT TO SCALE

2
C-4

Source: CIVILTEC Engineering Inc. 2023

General Slide and Gate Details

Exhibit 3-5

Explorer Well Project

PSOMAS

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casing and the borehole wall. The estimated pumping water level for the proposed well is 425 feet below ground surface, and the estimated static water level is 257 feet below ground surface. These depths would be verified upon well drilling and used to size the well pump and motor. The Project's well design is depicted in Exhibit 3-6, Well Sections.

Also, temporary piping would be installed for use during well development. Pipes would be installed above ground during construction extending from temporary sediment settling (TSS) tanks to two spreading basins nearby to the west. Temporarily during well development, the drilling water would be directed to TSS tanks where solids would settle out. Then, the water would either be recirculated back to the well for drilling or would be discharged to a basin using the temporary, at-grade pipes described above.

Once the well has been equipped and the raw water pipeline component of the Project is completed, as described in more detail below, water that is produced by the Explorer Well would either be discharged to an existing spreading basin to the west during well startup or to the MHTS for treatment. Under a Statewide NPDES permit (Order WQ 2014-0194-DWQ), flows from community drinking water systems are allowed to be discharged to surface waters subject to waste discharge requirements in the permit. Authorized discharges include groundwater supply well flushing or pump-to-waste and groundwater well development and testing. As defined in the permit, discharges contained in PWP's spreading basins for groundwater recharge fall under the category of beneficial reuse and are not required to be monitored.

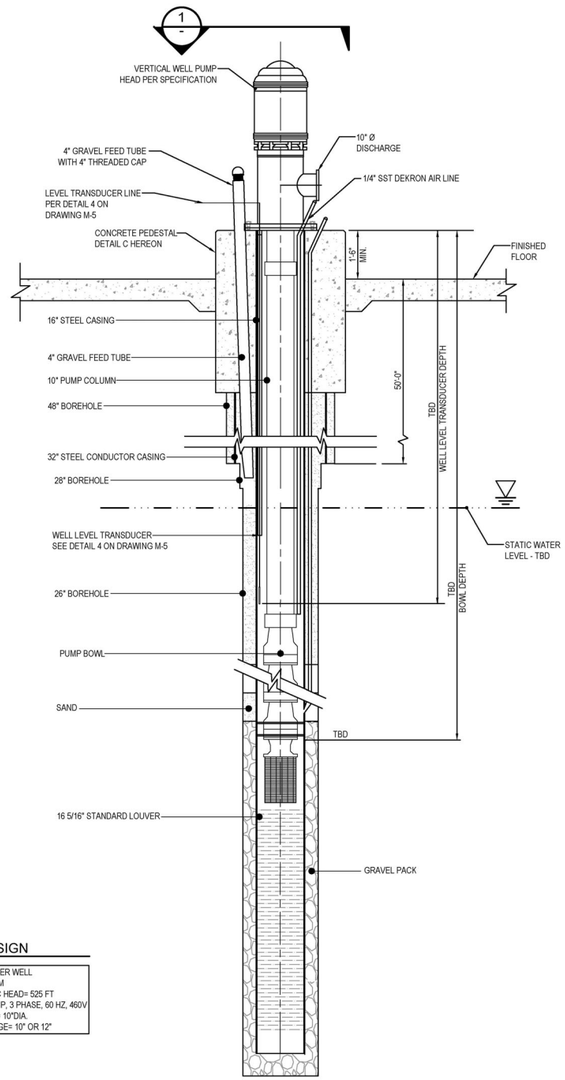
PIPELINE

The Project includes the installation of approximately 800-feet of raw water pipeline that would connect the Explorer Well to the MHTS. Raw water is defined as natural water found in the environment that has not been treated, and in this case refers to the groundwater withdrawn via the production wells. The new approximately 800-foot segment of 12-inch diameter raw water pipeline would be constructed from just north of the existing Arroyo Well to Well 52 as part of completing the circuit of water flowing from the wells to the Ventura Booster Station where it would then be pumped to the MHWTP. The 12-inch diameter pipe would be installed within trenches that are dug within the existing paved surfaces and/or shoulders of existing access roads (Explorer Road and Karl Johnson Parkway).

The Project would also include a tee in the design of the new 12-inch raw water pipeline, mentioned above, which would be installed north of the Arroyo Well. This tee would lead to a 12-inch pipe that would outlet into an existing basin to the west. The tee and 12-inch pipe would be installed below ground within a trench. This tee and outlet are being installed to outlet water during the well startup process. Well startup typically involves turning on a well pump and running the discharge to waste until the water clears, typically about 30 minutes, before redirecting the water to the treatment and distribution systems. This improvement would include an air gap, which is a physical separation in the piping to protect the potable water system from backflow/potential contamination.

3.2 PROJECT DEMOLITION AND CONSTRUCTION

Construction of the Project is anticipated to take approximately 21 months, beginning in April 2024 and ending in December 2025. Construction hours would comply with Pasadena Municipal Code Chapter 9.36, except for the well drilling activities, which requires an exemption from the construction hour limitations for around-the-clock drilling. Continuous drilling and maintenance of the drilling fluid pressure is necessary to avoid collapse of the borehole. Designated staging areas would be fenced to prevent safety hazards, as well as to deter vandalism and theft. Table 1,



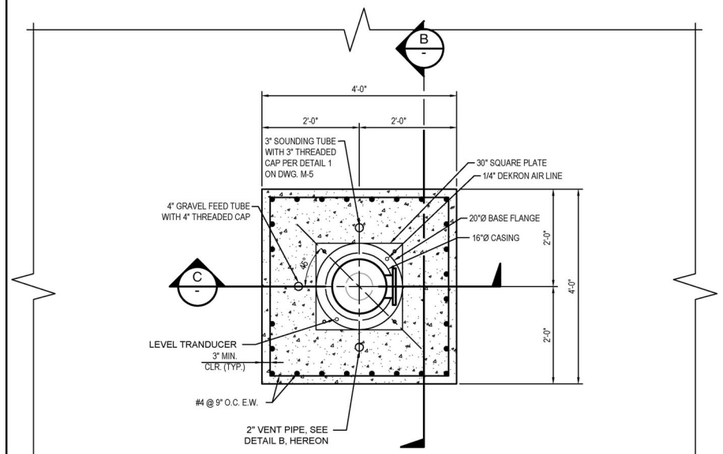
WELL DESIGN

WELL = EXPLORER WELL
FLOW= 1600 GPM
TOTAL DYNAMIC HEAD= 525 FT
MOTOR= 350.0 HP, 3 PHASE, 60 HZ, 460V
PUMP COLUMN= 10"DIA.
PUMP DISCHARGE= 10" OR 12"

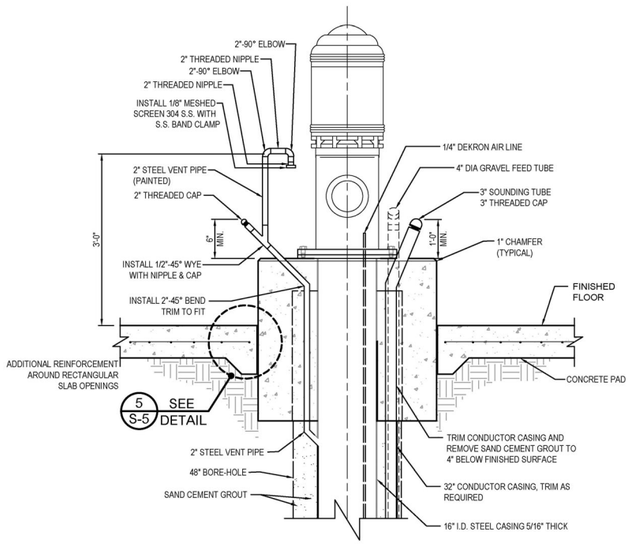
NOTES:

1. SEE DRAWING C-6 FOR WELL CONSTRUCTION DETAILS.

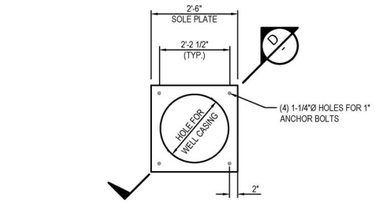
WELL SECTION A
NOT TO SCALE



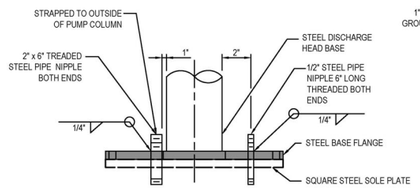
CONCRETE PUMP PEDESTAL PLAN VIEW 1
SCALE: 1/2"=1'-0"



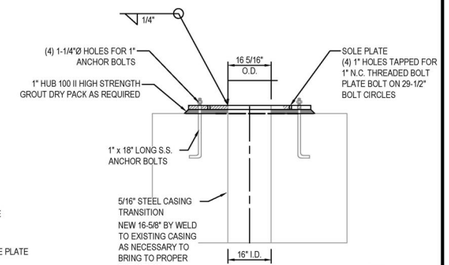
PUMP TUBING SECTION B
NOT TO SCALE



SOLE PLATE PLAN

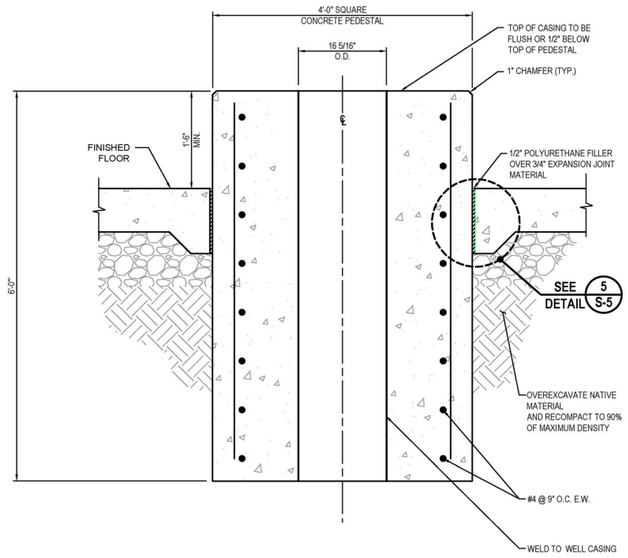


BASE FLANGE SECTION



SOLE PLATE SECTION D

WELL HEAD DETAIL 2
NOT TO SCALE



CONCRETE PUMP PEDESTAL SECTION C
SCALE: 1"=1'

Source: CIVILTEC Engineering Inc. 2023

Well Sections

Explorer Well Project

Exhibit 3-6

PSOMAS

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Construction Activity Assumptions, summarizes the anticipated construction activities for each phase of the Project.

TABLE 1
CONSTRUCTION ACTIVITY ASSUMPTIONS

Project Phase	Start/End Month and Year	Length of Activity	Equipment in Use	Number of Truckloads Per Phase	Import or Export Volumes
Explorer Well Construction					
Site Preparation and Mobilization	April 2024 – April 2024	8 hours/day; 5 days/week	Backhoe, semi-truck with trailers, drill rig mobilization, crane or gradall, worker trucks	15	250 CY
Noise Barriers	April 2024 – July 2024	8 hours/day; 5 days/week; 3-week duration	Front end loader, Backhoe, Drill rig, Well casing flatbed	0	0
Well Drilling (pilot borehole drilling, temporary zone construction and sampling)	May 2024 – June 2024	24 hours/day; 7days/week; 4-week duration	Drilling rig, air compressor, trash pumps, vacuum trucks, gradall	12	150 CY
Water Quality Analysis and Final Well Design	June 2024 – June 2024	2-week duration	None	0	0
Well Drilling (continued) (borehole reaming, casing installation) and Well Development	June 2024 – July 2024	Well Drilling: 7 days/week (24 hours a day) 2.5-week duration Well Development: 7 days/week (24 hours a day) 1.5week duration	Front end loader, Backhoe, Drill rig, Well casing flatbed, Temporary pump and generator, Baker tanks (water storage)	20	300 CY
Install Test Pump, Well Testing and Sampling	August 2024 – September 2024	8 hours/day; 5 days/week; 4week duration	Pump rig with trailer, diesel engine to operate test pump	0	0
Equipment Installation	December 2024 – March 2025	8 hours/day; 5 days/week	Front end loader, Backhoe, Drill rig, Well casing flatbed	0	0

TABLE 1
CONSTRUCTION ACTIVITY ASSUMPTIONS

Project Phase	Start/End Month and Year	Length of Activity	Equipment in Use	Number of Truckloads Per Phase	Import or Export Volumes
Site Development	December 2024 – December 2025	8 hours/day; 5 days/week	Front end loader, Backhoe, Dump truck, Work trucks	20	300 CY
Pave Site/Asphalt for Driveway Connections	July 2024 – October 2025	8 hours/day; 5 days/week	Front end loader, Backhoe, Dump truck, Work trucks	14	212 CY
Building Construction	February 2025 – April 2025	8 hours/day; 5 days/week	Front end loader, Backhoe, Dump truck, Work trucks	3	1,300 SF CMU
Architectural Coatings (painting of the building)	May 2025 – July 2025	8 hours/day; 5 days/week	Front end loader, Backhoe, Dump truck, Work trucks	3	1,144 SF
Well Discharge Pipeline					
Excavation/Trenching	April 2024 – September 2024	8 hours/day; 5 days/week	Front end loader, dump truck, backhoe, work trucks	1 and 16	6 CY and 230 CY
Piping Construction	April 2024 – September 2024	8 hours/day; 5 days/week	Front end loader, dump truck, backhoe, work trucks	1	1 CY
Paving	April 2024 – September 2024	8 hours/day; 5 days/week	Front end loader, dump truck, backhoe, work trucks	4	50 CY

CY: cubic yards; SF: square feet; CMU: concrete-masonry units.

All clean demolition debris and excess soil would be exported to the Scholl Canyon Landfill or to other landfills in the County.

Construction workers, equipment delivery vehicles, and haul trucks (to and from Scholl Canyon Landfill) are expected to come to the site from the I-210 at the Windsor Avenue off-ramp and head north on Windsor Avenue to Explorer Road and into the Project site. From I-210, trucks would head west on State Route (SR) 134; exit at the Figueroa Street/Scholl Canyon Road off-ramp; and head north-northeast toward the landfill. Trucks would come back from the landfill entering the eastbound on-ramp on the SR-134 at Figueroa Street and head east; trucks would then go west on I-210 to Windsor Avenue to Explorer Road and, ultimately, to the site.

3.3 LONG-TERM OPERATIONS

The Explorer Well would be operated continuously and in accordance with the requirements of Pasadena's domestic water supply permit. Future operations would require routine maintenance including daily monitoring by PWP's drinking water system operators, monthly water level measurements, and bi-annual flow meter accuracy tests.

3.4 AGENCY APPROVALS AND PERMITS

This IS/MND is intended to serve as the primary environmental document pursuant to CEQA for the Explorer Well Project, including all discretionary approvals requested or required to implement the Project. In addition, this is the primary reference document for the formulation and implementation of a mitigation monitoring program for the Project.

Table 2, Agency Approvals and Requirements, lists all the agencies that are known or expected to have permit or approval authority over the Project.

TABLE 2
AGENCY APPROVALS AND REQUIREMENTS

Agency	Approval/Permit Required	Purpose
City of Pasadena	Pasadena Municipal Code (PMC) Exemption[1]	Allow for round-the-clock construction activity during well drilling.
	Well Permit	Allow for well construction.
State Water Resources Control Board, Division of Drinking Water (DDW)	Amendment to Domestic Water Supply Permit	Allow for operation of a new well in Pasadena's drinking water system.

[1] A waiver from City construction hour limits was issued by the City Manager for the Project on December 5, 2023. The City Manager is authorized to exempt construction from those limits imposed by PMC Section 9.36.070, Construction Projects, if the construction serves the best interest of the public and protects the public health, safety, and welfare pursuant to PMC Section 9.36.170, Exemptions.

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SECTION 4.0 ENVIRONMENTAL ASSESSMENT

This section includes the completed CEQA environmental checklist form, as provided in Appendix G of the State CEQA Guidelines, as well as substantiation and clarification for each checklist response. The checklist form is used to assist in evaluating the potential environmental impacts of the Explorer Well Project and identifies whether the Project is expected to have potentially significant adverse impacts.

1. **Project Title:** Explorer Well Project

2. **Lead Agency Name and Address:** City of Pasadena
   Department of Water and Power
   150 South Los Robles Avenue, Suite 200
   Pasadena, California 91101

3. **Contact Person and Phone Number:** Johnathan Giang
   626.744.8423

4. **Project Location:** At the former JPL East Parking Lot and north of the intersection of Windsor Avenue and Ventura Street, in Pasadena, Los Angeles County, California

5. **Project Sponsor's Name and Address:** City of Pasadena
   Department of Water and Power
   150 South Los Robles Avenue, Suite 200
   Pasadena, California 91101

6. **General Plan Designation:** Open Space, Institutional

7. **Zoning:** OS (Open Space) and PS (Public, Semi-Public)

8. **Description of Project:** The Project includes construction of a new well in the Hahamongna Watershed of the Arroyo Seco (in an area that was formerly the JPL East Parking Lot), installed to intercept a groundwater contamination plume (perchlorate and volatile organic compounds) and a new segment of pipeline to connect the well to the existing Monk Hill Treatment System (MHTS). See Section 3 for additional details.

9. **Surrounding land uses and setting:** The areas included in the Project are bound by residential uses in Pasadena and the community of Altadena to the east and south; open spaces in the ANF to the north; Devil's Gate Dam and Reservoir to the southwest; and the Arroyo Seco stream corridor, Oak Grove Park, and other recreational areas, and the JPL campus on the west. See Section 2 for additional details.

10. **Other public agencies whose approval is required:** State Water Resources Control Board, California Department of Water Resources, Division of Drinking Water (DDW).

11. Have California Native American tribes traditionally and culturally affiliated with the project area requested consultation pursuant to Public Resources Code section 21080.3.1? If so, has consultation begun? Tribal consultation has occurred consistent with Assembly Bill 52 (AB 52). More information is provided in Section 4.16 of this IS/MND, which addresses tribal cultural resources.

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:

The environmental factors checked below would be potentially affected by this Project, involving at least one impact that requires mitigation, as indicated on the following pages.

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

DETERMINATION:

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 revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☐ 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 one 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.

_____ _____
Signature of Lead Agency Representative Date

_____ City of Pasadena _____
Printed name Agency

Negative Declaration/Mitigated Negative Declaration adopted on: _____

Adoption attested to by: _____ _____
Printed name/Signature Date

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 State 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.

4.1 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?	☐	☐	☒	☐
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☐	☒
c) In non-urbanized areas, would the Project 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, would the Project conflict with applicable zoning and other regulations governing scenic quality?	☐	☐	☒	☐
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☒	☐

IMPACT ANALYSIS

Regulatory Requirements

There are no regulatory requirements applicable to aesthetics.

Impact Discussion

a) Would the project have a substantial adverse effect on a scenic vista?

Less Than Significant Impact. A scenic vista is generally defined as a viewpoint that provides expansive views of a highly valued landscape for the benefit of the public.

The City's General Plan EIR 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). The Project site is located near scenic vistas, including views of the reservoir behind Devil's Gate, the Arroyo Seco, and the foothills of the San Gabriel Mountains.

The Project site is visible to trail users of the Gabrielino Trail looking west to the bottom of an approximate 50-foot embankment. The Project site is also visible from vehicles traveling Explorer Road with the embankment in the background. There are also limited, distant views of the Project site for park users from portions of Hahamongna Watershed Park to the southwest of the Project site, and for trail users on the Fern Truck, Mountain View, and El Prieto Trail Loop. Due to

intermittent topography and development, the Project site is not visible from the Sunset Ridge Trail or the Altadena Crest Trail.

During construction, views of the well-drilling rig would be present for 24 hours per day for a period of approximately eight weeks. Viewers that would be temporarily affected would include trail and park users noted above, The well-drilling rig used during construction would be approximately 40 feet tall. The well-drilling rig and other construction equipment would temporarily alter views of vegetation and the Arroyo Seco to the west of the Project site for the users of the Gabrielino Trail. The rig would also alter views to the north and south from Explorer Road. Trail and park users would temporarily view an active construction site that interrupts and detracts from the natural scenic views as they pass the Project site. However, for these users the temporary altered views would be a minor change given that construction routinely occurs within an urbanized area. From other viewpoints including, Hahamongna Watershed Park and the Fern Truck, Mountain View, and El Prieto Trail Loop, the Project site is further in the distance and views of construction activities would be obscured and minimally visible. Therefore, Project construction activities would minimally alter these views.

Similarly, the temporary at-grade pipes that would be required during construction would not substantially alter views of scenic vistas as these temporary pipes would not require any vegetation removal. Therefore, given their limited height and because no vegetation would need to be removed, the proposed temporary at-grade pipes would not result in impacts related to scenic vistas.

The Explorer Well and associated well enclosure would be the primary visible aspects of the Project. The new well would include a 10-foot-high chain-link fence that would be installed around the well site. The fence would enclose the new well building and transformer. The new building would be a maximum of 16 feet tall. The Project site is located at the toe of an approximate 50-foot embankment with the Gabrielino Trail along the top. Due to this difference in elevation, the Project will be minimally noticeable from users of the Gabrielino Trail looking west towards the Arroyo Seco and the JPL campus beyond. For recreators in the open spaces of the Hahamongna Watershed Park, the Project will be viewed from the west and will therefore have the 50-foot embankment in the background. For viewers from Explorer Road, views of the embankment and some of the higher elevations beyond would be partially blocked by the new building, but views of the San Gabriel Mountains to the north would not be impacted. Therefore, views of the proposed building from these scenic vantage points would be minimal and fleeting for those passing through the Project site as the building would appear to blend in with the landscape and adjacent scattered development.

Therefore, the Project's proposed building to enclose the Explorer Well would result in a less than significant impact related to scenic vistas.

The Project would require the realignment of a 400-foot segment of Explorer Road to accommodate the Explorer Well. These improvements would have minimal visual effects as this work would all occur at- or below-ground level and, thus, would not obstruct any views. The below-grade pipeline installation would not affect scenic vistas since the pipeline improvements would be underground and would not change the visual quality of the Project site as these areas would be backfilled and re-paved prior to the completion of construction.

Therefore, the Project would result in a less than significant impact related to this threshold, and no mitigation is required.

b) Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?

No Impact. Based on a review of the California Department of Transportation, California Scenic Highway Mapping System, the Project site is not near a designated or eligible State scenic highway (Caltrans 2023). Specifically, the Project site is not visible from SR-2 (an Officially Designated Scenic Highway) or I-210 (an Eligible Scenic Highway) due to intervening topography and development. Further, the Project would not require the removal of any trees, rock outcroppings, or historic buildings.

Therefore, the Project would result in no impact related to this threshold, and no mitigation is required.

c) In non-urbanized areas, would the Project 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, would the Project conflict with applicable zoning and other regulations governing scenic quality?

Less Than Significant Impact. The Project site is in an urbanized area of the City pursuant to Section 21071 of the State CEQA Guidelines. Given that the Project site is in an urbanized area, the analysis for this threshold focuses on whether the Project would conflict with applicable zoning and other regulations governing scenic quality. The Project site is on land designated and zoned as Open Space (OS) on the City's Land Use Plan and Zoning Map. (Pasadena 2019, 2023a, 2023b).

The proposed Project has been planned in compliance with applicable City regulations related to scenic quality, including maximum building heights. More information related to Project consistency with plans, policies, and regulations is provided in Section 4.10, Land Use and Planning. As described in more detail in Section 4.10, the Project would not conflict with the applicable zoning and other regulations governing scenic quality established in the City of Pasadena.

Given that the Project would not conflict with applicable zoning and other regulations governing scenic quality, the Project would result in a less than significant impact related to this threshold, and no mitigation is required.

d) Would the project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

Less Than Significant Impact. During well drilling activities of the Explorer Well, there would be a period of 8 weeks during which drilling activities would occur for 24 hours a day. Lighting would be necessary at this location during nighttime activities. The Gabrielino Trail, Explorer Road, Hahamongna Watershed Park, and Fern Truck, Mountain View and El Prieto Trail Loop, which have views of the Project site, are closed during the evening hours. As such, in the absence of viewers at the said parks and trails, new impacts pertaining to nighttime views would not occur. During construction, the Project site would be lit more during nighttime hours than in existing conditions, which would be most noticeable for nearby residents. From a distance, the additional lighting would appear similar to the exterior lighting that already exists along nearby roads and at nearby residences in proximity to the Project site. Also, all construction lighting to be used for evening work would be hooded and oriented towards active work areas within the Project site and away from nearby and adjoining properties and streets. Therefore, nighttime lighting as part of

construction activities would be temporary and result in a less than significant impact, and no mitigation is required.

Upon completion, the building containing the Explorer Well would have two exterior lights that would be located above the doors on the east and south sides of the building at a height of approximately eight feet above ground. Nighttime views of the Project site from nearby residences and public roads to the east of the Project site would have views of the new lighting. This new lighting would appear as an extension of the existing lighting within the Project vicinity. The two proposed exterior lights would be photo controlled exterior LED light fixtures and would be down-cast. The exterior lights that are proposed on the Explorer Well building are similar to the exterior light that already exists in the vicinity of the Project site at the Behner Water Treatment Plant and the Arroyo Well and Booster Station. Therefore, operational lighting would result in a less than significant impact related to this threshold, and no mitigation is required.

Furthermore, as shown on Exhibit 3-4, the Project design does not include any highly reflective building materials or paints that would result in day-time glare that would be atypical of uses in the Project vicinity. Therefore, the Project would result in a less than significant impact pertaining to glare, and no mitigation is required.

MITIGATION MEASURES

No significant impacts pertaining to aesthetics were identified; therefore, no mitigation measures are required.

4.2 AGRICULTURE AND FOREST RESOURCES	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?	☐	☐	☐	☒
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒
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])?	☐	☐	☐	☒
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒
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?	☐	☐	☐	☒

IMPACT ANALYSIS

Regulatory Requirements

There are no regulatory requirements applicable to agriculture and forest resources.

Impact Discussion

a) Would the project 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?

b) Would the project conflict with existing zoning for agricultural use, or a Williamson Act contract?

e) Would the project 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?

No Impact. There are no parcels within the Project site that are currently utilized for agriculture or forestry purposes. According to the California Important Farmland Finder maintained by the California Department of Conservation (DOC), the Project site is mapped as Urban and Built-Up Land (DOC 2023a). Therefore, the Project would not result in the conversion of any lands

identified by the DOC as Prime Farmland, Unique Farmland, or Farmland of Statewide Importance Farmland.

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 OS, which is not one of the zones that permits commercial growing areas (Pasadena 2019). Accordingly, there is no agricultural zoning, and no Williamson Act contracts within the City (Pasadena 2015a).

Therefore, the Project would result in no impacts related to these thresholds, and no mitigation is required.

c) Would the project 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])?

d) Would the project result in the loss of forest land or conversion of forest land to non-forest use?

e) Would the project 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?

No Impact. There is no timberland, Timberland Production Zones, forest land, or farmland located within the City of Pasadena (Pasadena 2015a). Furthermore, the Project site does not currently contain any forested areas, with only limited tree coverage along its boundaries. As such, the Project would not conflict with the existing zoning for, or cause rezoning of, forest land, timberland, or timberland zoned Timberland Production.

Therefore, the Project would result in no impacts related to these thresholds, and no mitigation is required.

MITIGATION MEASURES

No significant impacts pertaining to agriculture and forest resources were identified; therefore, no mitigation measures are required.

4.3 AIR QUALITY	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?	☐	☐	☒	☐
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?	☐	☐	☒	☐
c) Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☒	☐
d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?	☐	☐	☒	☐

IMPACT ANALYSIS

Regulatory Requirements

RR AQ-1 Construction activities must be conducted in compliance with the South Coast Air Quality Management District's (SCAQMD's) Rule 403, Fugitive Dust, which requires the implementation of best available control measures (BACM) for any activity or man-made condition capable of generating fugitive dust including, but not limited to, earth-moving activities, construction/demolition activities, disturbed surface area, or heavy- and light-duty vehicular movement. The BACMs include stabilizing soil; watering surface soils and crushed materials; covering hauls or providing freeboard; preventing track-out; and limiting vehicle speeds and wind barriers, among others.

RR AQ-2 In accordance with the City's Climate Action Plan, construction equipment and vehicles are required to limit idling times to no more than three consecutive minutes.

Impact Discussion

a) Would the project conflict with or obstruct implementation of the applicable air quality plan?

Less Than Significant Impact. 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 3, California and National Ambient Air Quality Standards.

TABLE 3
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; ppm: parts per million; 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; 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 SO_2 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 SO_2 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.

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 4, Designations of Criteria Pollutants in the South Coast Air Basin, summarizes the attainment status of the SoCAB for the criteria pollutants.

TABLE 4
DESIGNATIONS OF CRITERIA POLLUTANTS
IN THE SOUTH COAST AIR BASIN

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

O_3: ozone; PM10: particulate matter 10 microns or less in diameter; PM2.5: particulate matter 2.5 microns or less in diameter; CO: carbon monoxide; NO_2: nitrogen dioxide; SO_2: sulfur dioxide.

* The Los Angeles County portion of the SoCAB is designated nonattainment for lead; the remainder of the SoCAB is designated attainment.

Source: SCAQMD 2017; USEPA 2022.

Sensitive Air Quality Receptors

Sensitive receptors include, but are not limited to, children, the elderly, persons with preexisting respiratory or cardiovascular illness, and athletes and others who engage in frequent exercise. The nearest sensitive receptors to the Project site are single-family residential land uses, which are located approximately 195 feet to the east of the Project site.

Project Effects

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 2022 AQMP was adopted on December 2, 2022, by the SCAQMD Governing Board. The 2022 AQMP evaluates integrated strategies and measures to meet the following NAAQS (SCAQMD 2022):

- 8-hour O_3 target of 80 parts per billion (ppb) by 2024, 75 ppb by 2032, 70 ppb by 2038;
- Annual PM2.5 target of 12 micrograms per cubic meter [µg/m^3] by 2025;
- 1-hour O_3 target of 120 ppb by 2023; and
- 24-hour PM2.5 target of 35 µg/m^3 by 2023.

Pursuant to the SCAQMD's CEQA Air Quality Handbook, a project would be inconsistent with the AQMP if it would (SCAQMD 1993):

- Create an increase in the frequency or severity of air quality violations; cause or contribute to new violations; delay attainment of air quality standards; or
- Exceed the assumptions of the AQMP.

For the first criterion, 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 exceed the SCAQMD CEQA air quality significance thresholds. A project with daily emission rates below the SCAQMD's established air quality significance thresholds (shown above in Table 3) would have a less than significant effect on regional air quality. As shown in response to Threshold 5.2(b) below, pollutant emissions from the Project would be less than the SCAQMD thresholds; therefore, the Project meets the first criterion.

With respect to the second criterion, the Project was evaluated to determine whether it would exceed the assumptions in the 2022 AQMP. The 2022 AQMP is a regional and multi-agency effort among the SCAQMD, CARB, Southern California Association of Governments (SCAG), and the USEPA. The purpose of the 2022 AQMP is to set forth a comprehensive program to promote reductions in criteria pollutants, greenhouse gases, and toxic risk and improve efficiencies in energy use, transportation, and goods movement. The 2022 AQMP incorporates the latest scientific and technical information and planning assumptions, including the 2020–2045 Regional Transportation Plan/Sustainable Communities Strategy; updated emission inventory methods for various source categories; and SCAG's latest growth forecasts (SCAQMD 2022). The 2022 AQMP includes strategies and measures necessary to meet the NAAQS. The AQMP is based on projections of energy usage and vehicle trips from land uses within the SoCAB.

The Project site has a General Plan land use designation of S and zoning designation of OS. The Project would develop a well, pipeline, and related improvements that the City has determined would be consistent with the OS land use designation and zoning classification. Moreover, the Project would not directly result in population growth or development, or new land uses that have not been anticipated in the 2022 AQMP and the Project does not involve land uses that would increase the frequency or severity of air quality violations; cause or contribute to new violations; or delay attainment of air quality standards or exceed the assumptions of the AQMP. Therefore, the Project would not conflict with or obstruct implementation of the AQMP. The Project would also involve development of local water supplies which is less energy and pollution intensive than importing water.

Therefore, the Project would result in a less than significant impact related to this threshold, and no mitigation is required.

b) Would the project 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.

Less Than Significant Impact. The SCAQMD has adopted significance thresholds to assess the regional impact of air pollutant emissions in the SoCAB. Table 5, 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 impact on air quality.

TABLE 5
SCAQMD REGIONAL POLLUTANT SIGNIFICANCE THRESHOLDS
(LBS/DAY)

Mass Daily Thresholds (lbs/day)		
Pollutant	**Construction**	**Operation**
VOC	75	55
NO_x	100	55
CO	550	550
PM10	150	150
PM2.5	55	55
SO_x	150	150
Lead	3	3

lbs/day: pounds per day; VOC: volatile organic compound; NOx: nitrogen oxides; CO: carbon monoxide; PM10: respirable particulate matter 10 microns or less in diameter; PM2.5: fine particulate matter 2.5 microns or less in diameter; SOx: sulfur oxides.

Source: SCAQMD 2019

Regional Construction Impacts

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 for the Project based on an estimate of construction equipment as well as scheduling and Project phasing assumptions that were developed by Psomas in consultation with the City. 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; and
- Mobile-source combustion emissions and fugitive dust from worker commute and truck travel.

Emissions were calculated using the California Emissions Estimator Model Version 2022.1.1.17 (CalEEMod) emissions inventory model (CAPCOA 2022). 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 Project. Consistent with the requirements of SCAQMD Rule 403 (**RR AQ-1**), watering for dust control is included in the emissions calculations.

The regional emissions thresholds that are presented above within Table 5 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, building construction) are identified by start date and duration, as described in Table 1. Each activity has associated off-road equipment (e.g., backhoes, loaders, cranes) and on-road vehicles (e.g., haul trucks, concrete trucks, worker commute vehicles). Detailed construction assumptions and CalEEMod inputs and outputs can be found in Appendix A.

Maximum daily construction emissions during the peak workday are shown in Table 6, Estimated Maximum Daily Construction Emissions. If construction is delayed or occurs over a longer time period, 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.

Therefore, the Project would result in a less than significant impact related to this threshold, and no mitigation is required.

TABLE 6
ESTIMATED MAXIMUM DAILY CONSTRUCTION EMISSIONS
(LBS/DAY)

Construction Year	VOC	NOx	CO	SOx	PM10	PM2.5
2024	3	31	47	<1	2	1
2025	2	14	23	<1	1	1
Maximum Construction Emissions	3	31	47	<1	2	1
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 2022.1.1.17

Localized Construction Impacts

In addition to the mass daily emissions thresholds established by the SCAQMD, short-term local impacts to nearby sensitive receptors from on-site emissions of NO_2, CO, PM10, and PM2.5 are examined based on SCAQMD's localized significance threshold (LST) methodology. To assess local air quality impacts for development projects without complex dispersion modeling, the SCAQMD has developed screening (lookup) tables that assist lead agencies in evaluating impacts. The LST method was developed to provide a conservative estimate of the level of project-generated air pollutants that have the potential to exceed the NAAQS or CAAQS, which could consequently result in adverse health impacts. Exceedance of the LST does not describe

the prevalence or magnitude of health effects, but rather assesses the potential for a project-related health effect to occur. The LST method cannot provide an estimate of health effects related to criteria pollutants or ozone. Reactive organic gases and NO_x are pollutants that contribute to the formation of ozone, otherwise known as ozone precursors. It would be too speculative to determine how an individual project could affect the formation of ozone, and how it could affect the health for a specific receptor because ozone does not fully form within the proximity of a Project site, and the formation of ozone is affected by solar irradiance, meteorological conditions, presence of ozone precursors from other sources, and other factors. As such, modeling of ozone concentrations is conducted on the "macro" scale of an air basin for all pollutant sources within the basin, and not for an individual project.

The LST method is recommended to be limited to projects that are five acres or less. 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. The emissions limits in the lookup tables are based on the SCAQMD's Ambient Air Quality Standards (SCAQMD 2022). The closest receptors that may remain for 1 hour are residential uses located approximately 195 feet to the east of the Project's boundaries.

Table 7, Construction-Phase Localized Significance Threshold Emissions, shows the maximum daily on-site emissions for construction activities compared with the SCAQMD LST screening criteria. The Project's maximum daily on-site emissions would occur during the demolition phase (for NOx and CO), and during the grading/excavation phase (for PM10 and PM2.5). As shown in Table 7, localized emissions for all criteria pollutants would be less than their respective screening criteria. Therefore, localized air quality impacts at receptors proximate to construction activities would be exposed to less than significant air quality impacts.

TABLE 7
CONSTRUCTION-PHASE
LOCALIZED SIGNIFICANCE THRESHOLD EMISSIONS

Emissions and Thresholds	Emissions (lbs/day)			
	NOx	CO	PM10	PM2.5
Project maximum daily on-site emissions	16	22	1	1
Localized Significance Threshold screening criteria*	**71**	**858**	**14**	**5**
Exceed screening criteria?	**No**	**No**	**No**	**No**

lbs/day: pounds per day; NOx: nitrogen oxides; CO: carbon monoxide; PM10: respirable particulate matter 10 microns or less in diameter; PM2.5: fine particulate matter 2.5 microns or less in diameter.

Note: Data is for SCAQMD Source Receptor Area 8, West San Gabriel Valley

* NOx, CO, PM10 and PM2.5 thresholds are based on a distance of 60 meters (197 feet) of the Project site.

Source: SCAQMD 2009 (thresholds); see Appendix A for CalEEMod model outputs.

Toxic Air Contaminants Impacts

Construction activities would result in short-term, Project-generated emissions of diesel particulate matter (DPM) from the exhaust of off-road, heavy-duty diesel equipment used for site preparation (e.g., demolition, excavation, and grading); paving; building construction; and other miscellaneous activities. CARB identified DPM as a Toxic Air Contaminant (TAC) in 1998. The dose to which receptors are exposed is the primary factor used to determine health risk. Dose is a function of the concentration of a substance or substances in the environment and the duration of exposure to the substance. Thus, the risks estimated for a maximally exposed individual are higher if a fixed exposure occurs over a longer time period. According to the California EPA's

Office of Environmental Health Hazard Assessment, health risk assessments—which determine the exposure of sensitive receptors to TAC emissions—should be based on a 30-year exposure period; however, such assessments should be limited to the period/duration of activities associated with the Project.

There would be relatively few pieces of off-road, heavy-duty diesel equipment in operation during Project construction, and the total construction period would be relatively short when compared to a 30-year exposure period. Combined with the highly dispersive properties of DPM and additional reductions in particulate emissions from newer construction equipment, as required by USEPA and CARB regulations as well as the relatively large distance between the Project site and the nearest sensitive land uses, construction emissions of TACs would not expose sensitive receptors to substantial emissions of TACs. Therefore, the Project would have a less than significant impacted related to TACs, and no mitigation is required.

Long-Term Operational Impacts

Once the Project is built, the primary usage of energy would be related to electricity consumed for the well operations. Sources of new energy demand resulting from Project implementation include the pump at the proposed Explorer Well. The Project is estimated to use approximately 1.4 million kilowatt hours per year. Electricity use would not result in direct air quality related emissions but would result in greenhouse gas emissions. Also, there would be a minor increase in trips to the Project site for inspection and maintenance of the proposed well and ancillary facilities. With implementation of the Project, there would be one monitoring and maintenance round trip per day, including Saturdays, for an increase in six round trips per week compared to existing trips. Emissions associated with the operations phase of the Project would be negligible given the nominal increase in trips. Based on the results of the CalEEMod modeling found in Appendix A of this IS/MND, the Project's operations phase would result in less than 1 pound per day of all analyzed criteria pollutants, which is substantially less than the SCAQMD's operations phase significance thresholds. Therefore, there would be less than significant operational impacts, and no mitigation is required.

Cumulative Basis

The SCAQMD in their White Paper on Regulatory Options for Addressing Cumulative Impacts from Air Pollution Emissions (presented to the Board on September 5, 2003), 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 analyzed in an Environmental Assessment or EIR, except for the Hazard Index for TAC emissions (SCAQMD 2003). Any projects that are found to result in less than significant impacts on a project level are not considered to be cumulatively considerable and consequently would not result in a considerable contribution to cumulative impacts. Using this rationale, since the Project impacts were identified as less than significant, the Project's contribution to cumulative impacts would also be less than significant.

Overall, the Project would have a less than significant impact related to this threshold, and no mitigation is required.

c) Would the project expose sensitive receptors to substantial pollutant concentrations?

Less Than Significant Impact. As described in Threshold 4.3(b), the Project would not result in any significant TAC air pollution impacts, and construction criteria pollutant emissions would be less than the conservative LSTs. 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 that would operate 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 Project would generate vehicle traffic from additional maintenance trips to the Project site that would not have occurred without implementation of the Project. Due to the low quantity of trips (i.e., one or two trips per day), and that vehicles are already nearby for maintenance of other existing facilities, this volume and duration of Project-related vehicle trips would not have the potential to substantially add to the average LOS at nearby intersections and consequently would not contribute to the potential for the formation of a CO hotspot.

Therefore, the Project would result in a less than significant impact related to this threshold, and no mitigation is required.

d) Would the project result in other emissions (such as those leading to odors adversely affecting a substantial number of people?

Less Than Significant Impact. 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. Additionally, the Explorer Well would be enclosed within a building and would not result in any airborne emissions or any substances that have odors that rise to a level of a public nuisance.

Odors would be generated from short-term construction equipment and activities 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 unfamiliar or necessarily objectionable. Furthermore, the odors would be temporary and would dissipate rapidly from the source with an increase in distance. All Project-related odors are construction related and short term in nature and would not rise to the level of a public nuisance; therefore, the Project would not result in odors or other emissions adversely affecting a substantial number of people.

As such, the Project would have a less than significant impact related to this threshold, and no mitigation is required.

MITIGATION MEASURES

No significant impacts pertaining to air quality were identified; therefore, no mitigation measures are required.

4.4 BIOLOGICAL RESOURCES	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 Wildlife or U.S. Fish and Wildlife Service?	☐	☒	☐	☐
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	☐	☐	☐	☒
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☐	☒
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☒	☐	☐
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☒	☐
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒

IMPACT ANALYSIS

Regulatory Requirements

There are no regulatory requirements applicable to biological resources.

Impact Discussion

a) Would the project 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 Wildlife or U.S. Fish and Wildlife Service?

Less Than Significant With Mitigation. A general biological resources survey and habitat assessment was conducted on the Project site by Psomas Senior Biologist Marc Blain on July 28, 2023. All areas within the Project's proposed disturbance limits were assessed to document existing biological resources and determine suitability to support other resources including special status plant and wildlife species.

As depicted in Exhibit 2b, the Project site is located within a formerly paved parking lot and is partially located within currently paved roadways (Explorer Road and Karl Johnson Parkway). The Project site lacks vegetation other than scattered non-native weeds and minimal overhanging canopy from adjacent vegetated natural areas. A review of all special status species potentially occurring in the Project region, as reported in the California Natural Diversity Data Base, indicates there is no suitable habitat to support special status plant or wildlife species within the Project site (Appendix E; Special Status Species Potentially Occurring in the Region). There is limited potential for special status bird species to fly over the Project site, but they would not be expected to utilize the Project site for foraging or breeding or any other activity that would result in them using or inhabiting the Project site for extended time.

One special status wildlife species, the coastal whiptail (*Aspidoscelis tigris stejnegeri*), a California species of special concern, may potentially occur off-site within adjacent upland vegetated natural areas. This reptile may occur but would likely be limited in numbers due to prior disturbance of the Project site and fragmented suitable habitat due to paved roadways and parking lots, residential development, and infrastructure facilities in the Project vicinity. Due to the Project site's proximity to potentially occupied habitat, coastal whiptail individuals have potential to be harmed during Project activities. Due to the status as a species of special concern, these impacts would be considered significant unless mitigated. Potential impacts on coastal whiptail would be reduced to a less than significant level with implementation of **MM BIO-1**, which requires the installation of exclusionary fencing between adjacent habitat and Project work areas.

The Project would result in indirect impacts resulting from increases in noise level, dust, night lighting during both construction and operation. However, due to the existing levels of indirect disturbances in the area from surrounding roadways, pedestrian trails, equestrian trails, water infrastructure facilities, JPL, residential communities, the Project's impact would be considered negligible and unlikely to have a measurable effect on special status species. Therefore, the indirect impacts of the Project would be considered less than significant.

With implementation of **MM BIO-1**, the Project would have a less than significant impact related to this threshold.

b) Would the project 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 Wildlife or U.S. Fish and Wildlife Service?

No Impact. As described above, the Project site surface is paved and was formerly a parking area. The site lacks vegetation other than scattered individual weeds and minimal overhanging canopy from adjacent vegetated natural areas (See Exhibit 2b). Due to the lack of vegetation on the site, no riparian habitat or other sensitive natural community would be impacted by the Project. Although trimming of a few branches overhanging the site may occur as needed, these individual plants do not constitute a community and disturbance would be extremely limited and would not have a measurable effect on any habitat or community. Therefore, the Project would have no impact related to this threshold, and no mitigation is required.

c) Would the project have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

No Impact. No riparian habitat, wetlands, or watercourses occur within the Project site or immediately adjacent areas. The nearest natural jurisdictional drainage with riparian habitat, the

Arroyo Seco channel, is located approximately 500 feet to the west. The nearest potentially protected riparian habitat is located on the margin of an infiltration basin approximately 200 feet northwest of the Project well site and further from the pipeline portions of the site. Therefore, the Project would have no impact related to this threshold, and no mitigation is required.

d) Would the project 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?

Less Than Significant With Mitigation. The Project site is not expected to support regional wildlife movement due to the Project Site's limited size and location outside of recognized regional wildlife movement corridors. The Arroyo Seco and Hahamongna Watershed Park do provide for local wildlife movement, especially for urban-adapted wildlife such as coyotes, foxes, raccoons, and opossums through the area. However, considering the Project site is a former parking lot, lacks vegetation, and is located outside of recognized regional wildlife movement corridors, it does not support regional wildlife movement. As a result, the Project site would not be considered a vital component to the function of this area for regional wildlife movement. There may be indirect effects on wildlife movement (e.g., increased noise or dust), but these would be considered negligible and unlikely to affect existing wildlife movement in the watershed.

Nesting birds are protected under the provisions of the Migratory Bird Treaty Act and California Fish and Game Code. The U.S. Fish and Wildlife Service periodically publishes the list of migratory birds covered by the provisions of this statute, but essentially all naturally occurring bird species in North America would be migratory and are included on the list. The Project site provides very limited potential for nesting birds; however, adjacent areas support potentially suitable nesting habitat for migratory birds, which could be adversely impacted indirectly by construction of the Project. The loss of an active nest may be considered potentially significant; therefore, **MM BIO-2** would be implemented requiring that all construction activities occur outside the bird nesting season. If construction must occur between February 1 and September 15, which is within the bird nesting season, a pre-construction survey for nesting birds (including raptors), is required and any active nests must be protected to reduce potentially significant impacts to a level of less than significant.

With implementation of **MM BIO-2**, the Project would result in a less than significant impact related to this threshold.

e) Would the project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

Less Than Significant Impact. The City of Pasadena tree protection ordinance, codified as Chapter 8.52 of the City's Code of Ordinances, provides protections for all public trees and it is a violation to prune, remove, injure, or plant a public tree without a City permit. Disturbance in the root zone of a protected tree may be considered a potential injury. A survey of the Project site was conducted by Psomas, as noted above, which determined that there are no trees within the Project site. However, regulated trees are present within areas adjacent to the Project site. The root zone of a tree under normal conditions is typically considered to match the drip line. Although unlikely, it is possible that trenching activities for new pipeline construction that would occur on the roadway between the Arroyo Well and the Ventura Well (Karl Johnson Roadway) could injure tree roots.

Therefore, trees regulated by the City of Pasadena tree ordinance may be impacted by trenching and/or other Project activities. The project will comply with the City ordinance and will obtain authorization from the City Manager prior to any potential impact on a regulated tree. Therefore,

such impacts would not result in a conflict with a local ordinance protecting biological resources, and no mitigation is required.

f) Would the project conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?

No Impact. There is no adopted Habitat Conservation Plan (HCP); Natural Community Conservation Plan; or other approved State, regional, or local HCP that applies to the Project site. Therefore, the Project would result in no impact related to this threshold, and no mitigation is required.

Mitigation Measures

MM BIO-1 Prior to the start of construction of the Explorer Well portion of the Project, an exclusionary fence shall be installed to prevent coastal whiptail from entering the work area. The fence shall be installed along the eastern edge of the project disturbance limits at the Explorer Well, which is located at the toe of the vegetated slope. The exclusionary fencing shall consist of silt fencing, buried six inches deep where feasible and installed with no gaps in the fencing. Fencing shall be installed under the supervision of a qualified Biologist to ensure that wildlife are not impacted during installation of the fence. Exclusionary fencing shall be maintained throughout construction of the Explorer Well and shall be removed upon completion of the Explorer Well construction activities.

MM BIO-2 If feasible, project construction shall be conducted between September 16 and January 31, which is outside the bird nesting season. Construction conducted within this period shall be considered in compliance with the conditions set forth in the Migratory Bird Treaty Act (MBTA) and *California Fish and Game Code* with methods approved by the U.S. Fish and Wildlife Service (USFWS) and California Department of Fish and Wildlife (CDFW) to protect active bird and raptor nests. If the nature of the proposed construction activities requires that work be conducted during the breeding season for nesting birds (March 15–September 15) or nesting raptors (February 1–June 30), to avoid direct impacts on active nests, a pre-construction survey shall be conducted by a qualified Biologist for nesting birds and/or raptors within 3 days prior to any construction or disturbance activities (i.e., within 300 feet for nesting birds and within 500 feet for nesting raptors). If the Biologist does not find any active nests within or immediately adjacent to the impact area, the construction work shall be allowed to proceed. If a lapse of more than three days occurs between outdoor disturbance activities, the nesting bird survey will need to be repeated as nesting activities may potentially occur in that time frame. Results of the surveys will be provided to the City and to CDFW.

If the Biologist finds an active nest within or immediately adjacent to the construction area and determines that the nest may be impacted or breeding activities substantially disrupted, the Biologist shall delineate an appropriate buffer zone (at a minimum of 25 feet) around the nest depending on the sensitivity of the species and the nature of the construction activity. Any nest found during survey efforts shall be mapped on the construction plans. The active nest shall be protected until nesting activity has ended. To protect any nest site, the following restrictions to construction activities shall be required until nests are no longer active, as determined by a qualified Biologist: (1) clearing limits shall be established within a buffer around any occupied nest (the buffer shall be 25–100

feet for nesting birds and 300–500 feet for nesting raptors), unless otherwise determined by a qualified Biologist and (2) access and surveying shall be restricted within the buffer of any occupied nest, unless otherwise determined by a qualified Biologist. Encroachment into the buffer area around a known nest shall only be allowed if the Biologist determines that the proposed activity would not disturb the nest occupants. Construction can proceed when the qualified Biologist has determined that fledglings have left the nest or the nest has failed.

4.5 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 historical resource pursuant to § 15064.5?	☐	☐	☐	☒
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to § 15064.5?	☐	☒	☐	☐
c) Disturb any human remains, including those interred outside of dedicated cemeteries?	☐	☐	☒	☐

IMPACT ANALYSIS

Regulatory Requirements

RR CUL-1 If human remains are encountered during excavation activities, all work is required to halt in the immediate vicinity of the discovery and the County Coroner must be notified (*California Public Resources Code* §5097.98). The Coroner is required to determine whether the remains are of forensic interest. If the Coroner, with the aid of an archaeologist, determines that the remains are prehistoric, they are required to contact the Native American Heritage Commission (NAHC). The NAHC is responsible for designating the most likely descendant (MLD), who is responsible for the ultimate disposition of the remains, as required by Section 7050.5 of the *California Health and Safety Code.* The MLD is required to make their recommendation within 48 hours of being granted access to the site. The MLD's recommendation is required to be followed, if determined by the landowner to be feasible, and may include scientific removal and non-destructive analysis of the human remains and any items associated with Native American burials (*California Health and Safety Code* §7050.5). If the landowner rejects the MLD's recommendations, at a minimum the landowner is required to rebury the remains with appropriate dignity on the property in a location that will not be subject to further subsurface disturbance (*California Public Resources Code* §5097.98).

Impact Discussion

a) Would the project cause a substantial adverse change in the significance of a historical resource pursuant to § 15064.5?

No Impact. A cultural resources records search and literature review for the Project was conducted at the South-Central Coastal Information Center (SCCIC) in July 2023. The records search included a ½-mile radius around the Project site and was conducted by Psomas cultural resource staff. The purpose of the SCCIC search was to identify precontact[2] or historic archaeological sites or historic buildings and structures previously recorded within and around the Project site. The results revealed that 20 cultural resource studies have been conducted within the ½-mile radius of the Project site. Of the 20 studies, one study (LA-6948) from 2002 covered (e.g., previously studied) a portion of the Project site. The remaining studies range in date from 1965 to 2012 and did not overlap with the Project site. The types of studies identified from the literature review include archaeological resource surveys and assessments, and literature and

[2] Precontact refers to a period of time before contact of an indigenous people with European culture.

background research for the region. These studies are evidence of the cultural resource sensitivity of the region, including the Project site. However, even though the region is sensitive for cultural resources (Walker 1951), the SCCIC records search identified no previously recorded cultural resources within or adjacent to the Project site.

The California Historic Resources Information System (CHRIS) records indicate that the Angeles National Forest (Resource P-19-186535) is a registered California Historical Landmark; however, the Project is not anticipated to impact this resource.

The cultural studies for the Arroyo Seco Canyon Project identified that there are eight built environment resources near the Project site (City of Pasadena 2020a, 2020b). These resources include the Jet Propulsion Laboratory campus, the registered National Historic Landmark Space Flight Operations Facility and the National Register of Historic Places (NRHP) eligible Space Simulator, which are both within the Jet Propulsion Laboratory campus; the United States Department of Agriculture (USDA) Forest Service Oak Grove administrative site; two individual buildings within the Arroyo Seco Ranger Station administration site; a USDA Forest Service Road; and the California Register of Historical Resources (CRHR) listed single-family property built in 1924 known as the Buffum House. The Arroyo Seco Canyon Project's EIR also determined that there were an additional three built resources near the Project site, including the Behner Water Treatment Plant, Bridge No. 2, and Bridge No. 3, that were found to be eligible for NRHP, CRHR, and local designation. The Project would not affect any of the aforementioned cultural or historical resources.

Given that there are no known historical resources located on or adjacent to the Project site, that are listed or eligible for listing under the NRHP or the CRHR, the Project would not result in impacts related to this threshold, and no mitigation is required.

b) Would the project cause a substantial adverse change in the significance of an archaeological resource pursuant to § 15064.5?

Less Than Significant With Mitigation. As discussed above, there is one documented cultural resource study that covered a portion of Project site, but no cultural resources have been recorded within or adjacent to the Project site itself.

However, because the region is sensitive for precontact cultural resources (Walker 1951), it is likely that indigenous Californians traversed the Project site and surrounding area in precontact times. Nevertheless, the surrounding floodplain has likely washed away archaeological resources or buried them by alluvial and colluvial processes, thus impacting the integrity of the archaeological resource(s). While unlikely, buried intact cultural resources with integrity could exist on the Project site in previously undisturbed soils that could be damaged by ground disturbing activities for Project construction. However, much of the Project's grading, excavation, trenching, and construction of building foundations would involve disturbance of previously disturbed areas, which reduces the likelihood of encountering cultural resources. Nonetheless, if intact archaeological resources were to be encountered, that would represent a significant impact to an archaeological resource.

To avoid impacts to archaeological resources potentially discovered during Project ground disturbance activities, **MM CUL-1** would be implemented, which requires that a qualified archaeologist be retained for on-call services in the event of the discovery of archaeological resources during ground disturbing activities. Any discovered resources would be evaluated for significance by a qualified archaeologist and a mitigation plan would be developed in consultation with the City and the local Native American community (if resources are precontact in origin). With

implementation of **MM CUL-1,** the Project would have a less than significant impact related to this threshold.

c) Would the project disturb any human remains, including those interred outside of formal cemeteries?

Less Than Significant Impact. While human remains from the Precontact period have been found elsewhere in the City of Pasadena, the SCCIC records search did not identify documented evidence of any known human remains on or near the Project site. In the unlikely event of an unanticipated encounter with human remains, the California Health and Safety Code and the California Public Resources Code require that any activity near a potential find be halted, and the Los Angeles County Coroner be notified, as described in **RR CUL-1**. With implementation of **RR CUL-1**, the Project would result in a less than significant impact related to this threshold, and no mitigation is required.

MITIGATION MEASURES

MM CUL-1 Prior to commencement of earthmoving activities, the City shall retain a qualified Archaeologist meeting the Secretary of the Interior's Professional Qualification Standards for Archaeology. The Archaeologist shall be present at the pre-grade conference; shall establish procedures for archaeological resource surveillance; and shall establish, in cooperation with the Contractor, procedures for temporarily halting or redirecting work to permit the sampling, identification, and evaluation of the artifacts, as appropriate. At a minimum, in the event archaeological resources are exposed during construction activities, all construction work occurring within 100 feet of the find shall immediately stop until a qualified archaeologist can evaluate the significance of the find and determine whether additional study is warranted. The Archaeologist shall first determine whether it is a "unique archaeological resource" pursuant to the California Environmental Quality Act (CEQA, i.e., Section 21083.2[g] of the California Public Resources Code) or a "historical resource" pursuant to Section 15064.5(a) of the State CEQA Guidelines. If the archaeological resource is determined to be a "unique archaeological resource" or a "historical resource", the Archaeologist shall formulate a mitigation plan in consultation with the City of Pasadena that satisfies the requirements of the above-referenced sections. The Archaeologist shall prepare a report of the results of any study prepared as part of a testing or mitigation plan, following guidelines of the California Office of Historic Preservation, and they shall record the site and submit the recordation form to the City of Pasadena and the California Historic Resources Information System (CHRIS) at the South-Central Coastal Information Center (SCCIC) at California State University, Fullerton. Work may proceed in other areas of the site, subject to the direction of the Archaeologist.

4.6 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?	☐	☐	☒	☐
b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?	☐	☐	☒	☐

IMPACT ANALYSIS

Regulatory Requirements

There are no regulatory requirements applicable to energy.

Impact Discussion

a) Would the project result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?

Less Than Significant Impact. Related to existing demands for energy, the existing wells, booster stations and treatment facility that are a part of the MHTS currently use energy for their operation. There is an existing Southern California Edison high-voltage overhead power line that crosses the Arroyo Seco in an east-west direction to the north of the Project. The Project site is within the PWP service area and there are PWP overhead power lines along North Windsor Avenue adjacent to the MHWTP, along North Arroyo Boulevard/Gabrielino Trail for service to the Behner Water Treatment Plant and other facilities to the north, and along other paths to service other facilities in the extended Project area.

Project construction would require the use of construction equipment for well drilling, vehicles of construction workers and vendors traveling to and from the Project site, on-road haul trucks for the export of materials from site clearing and the export of sediment from excavation, and semi-trailer trucks for the delivery of equipment and materials.

Off-road construction equipment use was calculated from the equipment data (vehicle types, hours per day, horsepower, load factor) provided in the CalEEMod construction output files that are included in Appendix A. The total horsepower hours for construction equipment used for the Project was then multiplied by fuel usage rates to obtain the total fuel usage for off-road equipment.

Fuel consumption from construction worker, vendor, and delivery/haul trucks was calculated using the trip rates and distances provided in the CalEEMod construction output files. Total vehicle miles traveled (VMT) was then calculated for each type of construction-related trip and divided by the fuel consumption factor from CARB's Emission FACtors (EMFAC) 2021 model. EMFAC provides the total annual VMT and fuel consumed for each vehicle type. Construction vendor and delivery/haul trucks were assumed to be heavy-duty diesel trucks. As shown in Table 8, Energy

Use During Construction, the Project is estimated to consume a total of 12,657 gallons of gasoline and 25,857 gallons of diesel fuel during construction.

TABLE 8
ENERGY USE DURING CONSTRUCTION

Source	Gasoline Fuel (gallons)	Diesel Fuel - (gallons)
Off-road Construction Equipment	4,969	25,486
Worker commute	7,659	19
Vendors	28	0
On-road haul and delivery	0	352
Total	**12,657**	**25,857**
Sources: Psomas 2020 based on data from CalEEMod (Appendix A), Offroad, and EMFAC2021 (Appendix B).		

Fuel energy consumed during construction would be temporary in nature and 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 comparable equipment at construction sites in other parts of the State. Therefore, construction of the Project would not result in inefficient, wasteful, or unnecessary fuel consumption.

Sources of new energy demand resulting from Project implementation include the pump at the proposed Explorer Well. The Project is estimated to use approximately 1.4 million kilowatt hours per year. This new demand for energy is not enough to require the development of new energy sources. No demand for natural gas would be created by the Project. Energy used in the operation of the Project allows for improved resiliency of the water system and reliability of PWP's local water supply, thereby lessening dependence on more energy-intensive imported water.

Also, a minimal amount (1–2 trips/day) of maintenance and inspection activities would generate vehicle trips that would utilize fossil fuels.

Due to the relatively small amount of energy used for operation and because the Project has public utility through the treatment of groundwater, the Project's energy use would not be considered wasteful or inefficient.

Therefore, the Project would result in a less than significant impact related to this threshold, and no mitigation is required.

b) Would the project conflict with or obstruct a state or local plan for renewable energy or energy efficiency?

Less Than Significant Impact. Operation of the Explorer Well's pump would require use of electricity. Electricity would be provided by tying into existing PWP infrastructure. Specifically, there are existing PWP overhead power lines and power poles in and near the site that would be used for the Project. Therefore, although the Project would result in a slight increase in overall electrical usage, no new major infrastructure (i.e., new energy sources) would be required to support the Project, and any new electrical connections would be constructed in accordance with the City's Building Code.

The City's Energy Element of the 1983 General Plan was replaced by the City's Open Space and Conservation Element in 2012 (City of Pasadena 2012). The purpose of the Open Space and

Conservation Element is to develop policies that promote the conservation of energy, air, water, and natural resources to enhance the overall quality of life in Pasadena. In terms of energy, the City seeks to improve energy conservation, expand renewable energy production, and promote sustainability. As discussed in the “Existing Utility Conditions and Urban Planning” Section of this Element, the City has goals of increasing conservation, efficiency, and sustainability. The Project is consistent with these goals since the Project would extract and clean local groundwater, which can help the City to have less dependence on imported water

Therefore, the Project would result in a less than significant impact related to this threshold, and no mitigation is required.

MITIGATION MEASURES

No significant impacts pertaining to energy were identified; therefore, no mitigation measures are required.

4.7 GEOLOGY AND SOILS	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
Would the project:				
a) Expose people or structures to 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.	☐	☐	☒	☐
ii) Strong seismic ground shaking?	☐	☐	☒	☐
iii) Seismic-related ground failure, including liquefaction?	☐	☐	☒	☐
iv) Landslides?	☐	☐	☒	☐
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☒	☐
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?	☐	☐	☒	☐
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?	☐	☐	☒	☐
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 waste water?	☐	☐	☐	☒
f) Directly or indirectly destroy a unique paleontological resource or site or unique geological feature?	☐	☒	☐	☐

IMPACT ANALYSIS

Regulatory Requirements

RR GEO-1 Grading, excavation, and construction is required to comply with the City's Building Code (Title 14 of the Pasadena Municipal Code, which incorporates the California Building Code), as they relate to site preparation and construction; alteration; moving; demolition; repair; use and occupancy of buildings; structures and building service equipment within the City. The California Building Code requires the preparation of engineering geologic reports, supplemental ground-response reports, and/or geotechnical reports for all new construction; new structures on existing sites; and alterations to existing buildings. It also includes seismic design criteria and requirements for use in the structural design of buildings (i.e., based on seismic hazard maps and the seismic design category) and specifies building components that require special seismic certification.

Impact Discussion

a) Would the project expose people or structures to 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.

Less Than Significant Impact. According to the Geotechnical Report prepared for the Project, included as Appendix C, there is no presence of active faulting within the Project site (Leighton Consulting Inc. 2018). Furthermore, the Project site does not occur within an "Earthquake Fault Zone," as defined by the State of California in the Alquist-Priolo Earthquake Fault Zoning Act (DOC 2023b). There are no known faults that underlie the Project site, but the Sierra Madre Fault Zone is located approximately 0.25-mile north of the Project site (DOC 2023b; Leighton Consulting Inc. 2018). Therefore, the Project would not expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving rupture of a known earthquake fault. The Project would result in less than significant impacts related to this threshold, and no mitigation is required.

ii) Strong seismic ground shaking?

Less Than Significant Impact. The Project site, as with the entire Southern California region, is subject to secondary effects from earthquakes. There are no known faults that underlie the Project site, but the Sierra Madre Fault Zone is located approximately 0.25-mile north of the Project site (DOC 2023b; Leighton Consulting Inc. 2018).

Implementation of the Project would not change the intensity of ground shaking that would occur on the Project site during a seismic event, but it would result in the exposure of a new structure to seismic activity. The proposed building and other improvements would be designed in accordance with the 2022 California Building Code (CBC; CBSC 2022). The CBC contains minimum standards regulating the design and construction of excavations, foundations, retaining walls, and other building elements to control the effects of seismic ground shaking and adverse soil conditions. The CBC also includes provisions for earthquake safety based on factors such as occupancy type, the types of soil and rock on-site, and the strength of ground motion that may occur at the Project site. Project implementation would also occur consistent with the recommendations outlined in the Geotechnical Report prepared for the Project.

Compliance with the applicable regulations would reduce potentially significant impacts that may result from strong seismic ground shaking at the Project site to less than significant levels.

Therefore, the Project would have a less than significant impact related to this threshold, and no mitigation is required.

iii) Seismic-related ground failure, including liquefaction?

Less Than Significant Impact. Liquefaction is the loss of soil shear strength due to a buildup of pore-water pressure during severe and sustained ground shaking. Liquefaction is associated primarily with loose (low density), saturated, fine-to-medium grained, cohesionless soils. As shaking action of an earthquake progresses, soil grains are rearranged and densify within a short period of time. Rapid densification of soil results in a buildup of pore-water pressure within saturated soils. When the pore-water pressure approaches the total overburden pressure, then soil shear strength reduces

greatly, and the soil temporarily behaves similarly to a fluid. Effects of liquefaction can include sand boils, settlement, and bearing capacity failures below structural foundations.

According to the Geotechnical Report, the Project site is located within a potential liquefaction hazard zone (Leighton Consulting Inc. 2018). However, groundwater was not encountered in the test pits excavated to a maximum depth of 8 feet at the Project site. Historical high groundwater levels were mapped at 20 feet below the ground surface at the site and potential for liquefaction occurring at the Explorer Well Project site is low due to the coarse and well graded alluvium with cobbles and boulders. In addition, the Project would be required to be built in accordance with recommendations in the NASA Optimization Plan and in compliance with applicable building code regulations (**RR GEO-1**), which would ensure that the structural integrity of the proposed improvements can withstand hazards, such as liquefaction. Moreover, the Project would not exacerbate liquefaction hazards within the Project site or in the vicinity of the Project site.

As such, the Project would result in a less than significant impact related to this threshold, and no mitigation is required.

iv) Landslides?

Less Than Significant Impact. Seismic hazards, such as landslides, would have the potential to damage the proposed infrastructure. However, the Project does not propose any habitable structures or structures whose height, mass, or materials would pose a hazard in the event of an earthquake. The Project site is considered generally level without significant slopes. As such, the Project site is not considered susceptible to either static or seismically-induced slope instability (Leighton Consulting Inc. 2018, DOC 2023c). Additionally, the Project would be required to be built in accordance with applicable building code regulations (**RR GEO-1**), which would ensure that the structural integrity of the proposed improvements can withstand seismic hazards.

Through compliance with **RR GEO-1**, the Project would result in a less than significant impact related to this threshold, and no mitigation is required.

b) Would the project result in substantial soil erosion or the loss of topsoil?

Less Than Significant Impact. The largest source of erosion and topsoil loss, particularly in a developed environment, is uncontrolled drainage during construction. Since the Project site would have more than one acre of ground disturbance, compliance with the SWRCB's National Pollutant Discharge Elimination System (NPDES) Construction General Permit[3] would be required. This would require preparation of a project-specific Storm Water Pollution Prevention Plan (SWPPP), which describes practices to reduce pollutants in stormwater discharges from the construction site by implementing best management practices (BMPs), such as sandbags and detention basins. The Project's potential construction and operational stormwater impacts, and applicable regulatory requirements are addressed further in Section 4.10, Hydrology and Water Quality.

The Project would include asphalt paving of a small area (i.e., 250 square feet) that is not currently paved. However, this area is within the footprint of the former JPL East Parking Lot, so a larger impervious area existed previously and drained to surrounding pervious areas without issues of soil erosion. Similar to previous drainage patterns for the parking lot, stormwater generated on the Project site would be conveyed downslope to offsite pervious surfaces as either sheet flow runoff or directed via an existing drainage ditch to an existing spreading basin. Soils in the former JPL East Parking Lot have been classified as "stream deposits" from the Arroyo Seco and consist

[3] 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.

primarily of gravelly sands with cobbles and boulders, which are excellent permeable materials (Converse Consultants 2013). Furthermore, the Hahamongna Watershed Park is an area that is designed to receive stormwater flows with the downstream Devil's Gate Reservoir serving to retain excess flows. Therefore, the stormwater generated by the Project's minor addition of approximately 250 square feet of impervious surface would likely percolate in the surrounding pervious area in a manner that would not substantially increase soil erosion or loss of topsoil.

In conclusion, the Project would result in a less than significant impact related to this threshold, and no mitigation is required.

c) Would the project 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?

Less Than Significant Impact. Secondary seismic hazards related to the underlying geologic unit include several types of ground failure that can occur due to severe ground shaking. 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 expansive soils. Liquefaction and landslides are addressed under Thresholds 4.7(a)(iii) and 4.7(a)(iv) above, and there would be a less than significant impact associated with these conditions. Lateral spreading is a liquefaction-related phenomenon; therefore, the above analysis in Threshold 5.7(a)(iii) would also apply to this secondary seismic hazard. 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 underlain by clay, and primarily underlain by fill and medium dense to very dense subsurface granular soils (Leighton Consulting Inc. 2018). The Project would include groundwater extraction; however, this would not increase the susceptibility of areas near the Project site to subsidence or collapsible soils given that the underlying groundwater basin is adjudicated and parties subject to the Raymond Basin Judgment, including PWP, are limited in the amount of groundwater that can be extracted based on the basin's safe yield. Safe yield of a groundwater basin is defined as the supply which can continuously be withdrawn without permanent and progressive lowering of the water table. Without lowering of the groundwater table, the Project would not result in subsidence impacts.

Furthermore, the proposed building that would contain the Explorer Well would be built in compliance with applicable building code regulations (**RR GEO-1**), which would ensure that the structural integrity of the proposed improvements can withstand seismic hazards. Additionally, the Project would comply with all recommendations as set forth in the Geotechnical Report, which would minimize adverse safety effects associated with unstable geologic units or soils to the maximum extent practicable. As such, the Project would result in a less than significant impact related to this threshold, and no mitigation is required.

d) Would the project be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?

Less Than Significant Impact. Expansive soils are soils that swell when they absorb water and shrink as they dry, such as pure clay soils and claystone. The hazard associated with expansive soils is that they can overstress and cause damage to the foundation of buildings set on top of them. As stated under Threshold 4.7l, the Project site is not underlain by clay, and expansive native soils were not encountered or expected within this portion of the City (Leighton Consulting Inc. 2018). Additionally, the Project would be built in compliance with applicable building code

regulations (**RR GEO-1**), which would ensure that the structural integrity of the proposed improvements can withstand seismic hazards. Therefore, the Project would result in a less than significant impact related to this threshold, and no mitigation is required.

e) Would the project 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 waste water?

No Impact. There are no proposed sanitary facilities associated with the Project. Therefore, the Project would result in no impact related to this threshold, and no mitigation is required.

f) Would the project directly or indirectly destroy a unique paleontological resource or site or unique geological feature?

Less Than Significant With Mitigation. A paleontological resources records search and literature review for the Project was conducted at the Vertebrate Paleontology Section of the Natural History Museum (NHM), Los Angeles County in July 2023. The records search included a ½-mile radius around the Project site and was conducted by NHM staff. The purpose of the search was to identify paleontological resources or unique geological features previously recorded within and around the Project site and to assess the overall paleontological sensitivity for the Project site. The records search conducted at the NHM did not identify any previously recorded paleontological resources or unique geological features that lie directly within the Project site. However, several fossil localities have been documented nearby from the same sedimentary deposits that occur in the Project site, either at the surface or a depth. These paleontological resources include mammoth (*Mammuthus*), horse (*Equus*), sabertooth cat (*Smilodon*), turkey (*Meleagris*), and several uncatalogued invertebrates.

Only one of the geologic units underlying the Project site, Quaternary older alluvial sediments (Qoa), has as much as a moderate potential to yield paleontological resources. Therefore, excavations less than approximately five feet in depth, within the geologic materials overlying the Qoa deposits, are not likely to encounter paleontological resources. Deeper excavations that are over five feet in depth could expose paleontological resources. If paleontological resources were encountered and damaged by heavy equipment, a significant impact related to this threshold could result.

Therefore, to avoid impacts to paleontological resources, the Project would implement **MM GEO-1**, which requires that a qualified Paleontologist be retained for on-call services in the event of the discovery of paleontologically sensitive rock formations (i.e., Quaternary older alluvial sediments) during ground disturbance activities. Any discovered resources would be evaluated for significance by the paleontologist and appropriate exploration, salvage, and curation of significant paleontological resources, if necessary, would also be conducted, and a mitigation plan would be developed. With implementation of **MM GEO-1,** impacts related to this threshold would be less than significant.

MITIGATION MEASURES

MM GEO-1 Prior to commencement of earthmoving activities, the City shall retain a qualified Paleontologist, for on-call services in the event of a discovery of paleontologically sensitive rock formations (i.e., Quaternary older alluvial sediments) during ground disturbance activities. The Paleontologist shall be present at the pre-grade conference; and shall establish, in cooperation with the Contractor, procedures for temporarily halting or redirecting work to permit the sampling, identification, and evaluation of any discovered paleontological resources. Should these resources

be found during ground-disturbing activities for the Project, the Paleontologist shall first determine whether it is a significant paleontologically sensitive fossil locality or rock formation. If the above-mentioned resources are found during earthmoving activities, the Paleontologist shall formulate a report and a mitigation plan in consultation with the City of Pasadena. For paleontological resources, the disposition of the resources shall be subject to approval by the City. All recovered paleontologically sensitive fossils and rock formations shall be deposited in an accredited institution or museum, such as the Natural History Museum of Los Angeles County. If resources are discovered, work may proceed in other areas of the Project site, subject to the direction of the Paleontologist.

4.8 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?	☐	☐	☒	☐
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☒	☐

IMPACT ANALYSIS

Regulatory Requirements

There are no regulatory requirements applicable to greenhouse gas emissions.

Impact Discussion

a) Would the project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

Less Than Significant Impact. 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.

GHGs vary widely in the power of their climatic effects; therefore, climate scientists have established a unit called Global Warming Potential (GWP). The GWP of a gas is a measure of both potency and lifespan in the atmosphere as compared to CO_2. For example, since CH_4 and N_2O are approximately 28 and 265 times more powerful than CO_2, respectively, in their ability to trap heat in the atmosphere, they have GWPs of 28 and 265, respectively (CO_2 has a GWP of 1). Carbon dioxide equivalent (CO_2e) is a quantity that enables all GHG emissions to be considered as a group despite their varying GWPs. The GWP of each GHG is multiplied by the prevalence of

that gas to produce CO_2e. The atmospheric lifetime and GWP of selected GHGs are summarized in Table 9, Global Warming Potentials and Atmospheric Lifetimes.

TABLE 9
GLOBAL WARMING POTENTIALS AND ATMOSPHERIC LIFETIMES

Greenhouse Gas (ppt)	Atmospheric Lifetime (years)	Global Warming Potential (100-year time horizon)
Carbon Dioxide (CO_2)	50.0–200.0	1
Methane (CH_4) (ppb)	12.4	28
Nitrous Oxide (N_2O) (ppb)	121.0	265
HFC-134a	13.4	1,300
PFC-14 Tetrafluoromethane (CF_4)	50,000.0	6,630
PFC-116 Hexafluoroethane (C_2F_6)	10,000.0	11,100
Sulfur Hexafluoride (SF_6)	3,200.0	23,500
ppt: parts per trillion; ppb: parts per billion; HFC: hydrofluorocarbons; PFC: perfluorocarbons.		
Source: IPCC 2013.		

State of California Regulations and Legislation

Assembly Bill 32 – the California Global Warming Solutions Act of 2006

AB 32, the California Global Warming Solutions Act of 2006, recognizes that California is the source of substantial amounts of GHG emissions. The statute states that:

> Global warming poses a serious threat to the economic wellbeing, public health, natural resources, and the environment of California. The potential adverse impacts of global warming include the exacerbation of air quality problems, a reduction in the quality and supply of water to the State from the Sierra snowpack, a rise in sea levels resulting in the displacement of thousands of coastal businesses and residences, damage to marine ecosystems and the natural environment, and an increase in the incidences of infectious diseases, asthma, and other human health-related problems.

To avert these consequences, AB 32 established a State goal of reducing GHG emissions to 1990 levels by the year 2020, which is a reduction of approximately 15 percent from forecasted emission levels, with further reductions to follow (CARB 2011). Further reductions have been set by subsequent legislation. Executive Order (EO) B-30-15 establishes a GHG reduction goal of 40 percent less than 1990 levels by the year 2030, with the ultimate goal to reduce GHG emissions by 80 percent of 1990 levels by the year 2050 (Executive Order S-3-05) On September 8, 2016, the Governor signed Senate Bill 32 (SB 32) to codify the GHG reduction goals of Executive Order B-30-15 and requiring the State to reduce GHG emissions by 40 percent below 1990 levels by 2030 (Health and Safety Code Section 38566). This goal is expected to keep the State on track to meeting the goal set by EO S-3-05 of reducing GHG emissions by 80 percent below 1990 levels by 2050. SB 32's findings state that CARB will "achieve the state's more stringent greenhouse gas emission reductions in a manner that benefits the State's most disadvantaged communities and is transparent and accountable to the public and the Legislature."

There are also several regulations and legislation that cover a broad variety of emission sources, which include:

- Cap & Trade – These involve market-based compliance mechanisms which include five protocols for offset compliance projects.
- Building Energy Efficiency Standards – The Energy Commission's 2013 Building Energy Efficiency Standards are 25% more efficient than previous standards for residential construction and 30% better for nonresidential construction.
- Advanced Clean Cars Standards – GHG reductions from passenger vehicles for model years 2017–2025 under the Low Emission Vehicle standards.
- Water Appliance Standards – The Energy Commission's 2015 Water Appliance Standards are projected to save 10 billion gallons in the first year and increases to 100 billion gallons of water per year. These standards apply to toilets and urinals; residential lavatory faucets; kitchen faucets; and public lavatory faucets.
- Low Carbon Fuel Standards –10% reduction in carbon intensity of transportation fuels.
- Renewable Portfolio Standard – Mandates that energy production in California from renewable energy sources is phased-in from 20 percent in 2010, 33 percent by 2020, 60 percent by 2030, and 100 percent carbon-free by 2045.
- Mandatory Commercial Recycling – Establishes recycling requirements for businesses that generate 4 or more cubic yards of commercial solid waste per week and multifamily residential dwellings with 5 or more units.

Local

The City of Pasadena has prepared and adopted a Climate Action Plan (CAP) (City of Pasadena 2018). The City's CAP includes the following components: a summary of existing state and local initiatives addressing climate change; community wide GHG inventory and emissions forecasts; GHG reduction goals, measures, and actions; plans of implementation and monitoring of the plan; and adaptation strategies and climate change preparedness. The City's CAP builds upon the City's prior sustainability efforts, such as the Green City Action Plan and provides a framework to further reduce GHG emissions throughout the City.

The CAP Consistency Checklist (Checklist) is intended to be a tool for new development projects to demonstrate consistency with Pasadena's CAP, which is a qualified GHG emissions reduction plan in accordance with CEQA Guidelines Section 15183.5. Projects that meet the requirements of the Consistency Checklist would be deemed to be consistent with the City's CAP. The following options are provided by the City for new development projects to establish consistency with the CAP.

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 the applicable Pasadena's per service population GHG efficiency threshold.

Option C requires that the Project achieve Net Zero GHG Emissions, which requires quantifying the project's GHG emission levels and demonstrating that the Project would not result in a net increase in GHG emissions.

A consistency analysis for Option B is detailed below. The following analysis used CalEEMod to quantify GHG emissions associated with the Project, per the recommendation of the CAP Consistency Checklist. The formula to calculate the proposed Project's emissions is as follows:

Proposed Project's GHG Efficiency=Annual GHG Emissions/Service Population

> Annual GHG Emissions: construction emissions (amortized over 30 years) + operational emissions for the Proposed Project
>
> Service Population: Residents + Full-time employees

The CAP details that the proposed Project must be able to demonstrate a GHG efficiency, which is less than or equal to the threshold listed below for the Project's first operational year in order to be considered consistent with the CAP and State targets. Table 10 contains the efficiency thresholds from the City of Pasadena's CAP.

TABLE 10
CITY OF PASADENA CLIMATE ACTION PLAN
EFFICIENCY THRESHOLDS

Project's First Operational Year	Threshold
2017 – 2020	5.63 $MTCO_2e$/SP
2021 – 2025	4.56 $MTCO_2e$/SP
2026 – 2030	3.57 $MTCO_2e$/SP
2031 – 2035	2.73 $MTCO_2e$/SP
$MTCO_2e$: metric tons of carbon dioxide equivalent; SP: service person. Source: City of Pasadena 2018.	

The Project's first operational year would likely occur between 2026. Therefore, the 3.57 metric tons of carbon dioxide equivalent ($MTCO_2e$)/service person (SP) threshold is appropriate for this analysis.

Based on the proposed construction activities, the principal source of construction GHG emissions would be internal combustion engines of construction equipment, on-road construction vehicles, and workers' commuting vehicles. GHG emissions from construction activities were obtained from the CalEEMod model, described above. The estimated construction GHG emissions for the Project would be 700 $MTCO_2e$, as shown in Table 11.

TABLE 11
ESTIMATED GREENHOUSE GAS EMISSIONS
FROM CONSTRUCTION

Source	Emissions ($MTCO_2e$)
2024	305
2025	395
Total	700
$MTCO_2e$: metric tons of carbon dioxide equivalent. Notes: • Totals may not add due to rounding variances. • Detailed calculations in Attachment A.	

Operational GHG emissions would come primarily from electricity and mobile trips. Estimated Project operational GHG emissions are shown in Table 12.

TABLE 12
ESTIMATED ANNUAL GREENHOUSE GAS EMISSIONS FROM PROJECT OPERATION

Source	Emissions ($MTCO_2e$/yr.)
Area	<1
Energy	45
Mobile	3
Waste	<1
Water	<1
Total	**48**

$MTCO_2e$/yr.: metric tons of carbon dioxide equivalent per year.

Notes:
- Totals may not add due to rounding variances.
- Detailed calculations in Attachment A.

Because impacts from construction activities occur over a relatively short period of time, they contribute a relatively small portion of the overall lifetime project GHG emissions. In addition, GHG emission reduction measures for construction equipment are relatively limited. The City's Climate Action Plan and subsequent guidance recommend that construction emissions be amortized over a 30-year project lifetime so that GHG reduction measures address construction GHG emissions as part of the operational GHG reduction strategies (City of Pasadena 2018). Therefore, construction and operational emissions are combined by amortizing the construction emissions over an assumed 30-year project lifetime and adding the annualized construction emissions to the annual operational emissions. The total GHG emissions attributable to the Project is shown in Table 13 and evaluated against the Option B efficiency threshold.

TABLE 13
ESTIMATED TOTAL PROJECT ANNUAL GREENHOUSE GAS EMISSIONS

Source	Emissions ($MTCO_2e$/yr.[a])
Construction Amortized	23[a]
Operations (see Table 12)	48
Total Annual Project GHG emissions[b]	71
Service Population[c]	16,080
Project-level GHG efficiency ($MTCO_2e$/SP/year)	0.004
City of Pasadena GHG Efficiency Threshold ($MTCO_2e$/SP/year)	3.57
Exceed Threshold?	**No**

$MTCO_2e$/yr.: metric tons of carbon dioxide equivalent per year; GHG: greenhouse gas; SP: service person.

[a] Total derived by dividing construction emissions (see Table 11) by 30.
[b] Total annual emissions are the sum of amortized construction emissions and operational emissions.
[c] The service population was determined based on the following assumptions, which were developed in coordination with PWP staff using the latest information available to PWP:

- The projected production of the Explorer Well is 1,600 gallons per minute, or approximately 2,581 acre-feet per year.
- Residential water use was approximately 96 gallons per capita per day in 2019, which adds up to 35,040 gallons per capita per year.
- Residential use accounted for approximately 67 percent of PWP's overall water use in 2019.
- To determine the amount of water that would go to residential use in the average year, 67 percent of the Explorer Well's production was calculated, which is 1,729-acre feet per year (or 563,443,200 gallons per year).
- Dividing the average production of the Explorer Well that will go to residential use (563,443,200 gallons per year) by the 35,040 gallons per capita per year of average residential demand, a service population of 16,080 PWP residential customers was determined.

Based on Census data for the City of Pasadena, the Project would serve an estimated 16,080 residents (Census 2022). As shown in Table 13, the Project's GHG efficiency is 0.004 $MTCO_2e$/SP/year due to the large number of residents it would serve and the very low amount of GHG emissions associated with the development of the Project. Therefore, the Project would result in GHG emissions that do not exceed the City's applicable GHG efficiency threshold, and consequently the Project demonstrates consistency with the City's CAP via Option B. As previously noted, this report only evaluates the project against Option B criteria.

Therefore, the Project would have a less than significant impact related to this threshold, and no mitigation is required.

b) Would the project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

Less Than Significant Impact. The quantitative goal of AB 32 was to reduce GHG emissions to 1990 levels by 2020, and the goal of SB 32 is to continue with the timeline by reducing emissions 40 percent below 1990 levels by 2030. Plans and regulations (e.g., Regional Transportation Plan/Sustainable Community Strategy, GHG emissions standards for vehicles, and the

Low Carbon Fuel Standard) are being implemented at the statewide level and are aimed at reducing GHG emissions from major sources, such as transportation exhaust and building energy consumption, rather than replacement of small utility infrastructure elements. Since the Project would not result in a substantial increase in vehicle trips related to inspection and maintenance activities, the Project would not conflict with plans to reduce motor vehicle trips. The Project would improve the resiliency of the local water supply system and consequently lessen dependence on imported water. Local water supplies require less energy to transport and can result in less GHG emissions when compared to imported water, which utilizes a significant amount of energy to pump and transport water from Northern California and the Colorado River. As such, the Project would not conflict with or obstruct implementation of AB 32 or SB 32.

The City's Water Integrated Resources Plan (WIRP) adopted in 2011, identifies a preferred water resource portfolio with emphasis on water conservation and local water supply. The CAP states, "The WIRP, adopted in 2011, calls for a long-term water resource strategy through 2035 and contains information on PWP's water demands, water supply, and conservation options. The plan identifies a preferred water resource portfolio that includes aggressive water conservation and increasing local water supplies. These actions will reduce GHG emissions by reducing demand for imported water which utilize significant energy to pump water from Northern California and the Colorado River" (City of Pasadena 2018).

The Project would increase the resiliency of local water supplies which is consistent with the CAP's GHG reduction measure of increasing access to local water supplies. Groundwater in the Raymond Groundwater Basin is mainly replenished from rainfall in the area, thereby providing a local sustainable water source. Implementation of the Project would reduce dependence on imported water. Because the CAP has identified development of local water supplies as part of the CAP's actions to reduce GHG emissions, the Project would be consistent with the CAP and would help the City in meeting its GHG reduction targets. Therefore, implementation of the Project would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions.

The Project would result in a less than significant impact related to this threshold, and no mitigation is required.

MITIGATION MEASURES

No significant impacts pertaining to GHG emissions were identified; therefore, no mitigation measures are required.

4.9 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?	☐	☒	☐	☐
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?	☐	☒	☐	☐
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter-mile of an existing or proposed school?	☐	☒	☐	☐
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?	☐	☒	☐	☐
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?	☐	☐	☐	☒
f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☒	☐
g) Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☒	☐

IMPACT ANALYSIS

Regulatory Requirements

RR HAZ-1 Construction activities are required to comply with existing federal, State, and local regulations regarding hazardous material use, storage, disposal, and transport to prevent risks to public health and safety, including but not limited to regulations set forth by the U.S. Environmental Protection Agency; U.S. Department of Transportation (CFR Title 49, Hazardous Materials Transportation Act; and Title 40 261.31, 261.21, and 261.24); Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (40 CFR parts 300, 311, 355, 370, and 373); Resource Conservation and Recovery Act (RCRA) (40 CFR parts 240-299); Toxic Substances Control Act (40 CFR parts 745, 761 and 763); California Department of Toxic Substances Control (DTSC); California Department of Transportation (Caltrans) ; California Division of Drinking Water; and the California Occupational Safety and Health Administration (CalOSHA). All onsite generated waste during both construction and operation that meets hazardous waste criteria

will be stored, manifested, transported, and disposed of in accordance with applicable regulations and in a manner to the satisfaction of the local Certified Unified Program Agency (CUPA).

Additionally, **RRs TRA-1** and **TRA-2** from Section 4.17, Traffic and Transportation, related to construction site access and temporary traffic control would be applicable to the analysis of emergency response and evacuation plans.

Impact Discussion

a) Would the project create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?

b) Would the project 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?

Less Than Significant With Mitigation. The Project would draw contaminated groundwater from the Monk Hill subbasin for treatment, which would involve the routine transport (via pipeline) and disposal of groundwater containing trace levels of chemicals (volatile organic compounds [VOCs] and perchlorate) that exceed State and Federal MCLs for drinking water.

During installation of the Explorer Well, cuttings would be generated during the borehole drilling and drilling fluids (mud) would be used to cool and lubricate the drill bit. In reverse rotary well drilling, the method proposed for the Project, the cuttings and drilling fluid move upward inside the drill pipe and the cuttings are discharged by pump. The drilling fluid returns into the borehole via the annular space between the drill pipe and the borehole wall. Drill cuttings and mud could contain contaminants from contact with the groundwater.

As such, the Project would implement **MM HAZ-1** during the drilling phase of the Explorer Well, where the drill cuttings and mud shall be placed directly into California Department of Transportation-approved soil bins that would be temporarily stored at the Project site. Waste samples from these containers shall be analyzed for the “medium-specific parameters” presented in the Sampling and Analysis Plan in NASA’s 2009 Final Remedial Design/Remedial Action Work Plan, prepared in accordance with CERCLA requirements. Based on the laboratory results, the waste shall be classified as hazardous or non-hazardous and waste profiles and manifests for the waste shall be prepared.

During well development, the drilling water would be directed to TSS tanks where solids would settle out. Clarified water would either be recirculated back to the well for drilling or would be discharged for beneficial reuse to existing spreading basins through temporary at-grade piping.

During Project operation, groundwater will be conveyed to the MHWTP via buried pipelines. Should there be a main break, or other upset condition, the potential release of groundwater to the surface would not present a significant hazard to the public or environment due to the very low levels of contaminants present within the groundwater.

The construction of the Explorer Well would require earthmoving in the area of the former JPL Parking Lot. To determine whether the soils beneath the former parking lot were contaminated, the City contracted with Converse Consultants (Converse) to conduct a Limited Phase II Environmental Site Assessment Report for the adjacent Arroyo Seco Canyon Project, which included the Project site. In September 2015, Converse advanced five soil borings to depths of up to 15-feet below ground surface. Based on soil samples collected, it appears that the former

JPL parking lot has not been significantly impacted by past waste handling activities at JPL. The Converse report concluded that no additional assessment is necessary, and no remediation is required (Converse 2016).

Installation of the Project's pipelines would involve trenching excavations. While there is no known contamination of shallow soils along the pipeline alignments, unanticipated contaminants, particularly hydrocarbon-based, is not uncommon in urban areas. However, excavated soils would be managed in compliance with Title 40 of the Code of Federal Regulations and Title 22 of the California Code of Regulations (**RR HAZ-1**) and as required by **MM HAZ-2**, if contaminated soils are discovered, they would be excavated immediately upon discovery and tested prior to disposal to ensure proper handling and transport in compliance with applicable federal, State, and local regulations governing the handling of hazardous materials.

Construction of the Project would involve the limited transport, storage, use, and/or disposal of common construction-related hazardous materials, including oil and grease, solvents, diesel fuel, and other chemicals in vehicles, trucks, and heavy equipment. These materials could be released into the environment in small amounts in the event of an accident. To prevent environmental hazards, the handling of hazardous materials used in construction equipment would be conducted in accordance with existing regulations (**RR HAZ-1**).

In addition to the requirements of regulations set forth in **RR HAZ-1**, **MM HAZ-2** also includes Project-specific measures to avoid impacts associated with hazardous material spills and accidents in and near the Arroyo Seco during construction activities. These include inspecting trucks for oil, gasoline, or other vehicle fluid leaks; locating fueling areas and storage of hazardous materials away from water bodies and drainages; creating a plan for refueling; removing hazardous material spills and contaminated soils; controlling and containing hazardous materials spills; and ensuring cleanup kits are available.

In summary, all soil and other wastes generated by the Project that require disposal would be subject to laboratory testing; appropriate characterization, classification, and manifest preparation; and licensed transport as described in **RR HAZ-1** and required by **MM HAZ-1** and **MM HAZ-2**. Construction and operation of the Project would not result in a significant hazard to the public or the environment through implementation of **RR HAZ-1** and **MM HAZ-2** (construction-period only). With mitigation, the Project would result in a less than significant impact related to this threshold.

c) Would the project emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter-mile of an existing or proposed school?

Less Than Significant With Mitigation. Schools or similar facilities located within approximately ¼-mile of the Project site include:

- Odyssey Charter School located at 725 Altadena Drive, Altadena approximately 0.25 mile east-of the Project site.
- Little Finch Forest School located at the JPL Parking Lot Entrance, La Canada approximately 0.15 mile north of the Project site.

As discussed under Thresholds 4.9(a) and (b), construction and operation of the Project would involve the handling of potentially hazardous materials/wastes, which would be conducted in accordance with all applicable local, State, and federal laws. As described above, construction

and operation of the Project would not result in a significant hazard to the public or the environment through implementation of **RR HAZ-1** and **MM HAZ-2**.

In summary, with compliance with **RR HAZ-1** and implementation of **MM HAZ-2**, the Project would have a less than significant impact related to this threshold.

d) Would the project 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?

Less Than Significant With Mitigation. The JPL campus and off-site areas encompassed by the groundwater plume, have been designated as a Superfund site (i.e., pursuant to CERCLA). Since the mid-1980s, NASA has investigated and subsequently taken action to clean up groundwater contamination associated with historic waste management practices at the JPL. The groundwater beneath the JPL and surrounding areas is known to contain contaminants, primarily perchlorate, and CTC, a VOC. The analysis of construction and operation of the Project, including management of drilling wastes and contaminated groundwater associated with the Superfund site, is addressed under Thresholds 4.8(a) and (b). As discussed, the Project would not result in a significant hazard to the public or the environment through implementation of **RR HAZ-1** and **MM HAZ-1** (construction-period only).

In summary, with compliance with **RR HAZ-1** and implementation of **MM HAZ-1**, the Project would have a less than significant impact related to this threshold.

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?

No Impact. There are no airports or airstrips within two miles of the Arroyo Seco Canyon. The nearest airports are the Burbank Bob Hope Airport and the San Gabriel Valley Airport, which are both approximately 11 miles from the Project site. The Project would not involve the construction of high-rise structures or involve activities that could pose a safety hazard to helicopter or aircraft operations or airport activities, nor would it conflict with an airport land use plan. Therefore, the Project would have no impact related to this threshold, and no mitigation is required.

f) Would the project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

Less Than Significant Impact. The City of Pasadena Emergency Operations Plan 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 2011a). 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 Project site Is not located on public-access roads such that emergency vehicle access or evacuation through the site is considered foreseeable. Construction worker vehicles, trucks, delivery vehicles and haul trucks would access the site via I-210 at the Windsor Avenue off-ramp and head north on Explorer Road to reach the Project site. All construction staging and parking would occur on the Project site, and construction would not require staging along adjacent public roadways or other areas that would disrupt existing traffic patterns. Construction activities associated with the Project would not substantially obstruct Explorer Road, which provides emergency access to the Project area. A 400-foot segment of Explorer Road would be realigned as part of the Project. Access to JPL's east gate would be restricted for approximately one week while a section of Explorer Road is realigned. Any closures would be coordinated with JPL prior to implementation. The road realignment would allow for through traffic to continue to utilize Explorer Road while the well is constructed.

Once the Project is built, access to the Explorer Well would be provided from Explorer Road via new all-weather driveways that would provide access to the two proposed access gates. Additionally, compliance with the Standard Specifications for Public Works Construction (Greenbook) and the City's Supplements and Modifications to the Greenbook (**RR TRA-1**) regarding maintenance of emergency access at all times; the use of a flagperson to direct traffic, as necessary; and allowing for the continued public use of the Explorer Road at times when construction is not ongoing, would ensure that access impacts relative to this roadway would be less than significant. Temporary traffic control devices are also required to be provided in conformance with the Manual on Uniform Traffic Control Devices (MUTCD)and the California Supplement to the MUTCD (**RR TRA-2**). As such, the Project would not obstruct any emergency response plan or emergency evacuation plan. Therefore, the Project would result in a less than significant impact related to this threshold, and no mitigation is required.

g) Would the project expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?

Less Than Significant Impact. The Project site is located within a Fire Hazard Severity Zone in a Local Responsibility Area (LRA) (CAL FIRE 2023). According to mapping prepared by the Pasadena Fire Department, the northern portion of the Project site is within an area that is designated as a Very High Fire Hazard Severity Zone (VHFHSZ) (City of Pasadena 2023b).

The Project involves the construction and operation of a new building containing a well. Although the Project site is designated as a VHFHSZ, the Project site does not currently contain large number of trees or other vegetation with potential to burn during a wildfire event. Further, the Explorer Well building would be designed and constructed in accordance with the Pasadena Fire Prevention Code (Chapter 14.28 of the City's Municipal Code), which adopts the California Fire Code with changes and additions to the adopted code.

The Project would not involve construction or operation of habitable structures that may expose people to wildfire hazards in the area. Maintenance workers that would come to the area would be in the area for limited time periods and could readily avoid or evacuate from the Project site in the event of a wildfire.

Also, Project construction would temporarily increase the risk of wildfire due to use of construction equipment. The City's Fire Prevention Code includes fire safety measures that would be followed during construction as specified in **RR PS-1**. With adherence to **RR PS-1**, the Project would result in a less than significant impact related to this threshold, and no mitigation is required.

MITIGATION MEASURES

MM HAZ-1 During the drilling of the Explorer Well, the drill cuttings and mud shall be placed directly into California Department of Transportation-approved soil bins and the bins would be temporarily stored on site. Waste samples from these containers shall be analyzed for the "medium-specific parameters" presented in the Sampling and Analysis Plan in NASA's 2009 Final Remedial Design/Remedial Action (RD/RA) Work Plan, prepared in accordance with CERCLA requirements. Based on the laboratory results, the waste shall be classified as hazardous or non-hazardous and waste profiles and manifests for the waste shall be prepared. The City shall coordinate with NASA to ensure the selection of a U.S. Environmental Protection Agency (EPA)-certified waste disposal facility and a licensed transporter to haul off the waste.

MM HAZ-2 During all earthmoving and construction activities, the City shall require the Contractors to implement the following measures:

- Trucks and equipment entering the site shall be inspected to be free from oil, gasoline, or other vehicle fluid leaks.
- Equipment fueling areas shall be located outside of the spreading basins and any jurisdictional waters as identified by the United States Army Corps of Engineers (USACE) and the California Department of Fish and Wildlife (CDFW).
- Hazardous materials shall not be stored on the site. Any hazardous material spills and/or contaminated soils shall be excavated immediately upon discovery and tested prior to disposal to ensure proper handling and transport in compliance with applicable federal, State, and local regulations governing the handling of hazardous materials.
- The Contractor shall maintain hazardous materials spill control, containment, and cleanup kits of adequate size and materials for potential accidental spills and releases.

4.10 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 ground water quality?	☐	☐	☒	☐
b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?	☐	☐	☒	☐
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:	☐	☐	☒	☐
i) result in a substantial erosion or siltation on- or off-site;	☐	☐	☒	☐
ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;	☐	☐	☒	☐
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; or	☐	☐	☒	☐
iv) impede or redirect flood flows?	☐	☐	☐	☒
d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?	☐	☐	☒	☐
e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	☐	☐	☐	☒

IMPACT ANALYSIS

Regulatory Requirements

RR HYD-1 The Explorer Well would be operated in compliance with Section 64560 of the California Code of Regulations, which provides requirements associated with installation of new drinking water production wells and is administered by the California Division of Drinking Water (DDW). The new well must also comply with DDW-specified minimum horizontal distances to sanitary hazards. Additionally, the proposed well is required to comply with the community water system well requirements in the California Department of Water Resources Bulletins 74-81 and 74-90 and the American Water Works Associated Standard A100-06 (Water Wells).

RR HYD-2 The Project is required to comply with the Statewide National Pollutant Discharge Elimination System (NPDES) Permit for Drinking Water System Discharges to Waters of the United States (Order WQ 2014-0194-DWQ, General Order No. CAG14001).

Impact Discussion

a) Would the project violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?

Less Than Significant Impact. Since the Project site would have more than one acre of ground disturbance, compliance with the SWRCB's NPDES Construction General Permit would be required. This would require preparation of a project-specific SWPPP, which describes practices to reduce pollutants in stormwater discharges from the construction site by implementing BMPs, such as sandbags and detention basins. As such, there would not be substantial pollutants introduced into storm water runoff, including sediment, during construction of the Project. Handling of hazardous materials and wastes during construction would occur in compliance with federal, State, and local requirements (**RR HAZ-1**), as discussed in Section 4.8, Hazards and Hazardous Materials.

Per **RR HYD-1**, construction and operation of the Explorer Well would require an amended domestic water supply permit pursuant to Section 64560 of Title 22 of the California Code of Regulations. This would require submittal of a permit amendment application and technical report to the DDW that would include a source water assessment; documentation demonstrating that a well site control zone with a 50-foot-radius around the site can be established for protecting the source from vandalism, tampering, or other threats; design and specifications; and CEQA documentation (i.e., this IS/MND, if adopted). These regulations also require that after DDW has provided written or oral approval of the amendment application and the well has been constructed, the water agency (in this case Pasadena Water and Power) would be required to submit a copy of the well permit from the City, California Department of Water Resources (DWR) well completion report, a copy of any pump tests required by DDW, results of all required water quality analyses, and as-built plans. Finally, the new well must also comply with DDW-specified minimum horizontal distances to sanitary hazards (e.g., manholes, storage tanks, septic tanks). In addition to DDW requirements pursuant to Title 22, the new well must be constructed in compliance with the community water system well requirements in the DWR Bulletins 74-81 and 74-90 and the American Water Works Association Standard A100-06 (Water Wells (NASA 2014). Through compliance with applicable permitting and other regulatory requirements (**RR HYD-1**), the Explorer Well would not violate water quality standards/waste discharge requirements or otherwise degrade water quality. On the contrary, installation of the proposed well would contribute to the cleanup of the JPL Superfund site in a shorter timeframe than the existing remedial infrastructure.

As per **RR HYD-2**, the Project would continue to comply with SWRCB Order WQ 2014-0194-DWQ, "Statewide NPDES Permit for Drinking Water System Discharges to Waters of the United States" that currently applies to the existing facilities. The Order provides regulatory coverage for discharges a water purveyor may undertake to comply with the federal Safe Drinking Water Act, the California Health and Safety Code, and the State Water Board's Division of Drinking Water permitting requirements for providing reliable delivery of safe drinking water. Among the authorized discharges included in the Order are those due to groundwater supply well flushing or pump-to-waste; groundwater well development, rehabilitation, and testing; and groundwater monitoring for purpose of supply well development, rehabilitation, and testing. Furthermore, discharges authorized under this Order that are put to multiple use or beneficial reuse are not required to be monitored and generally not required to obtain any other waste discharge requirements. The Project complies with the provisions in the order and its discharges to spreading basins allowing for groundwater recharge is considered a beneficial reuse. Therefore, discharges into surface waters from the Project would not violate waste discharge requirements or otherwise violate water quality.

With adherence to **RR HYD-1**, **RR HYD-2**, and **RR HAZ-1**, the Project would result in a less than significant impact related to this threshold, and no mitigation is required.

b) Would the project substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?

Less Than Significant Impact. The Sustainable Groundwater Management Act of 2014 (SGMA) requires the designation of groundwater sustainability agencies (GSA's) by one or more local agencies and the adoption of groundwater sustainability plans (GSPs) for basins designated as medium- or high-priority by the DWR. SGMA applies to all California groundwater basins and requires the DWR to prioritize California's 517 groundwater basins and subbasins as either high, medium, low, or very low (DWR 2023). The Raymond Basin, which underlies the City of Pasadena, was determined by DWR to be "Very Low" priority and is already a fully adjudicated basin, therefore, not subject to the requirements to form a GSA or to develop a GSP.

The Raymond Basin Judgment adjudicates the groundwater rights in the Raymond Basin. Parties to the Judgment (pumpers) are decreed pumping rights based on the safe yield of the aquifer. The City's decreed groundwater pumping rights include 4,464 acre feet per year in the Monk Hill subbasin. The addition of the proposed Explorer Well would increase the City's capacity for pumping by 1,600 gpm, but the amount of water that is pumped from the underlying Monk Hill subbasin will remain limited by the Judgment. This includes pumping as it relates to the operation of the Project as well as the construction of the Project. During construction, groundwater would be extracted during development of the Explorer Well and directed to TSS tanks. From these tanks the water would either be recirculated back to the well for drilling, off-loaded for disposal, or discharged to PWP's spreading basins which would allow for much of the water to percolate back into the groundwater aquifer. Temporary piping would be used to direct the discharge from the TSS tanks near Explorer Well to the spreading basins to the west and would consist of above-ground pipes. During both the well development stage and during operation, the Project would not decrease groundwater supplies because more water cannot be pumped from the basin than is allowed pursuant to the Raymond Basin Judgement.

The Project also would not substantially decrease groundwater supplies through its use of water. Historically, about 40% of PWP's water supplies have come from groundwater. However, the relatively minor water use anticipated for the Project during both construction and operation would not have a substantial impact on groundwater supplies given the relatively small amount of water relative to the overall City water supply.

For example, construction of the Project would involve earthwork/grading that would require water for dust suppression to comply with SCAQMD Rule 403. Also, operation of the Project would involve minor use of water for general facility maintenance, including for potential landscaping. The water for these uses would be provided from the municipal water system. The quantity of water that would be used during construction and operation would have a negligible effect on the City's overall water demand. Moreover, such additional water demand would have no effect on the amount of water withdrawn from groundwater supplies, as such withdrawal is controlled by the adjudication.

The Project also would not substantially interfere with groundwater recharge. The Project would include asphalt paving of a small area (i.e., 250 square feet) that would drain to surrounding pervious areas, as either sheet flow runoff or directed via an existing drainage ditch to an existing spreading basin. Soils in the former JPL East Parking Lot have been classified as "stream deposits" from the Arroyo Seco and consist primarily of gravelly sands with cobbles and boulders which are excellent permeable materials that would allow percolation into the ground. Similarly,

drainage directed to the spreading basins would percolate and contribute to groundwater recharge. Therefore, the Project's minor addition of approximately 250 square feet of impervious surface would not have a substantial effect on recharge of the underlying groundwater basin.

In conclusion, the Project would result in a less than significant related to this threshold, and no mitigation is required.

c) Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:

i) result in a substantial erosion or siltation on- or off-site?

Less Than Significant Impact. The Project has the potential to result in erosion and siltation during construction. Development and implementation of a SWPPP for the Project, as required in compliance with the SWRCB's General Construction Permit, would ensure potential effects related to erosion and siltation are reduced to less than significant levels during construction.

The Project would result in a minor increase in impervious surfaces compared to the existing condition once built. However, the areas where impervious surfaces would be added are within the footprint of the former JPL East Parking Lot. Soils in the former JPL East Parking Lot have been classified as "stream deposits" from the Arroyo Seco and consist primarily of gravelly sands with cobbles and boulders, which are excellent permeable materials that would allow drainage from the Project's paved area to percolate into the ground. Therefore, operation of the Project would result in less than significant impacts related to erosion and siltation.

Overall, the Project would result in a less than significant impact related to this threshold, and no mitigation is required.

ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;

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; or

Less Than Significant Impact. The rate of stormwater runoff from the Project site would increase minimally from pre-Project conditions since there would be a small amount of additional impervious surface area that would occur with the Project. Stormwater generated on the Project site would be conveyed downslope to offsite pervious surfaces as either sheet flow runoff or directed via an existing drainage ditch to one of the existing spreading basins. In either case, drainage would primarily percolate into the ground. Stormwater that does not locally percolate would flow into the Devil's Gate Reservoir, which is an area that is designed to receive and retain excess flows for flood protection. Therefore, the Project would not result in flooding on- or off-site, nor would the Project contribute runoff water that would exceed the capacity of the stormwater drainage system. Thus, the Project would have a less than significant impact related to this threshold, and no mitigation is required.

iv) impede or redirect flood flows?

No Impact. The Project would result in no changes to the flow of the Arroyo Seco. As discussed under Threshold 2.10l(i) above, the Project would not substantially alter the existing drainage pattern of the site. The Federal Emergency Management Agency (FEMA) prepares Flood

Insurance Rate Maps for 100-year floods, meaning an area has a one percent chance of being inundated during a 12-month period, and 500-year floods, which means that in any given year, the risk of flooding in a designated area is 0.2 percent. As demarcated by FEMA, the Project is not within a flood hazard zone and is determined as "Zone X," meaning areas determined to be outside the 0.2 percent annual chance floodplain (FEMA 2008). Therefore, the Project would not impede or redirect flood flows. The Project would have no impact related to this threshold, and no mitigation is required.

d) Would the project, in flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?

Less Than Significant Impact. Seiches are large waves generated in enclosed bodies of water in response to ground shaking. Tsunamis are predominately ocean waves generated by undersea large magnitude fault displacement or major ground movement. Based on separation of the site from any body of water, seiche impact at this site is highly unlikely. Also, due to the inland location of this site and finish floor elevation at 1,108 feet above mean sea level, relative to the Pacific Ocean no tsunami risk exists at this site (Leighton Consulting Inc. 2018).

Earthquake-induced flooding can be caused by failure of dams or other water-retaining structures because of earthquakes. This portion of the Arroyo Seco (upstream of Devil's Gate Dam) is not located within a dam failure inundation zone (although various upstream and uphill water tanks and relatively small, enclosed reservoirs could fail and flood the low-lying Arroyo Seco area on the order of a foot deep). Furthermore, substantial amounts of pollutants would not be stored or otherwise occur onsite that could be at risk of release.

Therefore, the Project would have a less than significant impact related to this threshold, and no mitigation is required.

e) Would the project conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

No Impact. The Project site is located within an area that is covered by the Hahamongna Watershed Park Master Plan (HWPMP), which governs an area of approximately 300 acres within the Upper Arroyo Seco. The HWPMP provides a framework for managing the recreation, surface water, habitat resources, and cultural resources in the HWPMP area for the use and enjoyment of the public. An objective of the HWPMP is to "Maximize groundwater recharge to minimize the amount of water purchased from outside sources." The HWPMP does not specifically address groundwater pumping but recognizes that the City relies on the basin for water supply. Beyond that, the document lacks detail in this area to be considered a groundwater management plan.

The Raymond Basin Judgment adjudicates the groundwater rights in the Raymond Basin. Parties to the Judgment (pumpers) are decreed pumping rights based on the safe yield of the aquifer. The City's decreed groundwater pumping rights include 4,464 acre feet per year in the Monk Hill subbasin. The addition of the proposed Explorer Well would increase the City's capacity for pumping by 1,600 gpm, but the amount of water that is pumped from the underlying Monk Hill subbasin will remain limited by the Judgment. This includes pumping as it relates to the operation of the Project as well as the construction of the Project. Therefore, the Project would be implemented compliant with the Raymond Basin Judgement.

Responsibility for the protection of surface and groundwater quality in California lies with the SWRCB and nine RWQCBs. The RWQCB, Los Angeles Region (LARWQCB), has jurisdiction over the drainage area that includes the Project site, and the Los Angeles Regional Board's Basin Plan is the applicable water quality control plan. The Basin Plan designates beneficial uses for

surface and groundwaters, sets objectives to protect the designated beneficial uses, and describes implementation programs to protect waters in the region. The SWRCB has stipulated that the City's discharge of pumped groundwater to the spreading basins is considered "beneficial reuse" and is distinguished from other non-storm water discharges. However, the discharges must be fully contained within the spreading basins. By meeting these conditions, the Project would neither conflict with nor obstruct implementation of the LARWQCB's Basin Plan

In conclusion, the Project would result in a less than significant impact related to this threshold, and no mitigation is required.

MITIGATION MEASURES

No significant impacts pertaining to hydrology and water quality were identified; therefore, no mitigation measures are required.

4.11 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?	☐	☐	☐	☒
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?	☐	☐	☒	☐

IMPACT ANALYSIS

Regulatory Requirements

There are no regulatory requirements applicable to land use and planning.

Impact Discussion

a) Would the project physically divide an established community?

No Impact. The Project does not involve the displacement of existing residences or the construction of barriers through the developed areas surrounding the Project area. Therefore, the Project would not divide an established community. There would be no impact, and no mitigation is required.

b) Would the project 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?

Less Than Significant Impact. 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).

The Project would develop a well and associated pipeline, which would be consistent with the Open Space land use designation and zoning. Given that the Project would qualify as a Utility, Minor (defined by the Pasadena Zoning Code as "a utility facility that is necessary to support a legally established use and involves only minor structures…") land use, the Project would not require a Conditional Use Permit. Therefore, the Project would be consistent with the land use and zoning designation.

Additionally, the Project site is located within the HWPMP area, which includes approximately 300 acres and is part of the Upper Arroyo Seco. The HWPMP provides a framework for managing the recreation, surface water, habitat resources, and cultural resources in the HWPMP area for the use and enjoyment of the public. Because the Project consists solely of public works infrastructure facilities and does not affect the public parkland within the HWP or develop any structures/facilities that would be publicly accessible, the requirements of the HWPMP are not applicable to the Project.

Therefore, the Project would have a less than significant impact related to this threshold, and no mitigation is required.

MITIGATION MEASURES

No significant impacts pertaining to land use and planning were identified; therefore, no mitigation measures are required.

4.12 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?	☐	☐	☒	☐
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?	☐	☐	☒	☐

IMPACT ANALYSIS

Regulatory Requirements

There are no regulatory requirements applicable to mineral resources.

Impact Discussion

a) Would the project 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?

Less Than Significant Impact. According to the City's General Plan, no active mining operations exist in the City and mining is not a permitted use in the City's Zoning Code. There are two areas in Pasadena that have been identified by the California Geological Society (CGS) as Mineral Resource Zone (MRZ)-2, which is defined as areas where geologic data indicate that significant Portland Cement Concrete-Grade aggregate resources are present. These two areas are Eaton Wash and Devil's Gate Reservoir, which were both formerly mined for aggregate but are no longer utilized for these purposes (CGS 1982, 2010). The Project site is located within the Devil's Gate Reservoir area and is identified within the MRZ-2 area. CGS has identified sand and gravel deposits to a depth of 100 feet below the present-day channel surface in the Project site and vicinity (CGS 2010). The construction of the Explorer Well would result in the extraction of some underlying sand, gravel, or arroyo stone resources during drilling activities and may expose these resources during pipeline excavation and as part of grading activities for Explorer Well and pipeline installations. However, the amounts of materials extracted would be minor and these areas could not reasonably be mined given that they are zoned as OS.

Therefore, the Project would result a less than significant impact related to this threshold, and no mitigation is required.

b) Would the project 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?

Less Than Significant Impact. There are no identified oil, gas, or geothermal resources or ongoing mining/extraction activities at the Project site. As stated above, no active mining operations exist in the City, as mining is not a permitted use in the City's Zoning Code. The Project would not require mineral resources, nor would it significantly alter the availability of resources within Devil's Gate Reservoir. The removal of perchlorate and VOC from the mid-plume would not significantly impact sand and gravel resources in the reservoir. Additionally, no new structures or facilities would be constructed as part of the Project that could potentially restrict or obstruct future

mineral resource recovery activities within the Project site. Long-term operation and maintenance activities for the proposed well and pipeline would not require mineral resources.

Therefore, the Project would result in a less than significant impact related to this threshold, and no mitigation is required.

MITIGATION MEASURES

No significant impacts pertaining to mineral resources were identified; therefore, no mitigation measures are required.

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

IMPACT ANALYSIS

Regulatory Requirements

RR NOI-1 In accordance with Section 9.36.080 of the City of Pasadena Municipal Code, 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.

Impact Discussion

a) Would the project result in 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?

Less Than Significant With Mitigation.

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. Noise sensitive uses proximate to the Project site include residential uses located approximately 195 feet to the east, a church located approximately 2,130 feet to the southeast, and a school located approximately 1,230 feet to the east.

Existing Noise Levels

An ambient noise monitoring program was conducted to characterize the ambient noise levels at sensitive locations near the Project site. The 24-hour ambient noise level measurements were taken from July 26–28, 2023. Based on observations during the noise monitoring, primary noise sources are due to residential traffic, industrial uses from the JPL facility, pedestrian hiking, off-road motorized vehicles, and native wildlife.

The monitoring was conducted using Larson Davis Laboratories Model 831 and LxT integrating sound level meters (LD 831/LD LxT) which are characterized as Class 1 sound level meters according to International Electrotechnical Commission (IEC) 61260 and American National Standards Institute (ANSI) S1.11. The LD sound level meters were calibrated before and after use.

In addition to the 24-hour monitoring, a short-term ambient noise level measurement for 30 minutes was made, utilizing a Brüel & Kjær type 2270 sound level meter (also Class 1). All the monitored locations are shown in Exhibit 4-1, Noise Monitoring Locations. The average, maximum, and minimum (L_{eq}, L_{max}, and L_{min}) values, taken at the short-term location, and the Community Noise Equivalent Level values taken at the 24-hour noise monitoring locations, are shown in Table 14, Ambient Noise Level Measurements. The complete noise monitoring results are included in Appendix D.

TABLE 14
AMBIENT NOISE LEVEL MEASUREMENTS

Location No.	Location	Start Time (Duration)	Noise Levels (dBA)				Primary Noise Source(s)	Notes
			CNEL	L_{eq}	L_{max}	L_{min}		
1	Gabrielino Trail – West of 3085 Ridgeview Drive	1:00 PM (24 Hours)	61	55	80	48	Hum and material handling equipment at JPL. Occasional traffic.	Occasional hikers. Native wildlife. Vehicular traffic and off – road motor bikes.
2	Gabrielino Trail – West of 898 Altadena Drive	1:00 PM (24 Hours)	61	54	78	48	Hum and material handling equipment at JPL.	Occasional hikers. Native wildlife. Vehicular traffic and off – road motor bikes.
3	Arroyo Seco Basin	2:00 PM (24 Hours)	60	53	66	48	Hum and material handling equipment at JPL.	Occasional hikers. Native wildlife. Vehicular traffic and off – road motor bikes.
4	West end of Altadena Drive	2:00 PM (24 Hours)	62	52	77	49	Hum and material handling equipment at JPL.	Occasional hikers. Native wildlife. Vehicular traffic and off – road motor bikes.
5	Gabrielino Trail – West of 2923 Crestford Drive	2:27 PM (30 min)	–	47	56	44	Hum and material handling equipment at JPL.	Occasional hikers. Native wildlife. Vehicular traffic and off – road motor bikes.

dBA: A-weighted decibel; CNEL: Community Noise Equivalent Level is a 24-hour average sound level with a penalty for noise occurring at night; L_{eq}: average noise level over a period of minutes or hours expressed as the equivalent noise level for that time period; L_{max} and L_{min}: the highest and lowest (respectively) A-weighted sound level that occurs during that noise event; JPL-Jet Propulsion Laboratory; min: minutes.

Source: Psomas July 2023.

City of Pasadena

The City of Pasadena has established guidelines and standards in its General Plan and Municipal Code. The Noise Element 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.

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Noise Monitoring Locations

Exhibit 4-1

Explorer Well Project

N W E S

200 100 0 200 Feet

PSOMAS

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The following 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.

The City Municipal Code (Title 9, article IV, Chapter 9.36, Noise Restrictions) is the City's Noise Ordinance. 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

This 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, 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

This section is applicable for Construction Projects and 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 feet 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 therefrom 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

This section states that "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".

9.36.170 – Exemptions.

This section provides the following exemptions to the City's Noise Ordinance:

A. This chapter is not intended to regulate construction or maintenance and repair activities conducted by public agencies or their contractors necessitated by emergency conditions or deemed necessary by the city to serve the best interests of the public and to protect the public health, safety, and welfare. These operations may include, but are not limited to, street sweeping, debris and limb removal, removal of downed wires, restoring electrical service, repairing traffic lights, unplugging sewers, vacuuming catch basins, repairing water hydrants and mains, gas lines, oil lines, storm drains, roads, sidewalks, etc.
B. Notwithstanding the ordinance codified in this chapter, the city manager is authorized to permit special events to generate noise levels up to the limits specified in the noise element of the city's general plan.
C. Notwithstanding the ordinance codified in this chapter, the general manager of the Rose Bowl is authorized to permit events licensed by the Rose Bowl Operating Company to generate noise levels up to the limits specified in the noise element of the city's general plan.
D. Provisions in the permit or license agreement shall specify the specific hour limitations imposed, and the set decibel level delineated in the noise element which would apply.

Applicable Vibration Standards

The City of Pasadena does not have vibration standards. To assess the potential for vibration impacts, vibration thresholds found within the Federal Transit Administration's Transit (FTA) *Noise and Vibration Impact Assessment Manual* (FTA 2018) were used in the assessment of potential project related vibration impacts.

Noise Effects

Noise impacts associated with the proposed Project would be largely limited to the construction phase. 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). For well drilling, stationary equipment (such as an auger, compressor, and circulation tank motors) would be used. Mobile equipment is moved around the construction site and includes equipment (such as material delivery trucks, a gradall, and a backhoe). The primary noise sources during construction are the diesel engines of construction equipment (such as drill auger motor, compressor, circulation tank motor, backhoe loader, gradall, and delivery trucks). No pile driving or blasting activities are proposed; however, well development requires a continuous process of drilling to prevent well collapse. As such, well drilling would occur for 24 hours per day/7 days per week for four (4) weeks with a pause of two (2) weeks for water quality analyses and final well design, and a continuation of well drilling for two and half (2.5) weeks. Well construction and development would continue for one and half

(1.5) weeks following well drilling activities and would also occur for 24 hours/7 days. As such, 24 hour/7 day construction activities are anticipated to last for a total of approximately eight (8) weeks, as detailed in Table 15.

Explorer Well. The degree to which noise-sensitive receptors are affected by construction activities depends heavily on their proximity as well as the time of day or night. As stated above, per Section 9.36.080, Construction Equipment, of the City's Municipal Code, 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. Therefore, estimated noise levels attributable to the development of the proposed Project is evaluated at 100 feet from the equipment, as shown in Table 15, Construction Noise Levels at Noise-Sensitive Land Uses. Noise calculations are included in Appendix D. As shown in Table 15, noise levels from construction equipment would be less than the 85 dBA noise limit as measured at 100 feet from the equipment, per the City's Municipal Code Section 9.36.080 – Construction Equipment.

TABLE 15
CONSTRUCTION NOISE LEVELS AT NOISE-SENSITIVE LAND USES

Construction Phase	Noise Level at 100 ft (L_{eq} dBA)	City of Pasadena Noise Limit	Exceeds Limit?
Ground Clearing/Demolition	78	85	No
Excavation	83	85	No
Foundation Construction	72	85	No
Building Construction	81	85	No
Paving and Site Cleanup	83	85	No

L_{eq} dBA: Average noise energy level; ft: feet.

Note: Noise levels from construction activities do not take into account attenuation provided by intervening structures or sound barriers.

Source: USEPA 1971a.

Noise from on-site construction activities would be audible above the existing ambient noise environment but would generally occur during the least noise-sensitive portions of the day as per Pasadena Municipal Code Section 9.36.070 – Construction Projects. As mentioned previously, nighttime drilling is necessary for well development. To quantify noise emission levels from the Project site due to nighttime well drilling activities, SoundPlan, a three-dimensional computational noise model, was used. This model considers topographical elevations and noise attenuation provided by ground cover and structures. Noise data acquired from a similar well project[4] was utilized as the input dataset for the construction sources to the SoundPlan modeling for the well drilling activities of the Project. Well drilling noise is associated with the operation of diesel fueled motor for the auger, auger drilling activities, circulation tank motor for the drilled sediment, compressor, gradall used for carrying auger bit extensions, and a backhoe for the removal of excavated sediment. The Project site and nearby structures were modeled in three dimensions to allow for the heights of sound barriers used for noise attenuation to be considered.

Noise levels from Project-related nighttime well drilling activities at the nearest noise sensitive residential uses (i.e., residences located 195 feet east of the Project's site boundary) are estimated to be 54-56 dBA L_{eq} without noise reducing mitigation measures. This noise exposure level was modeled at the property line of the nearest residential uses located up the hill to the east of the Project site. Building structures generally attenuate exterior noise levels by 20 to 25

[4] Garfield Replacement Well Project, July 2021

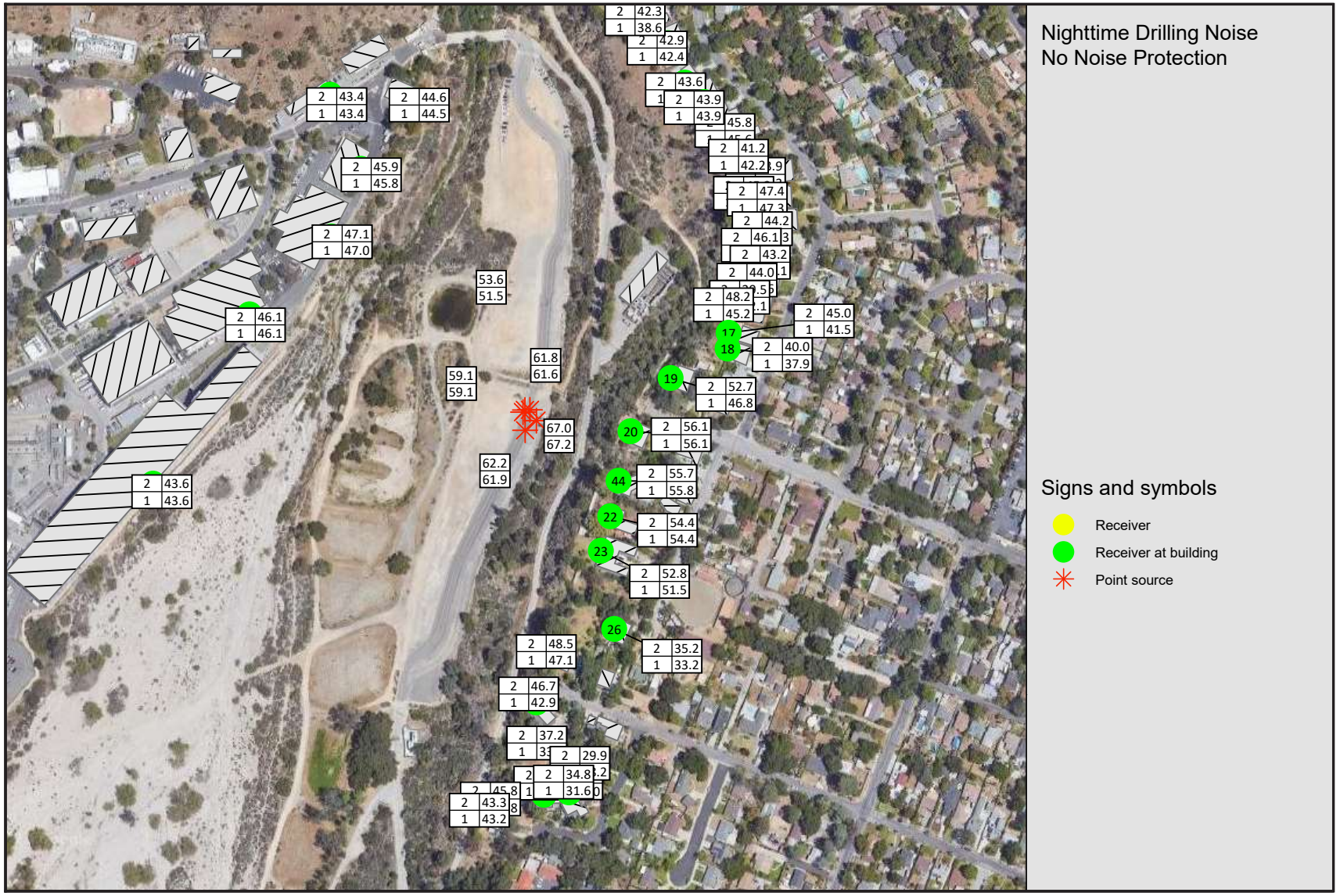
dBA under a "windows-closed" condition (FHWA 2011). Without noise reducing mitigation measures, the noise reduction provided by the residential building structures, interior noise levels are anticipated to be up to 34–36 dBA L_{eq} at the nearest residential structures. The United States Environmental Protection Agency (USEPA) has referenced a sleep disturbance study that provides context on the levels of sleep disturbance expected from noise levels. This study states that there is a correlation between ranges of A-weighted sound level results and frequency of complaints by those who experience these sound levels. The study found the following: below about 33 decibels, no complaints; 33–38 decibels, occasional complaints; 38–48 decibels, frequent complaints; and over 48 decibels, unlimited complaints" (USEPA 1971b). This level of noise that would result in sleep disturbance is also consistent with the recommendation from the World Health Organization (WHO) which states that "If negative effects on sleep are to be avoided the equivalent sound pressure level should not exceed 30 dBA indoors for continuous noise.

As mentioned previously, well drilling activities would result in an interior noise exposure level of up to 34–36 dBA L_{eq} without noise reduction mitigation measures. This level of noise would exceed the 30 dBA L_{eq} recommended interior noise exposure threshold for sleep disturbance at nearby residential uses. To minimize the potential for sleep disturbance from nighttime well drilling activities, the noise reduction measures detailed under **MM NOI-1** through **MM NOI-4** are required to reduce noise to levels that are below the above-mentioned sleep disturbance thresholds.

MM NOI-1 requires the Construction Contractor to implement best management practices for construction equipment during construction activities, including, but not limited to, ensuring that all stationary and mobile construction equipment be equipped with properly operating and maintained mufflers (**MM NOI-1a**) and backup alarms for construction equipment be low-impact (**MM NOI-1e**).

MM NOI-2 details sound barrier requirements for nighttime construction activity, such as 12-foot sound enclosures on stationary equipment (**MM NOI-2a**), and strategic placing of construction equipment onsite (**MM NOI-2c)**. To assess noise levels from nighttime well drilling activities with MM NOI-2a and MM NOI-2b, an engine enclosure for the circulation tank motor was modeled within SoundPlan, respectively. As shown in Exhibits 4-2 through 4-5, well drilling activities with noise-reducing mitigation measures would result in a noise exposure level of up to 44–49 dBA L_{eq} at the nearest residential façades. With the exterior to interior noise reduction provided by residential building structures, interior noise levels is anticipated to be 20 to 25 dBA less and would result in an interior noise level of up to 24–29 dBA L_{eq}. It should be noted that not all mitigation measures required for this Project were quantified in the SoundPlan analysis, thus providing a conservative estimate of proposed noise levels. Based on the beforementioned guidance provided by the USEPA and WHO, interior noise levels of less than 30 dBA L_{eq} are not anticipated to result in sleep disturbance at nearby residential uses. Additionally, **MM NOI-3** requires that an opportunity for communication between City staff and the surrounding communities regarding nighttime construction activities is provided.

Per **MM NOI-3**, prior to commencement of nighttime Project construction, the City of Pasadena shall establish a designated phone hotline and email address for Project-related information and complaints from the surrounding neighborhood. Fliers and posters shall be posted and visible at the Project boundary at least one week prior to commencement of nighttime construction activity and be visible throughout the nighttime construction duration. Also, **MM NOI-4** requires that the City retain a Noise Monitor for on-call services to ensure that nighttime construction noise does not exceed 50 dBA L_{eq} at the nearest residential façade proximate to the site during nighttime construction activities. A 50 dBA L_{eq} exterior exposure level would be reduced by at least 20–25 dBA due to the building façade and result in interior noise levels of 30 dBA or less which is below the USEPA's sleep disturbance level. As such, most people with typical noise sensitivities at nearby residential uses closest to the Project site are not anticipated to experience sleep



Source: Psomas, 2023

Noise Modeling Results for Nighttime Drilling with No Noise Protection

Exhibit 4-2

Explorer Well Project

N
W E
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Map not to scale

PSOMAS

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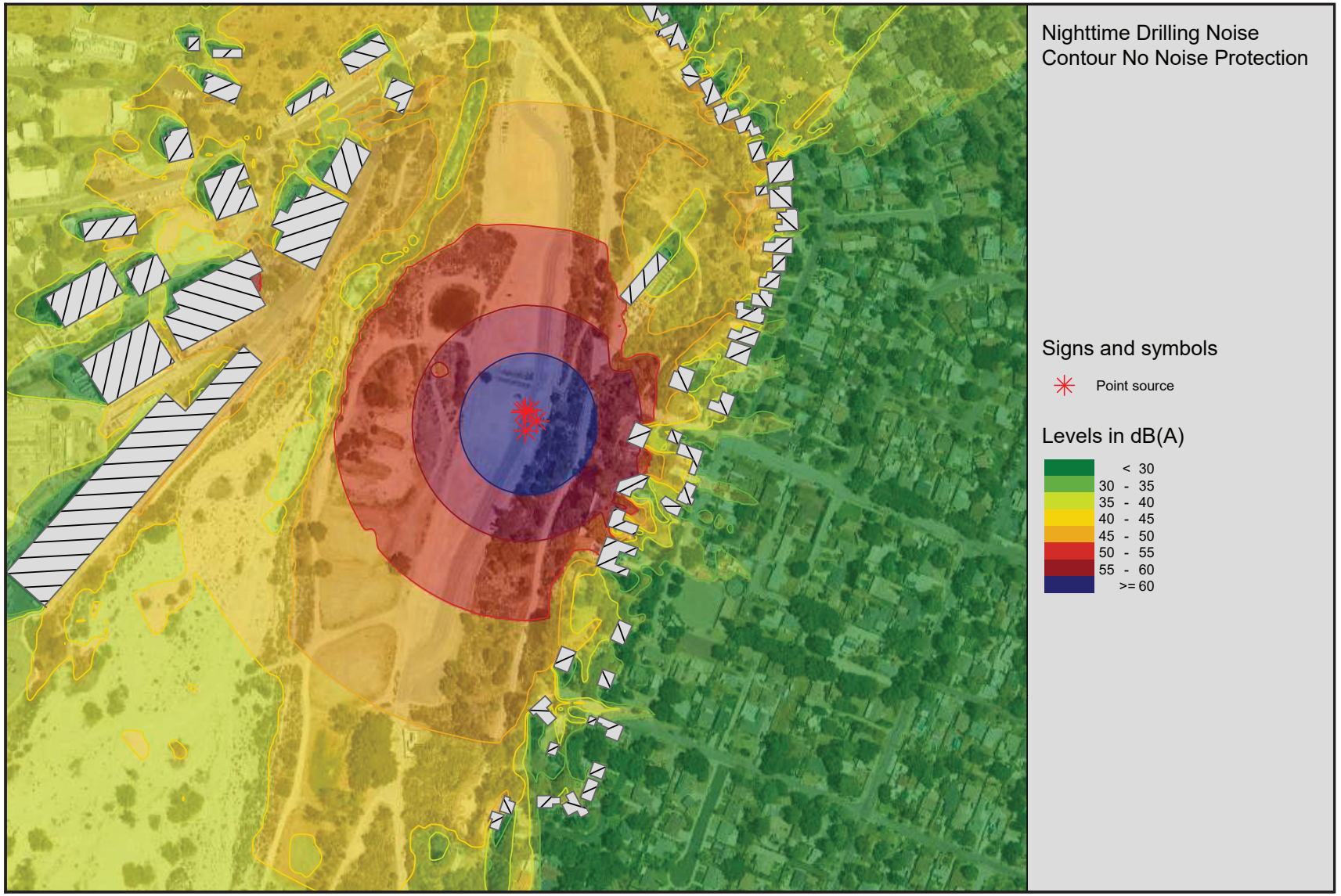

Source: Psomas, 2023

Noise Modeling Levels for Nighttime Drilling with No Noise Protection

Exhibit 4-3

Explorer Well Project

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Source: Psomas, 2023

Noise Modeling Results for Nighttime Drilling with Noise Protection

Exhibit 4-4

Explorer Well Project

N W E S

Map not to scale

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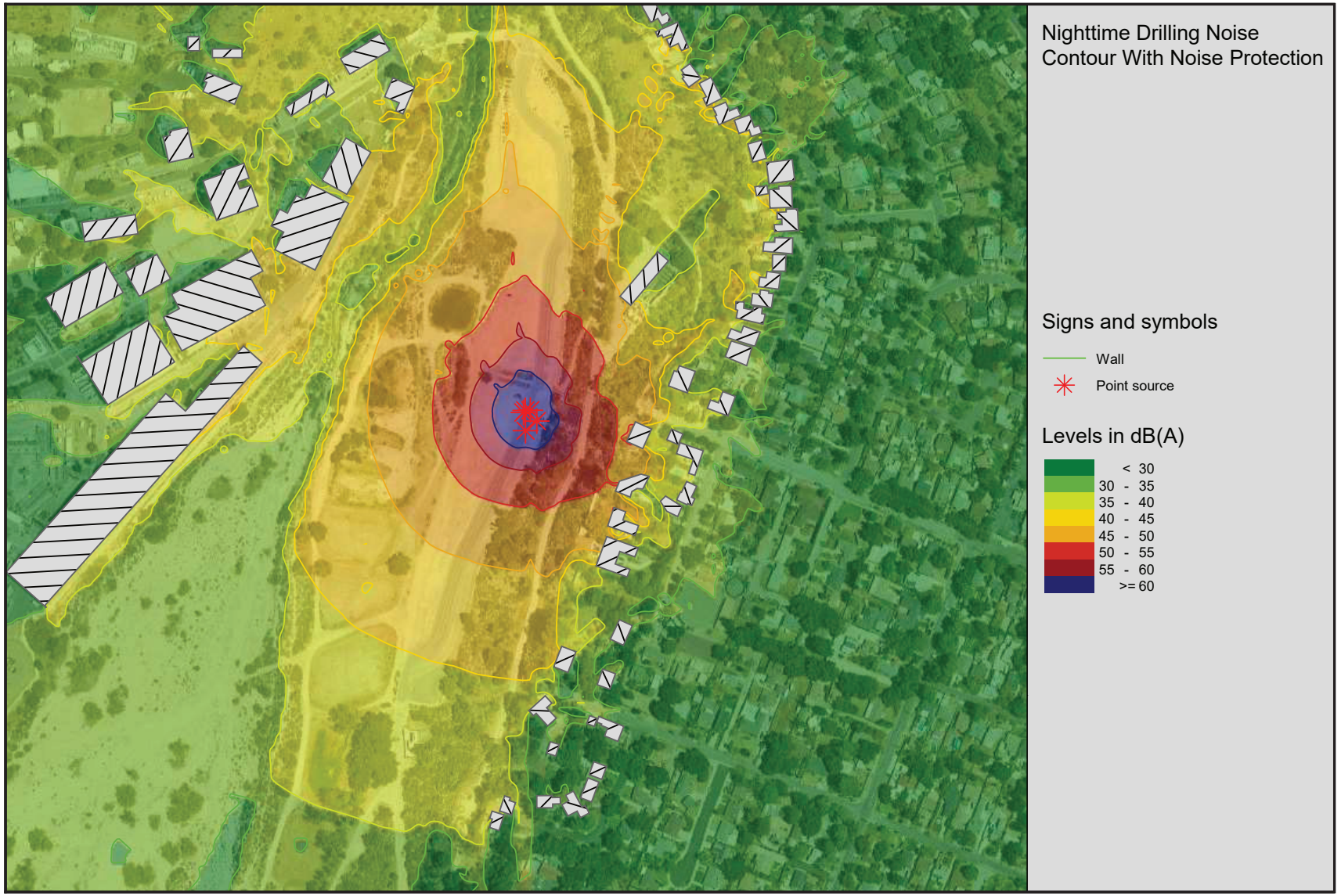

Source: Psomas, 2023

Noise Modeling Levels for Nighttime Drilling with Noise Protection

Exhibit 4-5

Explorer Well Project

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disturbance from on-site Project-related construction activities under mitigated conditions. Residential uses located further from the Project site are exposed to less noise and would likewise not experience sleep disturbance from the Project's mitigated construction activities. Impacts from on-site construction during nights and early mornings would thereby be less than significant with mitigation.

The Project would generate construction traffic noise from vehicle traffic, including workers commuting to and from the Project site, vendors delivering materials, and haul trucks exporting well drilling spoils and liquid storage tanks. Truck (i.e., heavy truck) pass-by trips would be heard at residences adjacent to the roads used, which would include Windsor Avenue, from the I-210 to Explorer Road and into the Project site. The maximum number of heavy truck trips is anticipated to be thirty truck trips over a one-month period. This quantity amounts to approximately 1–2 truck trips per day. Additionally, **MM NOI-1d** limits truck trips to export drill cuttings to the daytime when people are less sensitive to noise. It is anticipated that an average of approximately three workers would be onsite at the same time, which would generate an average of approximately six construction-related worker commute trips per day. Due to the infrequency of Project-related truck and worker commute trips, the increase in traffic noise would be less than the 3 dBA significance threshold for noise (Caltrans 2013). A 3 dBA increase is the minimum change in noise levels that is audible in outdoor environments. A doubling of traffic along local roadways is necessary for a 3 dBA change in noise levels. Consequently, construction-related traffic noise impacts would be temporary, but not substantial.

As discussed previously, the noise generated during construction would not involve pile drivers or other equipment that would exceed the 85 dBA noise level limit as measured at 100 feet established by the City under Pasadena Municipal Code Section 9.36.080. As such, the Project would not result in substantial temporary noise impacts and sleep disturbance to residential land uses nearby the Project site. Thus, noise associated with Project-related construction activities would comply with Pasadena Municipal Code Sections 9.36.050, General Noise and be below the sleep disturbance thresholds, and thus, less than significant impacts would result with implementation of **MMs NOI-1** through **MM NOI-4**.

The Project's proposed 800 feet of new raw water pipeline within Karl Johnson Parkway would require the demolition of existing asphalt, trenching, pipe installation, and well site piping connections. Construction activities would be located as close as 200 feet from nearby residential uses. The estimated noise level at the closest homes along Ridgeview Drive in Altadena, which would occur intermittently, is calculated at 73 dBA which is less than the County standard of 75 dBA L_{eq}. This noise level is also less than the limit of 85 dBA at 100 feet stated in Section 9.36.080 of the City of Pasadena Noise Ordinance. As such, noise from construction activities associated with the pipelines would be less than significant. All pipeline construction activities would also be limited to between the hours of 7:00 AM and 7:00 PM Monday through Friday and between 8:00 AM and 5:00 PM on Saturday, as required by the City's Noise Ordinance. Although no mitigation is required, **MM NOI-1** would be implemented for all phases of the Project.

The operating conditions of the Project would involve a pump for groundwater extraction and transference, which would generate noise that is contained within an enclosed building to attenuate noise. The building would be constructed of concrete-masonry units. **MM NOI-5** would ensure that the Project is compliant with applicable noise standards through a post-construction noise survey and applying any necessary noise reduction measures to ensure compliance.

In summary, with implementation of **MMs NOI-1 through MM NOI-5**, the Project would have a less than significant impact related to this threshold.

b) Would the project result in generation of excessive groundborne vibration or groundborne noise levels?

No Impact. As stated above, there are no applicable City of Pasadena standards for vibration-induced annoyance or building damage from vibration. Potential vibration impacts are assessed based on thresholds recommended by the FTA. The FTA recommends a construction vibration damage criteria of 0.2 peak particle velocity (ppv) for non-engineered timber and masonry buildings. This is representative of the residential and nonresidential structures closest to the Project site. Construction equipment utilized during Project development would produce vibration from vehicle travel as well as demolition, grading, and building construction activities. The development of the Project facilities would generally occur at a distance of 200 feet from construction equipment to the nearest residential structures. Table 16, Vibration Criteria at Nearest Sensitive Uses, shows the vibration levels relative to building damage to sensitive uses from vibration activities. As shown in Table 16, all ppv levels would be below the vibration threshold at the nearest off-site structures.

TABLE 16
VIBRATION CRITERIA AT NEAREST SENSITIVE USES

	Vibration Levels (ppv)			
	Residences to the East	**Altadena Staples**	**Odyssey Charter School**	**Sacred Heart Catholic Church**
Equipment	**(ppv @ 195 ft)**	**(ppv @ 580 ft)**	**(ppv @ 1,230 ft)**	**(ppv @ 2,130 ft)**
Vibratory Roller	0.010	0.002	0.001	0.000
Caisson Drill	0.004	0.001	0.000	0.000
Large bulldozer	0.004	0.001	0.000	0.000
Small bulldozer	0.000	0.000	0.000	0.000
Jackhammer	0.002	0.000	0.000	0.000
Loaded trucks	0.003	0.001	0.000	0.000
Vibration Criteria*	**0.2**	**0.2**	**0.2**	**0.2**
Exceeds Criteria?	**No**	**No**	**No**	**No**

ppv: peak particle velocity; ft: feet.
* Federal Transit Administration. Table 7-5 Construction Vibration Damage Criteria..

These vibration levels represent conditions when construction activities occur closest to receptor locations. Because vibration levels would be substantially below the significance threshold, vibration generated by the Project's construction equipment would result in less than significant vibration impacts, and no mitigation is required.

When the Project begins operations, the Project-related equipment would not generate substantial levels of vibration that would be detectable at nearby residential land uses. As such, the Project would result in less than significant vibration impacts during operation of the Project, and no mitigation is required.

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?

No Impact. There are no airports or airstrips within two miles of the Project site. The nearest airports are the Burbank Bob Hope Airport and the El Monte Airport, which are both approximately

11 miles from the site. The Project would not subject persons in the area to excessive levels of noise exposure from public or private airports, nor would the Project generate aircraft noise. There would be no significant impact from the exposure of aircraft noise to maintenance workers related to the Project.

MITIGATION MEASURES

MM NOI-1 The Construction Contractor shall implement the following noise reduction measures during all construction activities:

a. All stationary or mobile construction equipment shall be equipped with properly-operating and maintained mufflers and engine enclosures, compliant with or exceeding manufacturers' standards.

b. All construction equipment engine enclosures and covers, as provided by manufacturers, shall be in place during construction activities.

c. All construction equipment shall be shut down when not in use. Construction equipment shall not be allowed to idle for more than 3 minutes.

d. During Project construction, export of drill cuttings via trucks shall be limited to the hours of 7 AM through 7 PM.

e. For nighttime activities, construction-standard high-pitch backup alarms for construction equipment and vehicles shall not be used during construction of the Project. Construction equipment and vehicles shall use low-impact backup alarms, including, but not limited to, the following: manually-adjustable alarms, self-adjusting alarms, and broadband (white noise) alarms. These alarms shall conform to the safety requirements established by the Occupational Safety and Health Administration (OSHA).

MM NOI-2 During nighttime construction activity (i.e., from 7 PM to 7 AM), the Construction Contractor shall ensure that the following best management practices for sound barriers are implemented:

a. Sound barrier enclosures of a minimum height of 12 feet shall enclose all stationary equipment sources of noise on four sides. These enclosures shall be constructed of either ¾-inch plywood or greater thickness or sound blankets with a minimum sound transmission class (STC) rating of 25 and cover all sides as well as the top of the equipment. Minimal gaps in the enclosure are acceptable to ensure adequate air intake, exhaust ventilation, and heat dissipation for proper equipment functioning.

b. Temporary sediment settling tanks (i.e., Baker tanks) shall be strategically placed between the circulation tank motor and the nearest residential use.

MM NOI-3 Prior to commencement of nighttime Project construction, the City of Pasadena shall establish a designated phone hotline and email address for Project-related information and complaints from the surrounding neighborhood. The City shall designate a Noise Complaint Manager to monitor this phone hotline and email. Fliers or posters must be posted and visible at the Project boundary at least one week prior to commencement of nighttime construction activity and continue throughout the nighttime construction duration. These posters must provide the

following information: nighttime construction duration and other related details and contact information for the phone hotline and email address.

MM NOI-4 Prior to commencement of nighttime construction activities, the City shall retain a Noise Monitor to monitor noise levels during nighttime construction activities (i.e., from 7 PM to 7 AM). The Noise Monitor shall monitor and record noise at the property line for the nearest residential uses (west and east of the Project site) to ensure that noise levels from the Project construction site do not exceed 50 A-weighted decibels (dBA) at night. If Project-related noise levels exceed 50 dBA during nighttime activities, additional noise reduction measures shall be implemented to further reduce construction noise at the Project site to a level at or below 50 dBA, such as additional vertical and horizontal sound barriers.

MM NOI-5 Once the Project is operational, the City of Pasadena shall conduct a post-construction noise survey to ensure the operation of the well equipment is compliant with the City's noise ordinances.

4.14 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 extension of roads or other infrastructure)?	☐	☐	☒	☐
b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

IMPACT ANALYSIS

Regulatory Requirements

There are no regulatory requirements applicable to population and housing.

Impact Discussion

a) Would the project induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?

Less Than Significant Impact. The Project consists of a new building containing a new groundwater well, as well as a new segment of pipeline.
Given that the Project proposes no new homes or businesses, the Project would not result in any direct unplanned population growth.

The proposed groundwater well and new pipeline that are proposed as part of the Project would not result in indirect unplanned population growth given that all groundwater extraction conducted by PWP is limited by its groundwater rights in the Raymond Basin. Although the Project would increase the City's capacity for pumping, the amount of water pumped remains limited by the Raymond Basin Judgment. Since the Project does not increase the supply of water to the City, it does not indirectly induce growth.

Therefore, the Project would result in a less than significant impact related to this threshold, and no mitigation is required.

b) Would the project displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere??

No Impact. The Project would not require the displacement of any residents or removal of any housing. As such, the Project would not necessitate the construction of replacement housing elsewhere.

Therefore, the Project would result in no impact related to this threshold, and no mitigation is required.

MITIGATION MEASURES

No significant impacts pertaining to population and housing were identified; therefore, no mitigation measures are required.

4.15 PUBLIC SERVICES	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
Would the project:				
a) Would the project 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 any of the public services:				
Fire protection?	☐	☐	☒	☐
Police protection?	☐	☐	☒	☐
Schools?	☐	☐	☐	☒
Parks?	☐	☐	☐	☒
Other public facilities?	☐	☐	☐	☒

IMPACT ANALYSIS

Regulatory Requirements

RR PS-1 The Project shall be designed and constructed in accordance with the Pasadena Fire Prevention Code (Chapter 14.28 of the City's Municipal Code), which adopts the California Fire Code with changes and additions to the adopted code.

Impact Discussion

a) Would the project 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 any of the public services:

- **Fire protection?**
- **Police protection?**
- **Schools?**
- **Parks?**
- **Other public facilities?**

Fire Protection

Less Than Significant Impact. The Project would not increase the population within the Project site since the Project consists of a well and pipeline. The proposed building would result in a minor increase in demand for fire protection services, particularly response to fire service calls if needed once the Project is built. This minor increase in demand for fire protection services is not expected to require the construction of new or alteration of existing fire protection facilities to maintain an adequate level of fire protection service to the Project area.

The building that would be built as part of the Project would be designed consistent with the Uniform Building Code and the California Fire Code, which requires implementation of design standards and requirements to reduce potential fire risk. Also, the Project would be constructed in accordance with the Pasadena Fire Prevention Code (Chapter 14.28 of the City's Municipal Code) as described in **RR PS-1**. Compliance with codes would minimize the potential for fire to affect the Project's proposed well building and, therefore, the Project's demand for fire protection services.

Therefore, the Project would result in a less than significant impact related to fire protection services, and no mitigation is required.

Police Protection

Less Than Significant Impact. Construction of the Project would temporarily provide opportunities for crime (e.g., theft and vandalism). However, construction areas and staging areas would be screened/fenced, which would prevent theft and vandalism during the construction phase.

The Project would result in a new building that would require police protection; however, the area is already patrolled by the police and would therefore not substantially increase demand for police service. The proposed well and pipelines are not likely land uses that would attract criminal activities. A chain-link fence would be constructed around the well site enclosing the well building and transformer, which would further prevent crime and the need for police protection services.

Therefore, the Project would result in a less than significant impact related to police protection services, and no mitigation is required.

Schools

No Impact. The Project consists of a well and pipeline and would therefore not result in any new students nor would the Project otherwise generate demand for school services.

Therefore, the Project would have no impact related to schools, and no mitigation is required.

Parks

No Impact. The Project consists of a well and pipeline and would therefore not result in any new residents that would require parks or other recreational facilities.

Therefore, the Project would have no impact related to this threshold, and no mitigation is required.

Other Public Facilities

No Impact. The Project consists of a well and pipeline and would therefore not result in any new residents that would require libraries or other public facilities.

Therefore, the Project would have no impact related to other public facilities, such as libraries, and no mitigation is required.

MITIGATION MEASURES

No significant impacts pertaining to public services were identified; therefore, no mitigation measures are required.

4.16 RECREATION	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
Would/does the project:				
a) Would the project 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?	☐	☐	☐	☒
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☐	☒

IMPACT ANALYSIS

Regulatory Requirements

There are no regulatory requirements applicable to recreation.

Impact Discussion

a) Would the project 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?

b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?

No Impact. The Project consists of a well and pipeline and would therefore not result in any new residents that would require parks or other recreational facilities.

Therefore, the Project would have no impact related to these thresholds, and no mitigation is required.

MITIGATION MEASURES

No significant impacts pertaining to recreation were identified; therefore, no mitigation measures are required.

4.17 TRANSPORTATION	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?	☐	☐	☒	☐
b) Conflict or be inconsistent with CEQA Guidelines § 15064.3, subdivision (b)?	☐	☐	☒	☐
c) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☒	☐
d) Result in inadequate emergency access?	☐	☐	☒	☐

IMPACT ANALYSIS

Regulatory Requirements

RR TRA-1 Construction activities will be conducted in accordance with the Standard Specifications for Public Works Construction (Greenbook) and the City's Supplements and Modifications to the Greenbook to maintain access to all parcels in and near the construction sites. This includes notification of residents and businesses affected by the road work; utility agencies with facilities in the area; the Pasadena Fire and Police Departments; and other emergency service providers. The Greenbook also requires that access be made available at the end of each workday.

RR TRA-2 Temporary traffic control devices and methods used during construction are required to conform to the requirements of the latest edition of the Manual on Uniform Traffic Control Devices (MUTCD) and the California Supplement to the MUTCD. The contractor shall provide traffic tapers, traffic control devices, barricading, and signs necessary to ensure driver awareness and safety in construction areas and to assist fire and law enforcement personnel.

Impact Discussion

a) Would the project conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?

Less Than Significant Impact. Pasadena developed and adopted its Transportation Impact Analysis Current Practice and Guidelines (TIA Guidelines) to ensure that transportation system improvements necessary to support new development while maintaining the quality of life within the community are identified prior to project approval and funded prior to construction. As the CEQA Lead Agency, Pasadena's transportation guidelines apply to the Project. Pursuant to SB 743, Pasadena TIA Guidelines establish CEQA transportation analysis metrics including: VMT per Capita, vehicle trips per Capita, Proximity and Quality of the Bicycle and Transit Networks, and Pedestrian Accessibility (Pasadena 2022).

Per the Pasadena TIA Guidelines, a CEQA transportation analysis shall be conducted for development projects which satisfy any of the following conditions: (1) proposes 50 or more net new residential dwelling units, or (2) project proposes 50,000 or more net new non-residential square feet (Pasadena 2022). The Project is not a development project and does not meet any conditions requiring a full traffic analysis for long-term operation. Therefore, a TIA is not warranted for the Project.

The Project consists of a well and a pipeline, neither of which have the potential to conflict with any programs, plans, ordinances, or policies relating to the circulation system. Access to trails and along Explorer Road would be maintained throughout Project construction to the maximum extent feasible, with only minor temporary detours during the realignment of Explorer Road.

Therefore, the Project would result in a less than significant impact related to this threshold, and no mitigation is required.

b) Would the project conflict or be inconsistent with CEQA Guidelines § 15064.3, subdivision (b)?

Less Than Significant Impact. Section 15064.3(b)(1) of the State CEQA Guidelines refers to evaluating transportation impacts using vehicle miles traveled for land use projects.

The Project consists of a well and pipeline that have no potential to measurably increase the City's VMT/capita. VMT would be generated during construction associated with vehicle trips to/from the Project site and from construction equipment usage on the Project site. However, this would be a minor amount of VMT and would end once the Project is built. During operation, a limited number of vehicle trips per week would be generated for inspection and maintenance purposes. However, such amount of trips is well below the thresholds for requiring a VMT analysis or any other type of transportation review, per the City's Transportation Impact Analysis Guidelines, which specify that non-residential land uses that generate less than 110 net new daily trips are exempt from transportation review.

Therefore, the Project would have a less than significant impact related to this threshold, and no mitigation is required.

c) Would the project substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

Less Than Significant Impact. A 400-foot segment of Explorer Road would be permanently realigned as part of the Project. The realigned segment of Explorer Road would be similar to the existing roadway once re-built except that the road would be aligned approximately ten feet to the west. This minor realignment would create new curves in the road that do not currently exist; however, these curves would not be sharp, and signage would be provided so that users of Explorer Road will be able to navigate the turns. Furthermore, the curves proposed are similar to curves in the road that exist to the south of the Project site.

New driveways would be provided at two locations within the Project site that would connect to the realigned Explorer Road. These driveways have been designed to allow for adequate sight distance for vehicles entering and leaving the Explorer Well property. Also, these driveways have been designed to include clear demarcations such as striping and signage to minimize potential conflict with users on Explorer Road.

During construction of the realigned Explorer Road, access to JPL's east gate would be restricted for approximately one week while a section of Explorer Road is realigned. Any closures would be coordinated with JPL prior to implementation. Construction of the road realignment would allow for through traffic to continue to utilize Explorer Road while the well is constructed. In addition, designated staging areas would be fenced to prevent safety hazards. As such, the proposed well would not pose a roadway design hazard or impediment.

The proposed pipeline would be constructed underground within the Karl Johnson Parkway and Explorer Road. During pipeline installation, sections of Karl John Parkway will be closed off to vehicle and pedestrian traffic. The pipeline installation would not result in roadway design hazards, as it is not a public-access roadway and since the roadway would be re-paved and returned to pre-Project conditions after construction is complete.

During construction, the Project would adhere to **RR TRA-1**, which mandates that construction activities are conducted in accordance with the Standard Specifications for Public Works Construction (Greenbook) and the City's Supplements and Modifications to the Greenbook. The Greenbook also requires that access be made available at the end of each workday. Implementation of **RR TRA-1** would ensure that there would not be increased hazards for any users of the road.

A minor increase in the number of construction vehicles and trucks on Windsor Avenue during Project implementation would increase opportunities for traffic hazards. Flagpersons, signs, and traffic control devices would be provided as needed by the Contractor in accordance with the Greenbook (**RR TRA-1**) and MUTCD (**RR TRA-2**) to prevent hazards associated with construction vehicles.

Therefore, the Project would result in a less than significant impact related to this threshold, and no mitigation is required.

d) Would the project result in inadequate emergency access?

Less Than Significant Impact. Construction worker vehicles, trucks, delivery vehicles, and haul trucks would access the site via I-210 at the Windsor Avenue off-ramp and head north on Explorer Road to reach the Project site. All construction staging and parking would occur on the Project site. Construction activities associated with the Project would not result in obstruction of Explorer Road, which provides emergency access. Additionally, the Project would comply with the Standard Specifications for Public Works Construction (Greenbook) and the City's Supplements and Modifications to the Greenbook (**RR TRA-1**) regarding maintenance of emergency access at all times; the use of a flagperson to direct traffic, as necessary; and allowing for the continued public use of the Explorer Road at times when construction is not ongoing. Temporary traffic control devices are also required to be provided in conformance with the MUTCD and the California Supplement to the MUTCD (**RR TRA-2**).

Therefore, the Project would result in a less than significant related to this threshold, and no mitigation is required.

MITIGATION MEASURES

No significant impacts pertaining to transportation were identified; therefore, no mitigation measures are required.

4.18 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 § 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), or	☐	☒	☐	☐
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 § 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code § 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe?	☐	☒	☐	☐

IMPACT ANALYSIS

Regulatory Requirements

Regulatory requirements related to tribal cultural resources have been incorporated into **MM TCR-3**, which is discussed below.

Impact Discussion

a) Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code § 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), or

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 Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe?

Less Than Significant With Mitigation. The 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, an MND, or an EIR is required pursuant to CEQA. The Tribes are provided 30 days to request consultation after the lead agency notifies the tribe of a project.

The City initiated the AB 52 process in September 2023 by sending notifications to tribes on the City's AB 52 contact list. The City conducted AB 52 tribal consultation with the one responding tribe, Gabrieleño Band of Mission Indians – Kizh Nation. During tribal consultation, no information was provided indicating the presence of any known tribal cultural resources within the Project site. However, due to the potential for unknown tribal cultural resources to be encountered during ground disturbance activities that would occur during construction, the Gabrieleño Band of Mission Indians – Kizh Nation requested that measures be implemented to avoid and minimize potential impacts. The Project would implement **MM TCR-1,** which requires that a Native American Monitor be retained prior to commencement of ground disturbing activities, and which establishes monitoring requirements. **MM TCR-2** would also be implemented, which establishes the protocols to be followed in the event that unanticipated discoveries of tribal cultural resource objects occur. Finally, **MM TCR-3** would also be implemented by the Project, which establishes the protocols if human remains, grave goods, and/or historical archaeological materials are encountered.

With implementation of **MM TCR-1, MM TCR-2, and MM TCR-3,** the Project would result in a less than significant impact related to these thresholds.

MITIGATION MEASURES

MM TCR-1 **Retain a Native American Monitor Prior to Commencement of Ground Disturbing Activities**: Prior to commencement of ground-disturbing activities, the City of Pasadena (City) shall retain a Native American Monitor (NAM) from or approved by the Gabrieleno Band of Mission Indians – Kizh Nation (the "Tribe" or "Kizh") to observe ground-disturbing activities, which may include, but are not limited to, pavement removal, pot-holing or augering, grubbing, tree removals, boring, grading, excavation, drilling, and trenching, within the Project site. Monitoring by the NAM is only to occur onsite when well drilling is scheduled within 50 feet below the ground surface (bgs) and is not to exceed five consecutive working days. The NAM shall complete daily monitoring logs providing descriptions of the day's activities including construction activities, locations, soil, and any cultural materials identified. All discovered tribal cultural resources found during ground-disturbing activities for the Project within 50 feet bgs, shall be temporarily curated in a secure location on site by the Project Archaeologist (refer to MM-CUL-1). If removal of artifacts from the Project site is necessary, each artifact shall be catalogued by the Project Archaeologist, and an inventory will be provided to the NAM upon each addition.

Additionally, a tribal cultural specialist from the Kizh Nation will assess the significance of any Tribal Cultural Resource (TCR) under Assembly Bill 52 of the California Environmental Quality Act (CEQA). While there is significant overlap between archaeological resources and Tribal Cultural Resource, they are different protected resources under CEQA. Provenience is important for determining "significance" for an archaeological resource in order to establish whether it meets the California Register of Historical Resources eligibility criteria, however the same

is not true for TCRs. The objects, features, sites, sacred spaces, and landscapes are cosmologically considered living things and are considered significant to the descendants of those People that left them behind. Therefore, both levels of significance assessments shall be made by both an archaeologist and the Kizh tribal monitor.

Following the completion of the Project, all tribal cultural resources shall be returned to the Tribe. Following a discovery, at the completion of all ground-disturbing activities, the Project Archaeologist shall formulate a Monitoring Report (refer to MM CUL-1) and submit said report to the City of Pasadena and the South-Central Coastal Information Center (SCCIC) located at California State University, Fullerton and the Gabrieleño Band of Mission Indians-Kizh Nation Tribal Government. The report will document all monitoring efforts and involvement of the NAM. The report shall be completed within 60 days of conclusion of all Project ground-disturbing activities. The disposition of the resources shall be subject to review and approval by the City. If tribal cultural resources are discovered, work may proceed in other areas of the site, subject to the direction of the Project Archaeologist or NAM.

MM TCR-2 **Unanticipated Discovery of Tribal Cultural Resource Objects (Non-Funerary/Non-Ceremonial)**: Upon discovery of a tribal cultural resource within the Project site during Project construction, all construction activities shall cease in the immediate vicinity of the discovery (not less than the surrounding 50 feet) and shall not resume until the find can be assessed. All tribal cultural resources unearthed by Project activities shall be evaluated by the Project Archaeologist and the NAM. If the resources are Native American in origin, the consulting tribe will retain it/them in the form and/or manner the tribe deems appropriate, for educational, cultural, and/or historic purposes.

MM TCR-3 **Unanticipated Discovery of Native American Human Remains and Associated Funerary or Ceremonial Objects:** If human remains and/or grave goods are discovered or recognized at the project sites, all ground disturbance shall immediately cease, and the county coroner shall be notified per Public Resources Code Section 5097.98, and Health & Safety Code Section 7050.5. Human remains and grave/burial goods shall be treated alike per California Public Resources Code section 5097.98(d)(1) and (2). Work may continue in other parts of the project sites while evaluation and, if necessary, mitigation takes place (CEQA Guidelines Section 15064.5[f]). Preservation in place (i.e., avoidance) is the preferred manner of treatment for human remains and/or burial goods. If preservation in place is not feasible, treatment may include implementation of archaeological data recovery excavations to remove the resource along with subsequent laboratory processing and analysis. Any discovery of human remains/burial goods that are Native American in origin shall be kept confidential to prevent further disturbance.

4.19 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?	☐	☐	☒	☐
b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?	☐	☐	☒	☐
c) Result in a determination by the waste water 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?	☐	☐	☒	☐
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?	☐	☐	☒	☐
e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?	☐	☐	☒	☐

IMPACT ANALYSIS

Regulatory Requirements

RR UTIL-1 The Contractor is required to comply with the City's Construction and Demolition Waste Management Ordinance (Chapter 8.62 of the Pasadena Municipal Code), which requires preparation and implementation of a Waste Management Plan that shows how at least 75 percent of construction and demolition debris would be diverted away from landfills. The Waste Management Plan is subject to City approval prior to the start of construction activities, and the Contractor shall provide monthly reports to demonstrate compliance during the construction phase.

Impact Discussion

a) Would the project 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?

Less Than Significant Impact. The Project would involve new connections to existing electrical and water service lines, which would connect to the building containing the Explorer Well. The Project's demands for electricity would be minimal as described in more detail in Section 4.6, Energy. Also, the Project's demands for potable water would similarly be minimal. Therefore, the Project would not require the relocation or construction of any new or expanded utility systems.

The Project would have a less than significant impact related to this threshold, and no mitigation is required.

b) Would the project have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?

Less Than Significant Impact. The Project would connect to existing potable water service line; however, the Project's demand for potable water would be minimal once built. PWP ensures sufficient water supplies through their implementation of their 2020 UWMP (PWP 2021).

Therefore, the Project would have a less than significant impact related to this threshold, and no mitigation is required.

c) Would the project result in a determination by the waste water 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?

Less Than Significant Impact. As discussed under Threshold 4.19(a) above, the Project would not generate wastewater during operations. Construction activities would generate a minor amount of wastewater from portable toilets, which would be provided temporarily at the Project site for the construction crew. This nominal amount of wastewater would be disposed of off-site.

Therefore, the Project would result in a less than significant impact related to this threshold, and no mitigation is required.

d) Would the project 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?

Less Than Significant Impact. Construction activities would generate solid wastes, primarily composed of demolition debris (e.g., asphalt, building materials) and soils/sediment. Project construction and demolition debris and soil to be exported would be disposed of at Scholl Canyon Landfill, located approximately eight driving miles from the site, at 3001 Scholl Canyon Road in Glendale. 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 (**RR UTIL-1**). Therefore, implementation of the Project would result in a nominal construction waste stream requiring landfill disposal. Operation of the Project would not generate any solid waste.

Therefore, the Project would result in a less than significant impact related to this threshold, and no mitigation is required.

e) Would the project comply with federal, state, and local management and reduction statutes and regulations related to solid waste?

Less Than Significant Impact. As discussed under Threshold 2.19(d) above, the Project would be subject to and would comply with the City's C&D ordinance. The Project's minor amount of construction waste 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 Project would comply with federal, State, and local regulations related to solid waste.

Therefore, the Project would have a less than significant impact related to this threshold, and no mitigation is required.

MITIGATION MEASURES

No significant impacts pertaining to utilities and service systems were identified; therefore, no mitigation measures are required.

4.20 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?	☐	☐	☒	☐
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?	☐	☐	☒	☐
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?	☐	☐	☒	☐
d) 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?	☐	☐	☒	☐

IMPACT ANALYSIS

Regulatory Requirements

There are no regulatory requirements applicable to wildfire.

Impact Discussion

a) Would the project substantially impair an adopted emergency response plan or emergency evacuation plan?

Less Than Significant Impact. The Project site is located within a Fire Hazard Severity Zone in an LRA (CAL FIRE 2023). According to mapping prepared by the Pasadena Fire Department, the northern portion of the Project site is within an area that is designated as a VHFHSZ (City of Pasadena 2023b).

The Project would not directly affect any City or County emergency evacuation routes, such as I-210 and Woodbury Road (Los Angeles County 2023). The Project would result in additional traffic temporarily on these roadways during construction; however, the number of trips during construction would be minimal when compared to the capacity of these roads.

Otherwise, there are no City or County emergency response or evacuation plans that are directly applicable to the Project or to the Project site.

Therefore, the Project would result in a less than significant impact related to this threshold, and no mitigation is required.

b) Would the project 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?

Less Than Significant Impact. There would be no long-term occupants associated with the Project as the Project involves the construction and operation of a well and pipeline. Temporarily during construction there would be construction crews on the Project site who could potentially be affected by wildfire; however, impacts would be minimized as construction staff would evacuate the Project site in such an event.

Therefore, the Project would result in a less than significant impact related to this threshold, and no mitigation is required.

c) Would the project 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?

Less Than Significant Impact. The Project would not involve any infrastructure outside of the Project site. The Project's ongoing maintenance would not involve any activities that would in any way exacerbate fire risks or that would otherwise result in environmental impacts.

Therefore, the Project would result in a less than significant impact related to this threshold, and no mitigation is required.

d) Would the project 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?

Less Than Significant Impact. The Project would not involve construction or operation of habitable structures; therefore, the Project would not expose people to wildfire or post-wildfire hazards. The proposed well and building would be built outside of the floodplain and would not be at-risk of flooding. All project components would comply with the City's Floodplain Management Regulations Ordinance (Chapter 14.27 of the Pasadena Municipal Code), which requires facilities to be adequately anchored to prevent flotation, collapse, or lateral movement; to be constructed with materials and equipment resistant to flood damage; to have utility and service facilities designed and located to prevent water from entering; and to provide adequate drainage to reduce exposure to flood hazards. The Project's proposed structures would also be designed and constructed in accordance with the City's Building Code and the recommendations of the Project's Geotechnical Report which would ensure construction would avoid activities associated with landslide and soil instability.

Therefore, the Project would result in a less than significant impact related to this threshold, and no mitigation is required.

MITIGATION MEASURES

No significant impacts pertaining to wildfire were identified; therefore, no mitigation measures are required.

4.21 MANDATORY FINDINGS OF SIGNIFICANCE	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
Does the project:				
a. Does the project 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 a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☒	☐	☐
b. Does the project 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)?	☐	☐	☒	☐
c. Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☒	☐	☐

MANDATORY FINDINGS OF SIGNIFICANCE ANALYSIS

a) Does the project have the potential to 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 rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?

Less Than Significant With Mitigation. The Project would result in significant impacts related to biological resources, cultural resources, geology and soils, and tribal cultural resources prior to the implementation of mitigation. Regarding biological resources, the Project has the potential to result in significant impacts related to one special status wildlife species, the coastal whiptail, which would be mitigated to a less than significant level through implementation of **MM BIO-1**. The Project would also potentially result in significant impacts related to migratory birds, which would be mitigated through implementation of **MM BIO-2.** Regarding cultural resources, the Project could potentially encounter unknown archaeological resources that would result in a significant impact prior to mitigation; however, with implementation of **MM CUL-1** the Project's impact would be reduced to a less than significant level. Regarding geology and soils, the Project has the potential to encounter unknown paleontological resources that would result in a significant impact prior to mitigation; however, with implementation of **MM GEO-1**, the Project's impact related to paleontological resources would be reduced to a less than significant level. Regarding tribal cultural resources, the Project has potential to encounter unknown tribal cultural resources that would result in a significant impact prior to mitigation; however, with implementation of **MM TCR-1** through **MM TCR-3**, the Project's impact related to tribal cultural resources would be reduced to a less than significant level.

b) Does the project 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)?

Less Than Significant Impact. The Project would not have adverse environmental impacts at a significant level for any resource topics. All potential significant impacts would be reduced to less than significant levels with implementation of MMs. No significant cumulative effects are anticipated because no resources would be adversely affected by the Project, or the Project effects would be localized and of limited extent. A less than significant impact would occur in relation to cumulatively considerable effects.

c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?

Less Than Significant With Mitigation. The Project would result in less than significant impacts related to air quality and public services, and the Project would result in less than significant impacts with mitigation related to geology and soils, hazards and hazardous materials, and noise. Therefore, the Project would not cause significant adverse effects to human beings, either directly or indirectly. With implementation of mitigation, the Project would result in less than significant impacts related to this threshold.

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Appendix A

Air Quality Calculations

APPENDIX A
AIR QUALITY CALCULATIONS

Explorer Well v4 Detailed Report

Table of Contents

8. User Changes to Default Data

1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	Explorer Well v4
Construction Start Date	4/1/2024
Lead Agency	—
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	2.50
Precipitation (days)	5.20
Location	Explorer Rd, Pasadena, CA, USA
County	Los Angeles-South Coast
City	Pasadena
Air District	South Coast AQMD
Air Basin	South Coast
TAZ	4930
EDFZ	7
Electric Utility	Pasadena Water & Power
Gas Utility	Southern California Gas
App Version	2022.1.1.20

1.2. Land Use Types

Land Use Subtype	Size	Unit	Lot Acreage	Building Area (sq ft)	Landscape Area (sq ft)	Special Landscape Area (sq ft)	Population	Description
Other Asphalt Surfaces	9.75	1000sqft	0.22	0.00	—	—	—	—

User Defined Industrial	600	User Defined Unit	0.15	600	0.00	—	—	—
User Defined Linear	0.15	Mile	0.02	0.00	—	—	—	—

1.3. User-Selected Emission Reduction Measures by Emissions Sector

No measures selected

2. Emissions Summary

2.1. Construction Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Unmit.	3.43	31.5	47.5	0.07	1.34	0.70	2.03	1.23	0.17	1.39	7,748
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Unmit.	1.72	15.2	23.4	0.03	0.66	0.28	0.94	0.61	0.07	0.67	3,642
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—
Unmit.	1.05	9.33	15.2	0.02	0.36	0.18	0.54	0.33	0.04	0.37	2,387
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.19	1.70	2.78	< 0.005	0.07	0.03	0.10	0.06	0.01	0.07	395

2.2. Construction Emissions by Year, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—

2024	3.43	31.5	47.5	0.07	1.34	0.70	2.03	1.23	0.17	1.39	7,748
2025	1.60	14.2	23.4	0.03	0.55	0.28	0.83	0.51	0.07	0.57	3,652
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
2024	1.72	15.2	23.4	0.03	0.66	0.28	0.94	0.61	0.07	0.67	3,642
2025	1.60	14.2	23.2	0.03	0.55	0.28	0.83	0.51	0.07	0.57	3,636
Average Daily	—	—	—	—	—	—	—	—	—	—	—
2024	0.85	7.57	11.3	0.02	0.32	0.18	0.50	0.29	0.04	0.34	1,843
2025	1.05	9.33	15.2	0.02	0.36	0.18	0.54	0.33	0.04	0.37	2,387
Annual	—	—	—	—	—	—	—	—	—	—	—
2024	0.15	1.38	2.07	< 0.005	0.06	0.03	0.09	0.05	0.01	0.06	305
2025	0.19	1.70	2.78	< 0.005	0.07	0.03	0.10	0.06	0.01	0.07	395

3. Construction Emissions Details

3.1. Site Preparation/Mobilization (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.63	6.63	7.47	0.02	0.27	—	0.27	0.25	—	0.25	1,668
Dust From Material Movement	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—

Average Daily	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.03	0.29	0.33	< 0.005	0.01	—	0.01	0.01	—	0.01	73.1
Dust From Material Movement	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.05	0.06	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	12.1
Dust From Material Movement	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.04	0.57	0.00	0.00	0.10	0.10	0.00	0.02	0.02	107
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	0.18	0.07	< 0.005	< 0.005	0.04	0.04	< 0.005	0.01	0.01	148
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.02	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	4.53
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	6.49
Annual	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.75
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	1.07

3.3. Noise Barriers (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.36	3.83	6.23	0.01	0.16	—	0.16	0.15	—	0.15	966
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.06	0.69	1.13	< 0.005	0.03	—	0.03	0.03	—	0.03	175
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.13	0.21	< 0.005	0.01	—	0.01	< 0.005	—	< 0.005	28.9
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.04	0.57	0.00	0.00	0.10	0.10	0.00	0.02	0.02	107
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.09	0.00	0.00	0.02	0.02	0.00	< 0.005	< 0.005	18.7

Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.02	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	3.09
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.5. Well Drilling (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.24	11.0	15.3	0.02	0.40	—	0.40	0.36	—	0.36	2,290
Dust From Material Movement	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.10	0.87	1.21	< 0.005	0.03	—	0.03	0.03	—	0.03	182
Dust From Material Movement	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	0.02	0.16	0.22	< 0.005	0.01	—	0.01	0.01	—	0.01	30.1
Dust From Material Movement	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Worker	0.04	0.05	0.75	0.00	0.00	0.13	0.13	0.00	0.03	0.03	143
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	0.06	0.02	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	48.6
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.05	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	10.9
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	3.85
Annual	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	1.81
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.64

3.7. Well Drilling Continued (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	1.62	15.8	21.6	0.03	0.66	—	0.66	0.60	—	0.60	3,456
Dust From Material Movement	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.08	0.78	1.06	< 0.005	0.03	—	0.03	0.03	—	0.03	170
Dust From Material Movement	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.14	0.19	< 0.005	0.01	—	0.01	0.01	—	0.01	28.2
Dust From Material Movement	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.06	0.94	0.00	0.00	0.16	0.16	0.00	0.04	0.04	179
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	0.19	0.07	< 0.005	< 0.005	0.04	0.04	< 0.005	0.01	0.01	156
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.04	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	8.49

Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	7.71
Annual	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	1.41
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	1.28

3.9. Well Development (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.27	12.2	15.8	0.03	0.50	—	0.50	0.46	—	0.46	2,582
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.05	0.43	0.56	< 0.005	0.02	—	0.02	0.02	—	0.02	91.9
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.08	0.10	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	15.2
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—

Worker	< 0.005	< 0.005	0.02	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	3.61
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	3.31
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.12
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.12
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.02
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.02
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.11. Install Test Pump, Well Testing and Sampling (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.08	0.63	0.43	< 0.005	0.03	—	0.03	0.02	—	0.02	81.9
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	0.04	0.02	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	4.71
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Annual	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	0.01	< 0.005	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	0.78
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.02	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	3.61
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	3.31
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.20
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.19
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.03
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.03
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.13. Equipment Installation (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	0.36	3.83	6.23	0.01	0.16	—	0.16	0.15	—	0.15	966
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.23	0.38	< 0.005	0.01	—	0.01	0.01	—	0.01	58.6
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	0.04	0.07	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	9.70
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.02	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	3.41
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	3.31
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.21
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.20
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.03
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.03
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.15. Equipment Installation (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.32	3.48	6.20	0.01	0.12	—	0.12	0.11	—	0.11	967
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.32	3.48	6.20	0.01	0.12	—	0.12	0.11	—	0.11	967
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.21	2.28	4.06	0.01	0.08	—	0.08	0.07	—	0.07	634
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.04	0.42	0.74	< 0.005	0.01	—	0.01	0.01	—	0.01	105
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.02	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	3.54
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	3.26
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	3.34
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	3.26

Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	2.23
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	2.14
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.37
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.35
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.17. Site Development (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.24	2.40	3.83	0.01	0.11	—	0.11	0.10	—	0.10	583
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.15	0.23	< 0.005	0.01	—	0.01	0.01	—	0.01	35.4
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	0.03	0.04	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	5.86
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Offsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.02	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	3.41
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	3.31
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.21
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.20
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.03
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.03
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.19. Site Development (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.21	2.20	3.82	0.01	0.08	—	0.08	0.08	—	0.08	583
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	0.21	2.20	3.82	0.01	0.08	—	0.08	0.08	—	0.08	583
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.14	1.44	2.50	< 0.005	0.06	—	0.06	0.05	—	0.05	382
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.03	0.26	0.46	< 0.005	0.01	—	0.01	0.01	—	0.01	63.3
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.02	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	3.54
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	3.26
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	3.34
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	3.26
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	2.23
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	2.14
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.37
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.35

Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.21. Building Construction (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.24	2.40	3.83	0.01	0.11	—	0.11	0.10	—	0.10	583
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.15	0.23	< 0.005	0.01	—	0.01	0.01	—	0.01	35.4
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	0.03	0.04	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	5.86
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.02	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	3.41
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	3.31
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—

Worker	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.21
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.20
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.03
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.03
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.23. Building Construction (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.21	2.20	3.82	0.01	0.08	—	0.08	0.08	—	0.08	583
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.21	2.20	3.82	0.01	0.08	—	0.08	0.08	—	0.08	583
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.14	1.44	2.50	< 0.005	0.06	—	0.06	0.05	—	0.05	382
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.03	0.26	0.46	< 0.005	0.01	—	0.01	0.01	—	0.01	63.3

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.02	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	3.54
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	3.26
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	3.34
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	3.26
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	2.23
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	2.14
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.37
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.35
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.25. Paving (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	0.63	5.57	7.00	0.01	0.26	—	0.26	0.24	—	0.24	1,081
Paving	< 0.005	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.04	0.34	0.42	< 0.005	0.02	—	0.02	0.01	—	0.01	65.6
Paving	< 0.005	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.06	0.08	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	10.9
Paving	< 0.005	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Worker	0.09	0.11	1.28	0.00	0.00	0.26	0.26	0.00	0.06	0.06	271
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.08	0.00	0.00	0.02	0.02	0.00	< 0.005	< 0.005	16.7
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	2.77
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.27. Paving (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.60	5.34	6.98	0.01	0.23	—	0.23	0.21	—	0.21	1,081
Paving	< 0.005	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.60	5.34	6.98	0.01	0.23	—	0.23	0.21	—	0.21	1,081
Paving	< 0.005	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.39	3.50	4.58	0.01	0.15	—	0.15	0.14	—	0.14	709
Paving	< 0.005	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.07	0.64	0.84	< 0.005	0.03	—	0.03	0.03	—	0.03	117
Paving	< 0.005	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Worker	0.09	0.09	1.39	0.00	0.00	0.26	0.26	0.00	0.06	0.06	281
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Worker	0.08	0.10	1.18	0.00	0.00	0.26	0.26	0.00	0.06	0.06	265
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.07	0.81	0.00	0.00	0.17	0.17	0.00	0.04	0.04	177
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.15	0.00	0.00	0.03	0.03	0.00	0.01	0.01	29.3
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.29. Architectural Coatings (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.14	0.91	1.15	< 0.005	0.03	—	0.03	0.03	—	0.03	134

Architectural Coatings	0.03	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.06	0.07	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	8.13
Architectural Coatings	< 0.005	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	0.01	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	1.35
Architectural Coatings	< 0.005	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.02	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	3.41
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.21
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.03
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.31. Architectural Coatings (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.13	0.88	1.14	< 0.005	0.03	—	0.03	0.03	—	0.03	134
Architectural Coatings	0.03	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.13	0.88	1.14	< 0.005	0.03	—	0.03	0.03	—	0.03	134
Architectural Coatings	0.03	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.08	0.58	0.75	< 0.005	0.02	—	0.02	0.02	—	0.02	87.8
Architectural Coatings	0.02	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.11	0.14	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	14.5
Architectural Coatings	< 0.005	—	—	—	—	—	—	—	—	—	—

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.02	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	3.54
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	3.34
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	2.23
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.37
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.33. Linear, Grading & Excavation (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.24	2.40	3.83	0.01	0.11	—	0.11	0.10	—	0.10	583

Dust From Material Movement	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.07	0.72	1.15	< 0.005	0.03	—	0.03	0.03	—	0.03	176
Dust From Material Movement	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.13	0.21	< 0.005	0.01	—	0.01	0.01	—	0.01	29.1
Dust From Material Movement	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.38	0.00	0.00	0.07	0.07	0.00	0.02	0.02	71.7
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	0.02	0.01	< 0.005	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	19.5
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.10	0.00	0.00	0.02	0.02	0.00	< 0.005	< 0.005	20.7
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	5.88

Annual	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.02	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	3.43
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.97

3.35. Linear, Drainage, Utilities, & Sub-Grade (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.24	2.40	3.83	0.01	0.11	—	0.11	0.10	—	0.10	583
Dust From Material Movement	—	—	—	—	—	0.00	0.00	—	0.00	0.00	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.07	0.72	1.15	< 0.005	0.03	—	0.03	0.03	—	0.03	176
Dust From Material Movement	—	—	—	—	—	0.00	0.00	—	0.00	0.00	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.13	0.21	< 0.005	0.01	—	0.01	0.01	—	0.01	29.1

Dust From Material Movement	—	—	—	—	—	0.00	0.00	—	0.00	0.00	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.38	0.00	0.00	0.07	0.07	0.00	0.02	0.02	71.7
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.10	0.00	0.00	0.02	0.02	0.00	< 0.005	< 0.005	20.7
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.02	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	3.43
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.37. Linear, Paving (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.75	6.61	8.18	0.01	0.30	—	0.30	0.28	—	0.28	1,268

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.23	1.99	2.47	< 0.005	0.09	—	0.09	0.08	—	0.08	382
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.04	0.36	0.45	< 0.005	0.02	—	0.02	0.02	—	0.02	63.3
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Worker	0.09	0.10	1.51	0.00	0.00	0.26	0.26	0.00	0.06	0.06	287
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.03	0.40	0.00	0.00	0.08	0.08	0.00	0.02	0.02	83.0
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	0.01	0.07	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	13.7
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

4. Operations Emissions Details

4.10. Soil Carbon Accumulation By Vegetation Type

4.10.1. Soil Carbon Accumulation By Vegetation Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Vegetation	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—

4.10.2. Above and Belowground Carbon Accumulation by Land Use Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—

4.10.3. Avoided and Sequestered Emissions by Species - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Species	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—

5. Activity Data

5.1. Construction Schedule

Phase Name	Phase Type	Start Date	End Date	Days Per Week	Work Days per Phase	Phase Description
Site Preparation/Mobilization	Site Preparation	4/1/2024	4/22/2024	5.00	16.0	—
Noise Barriers	Site Preparation	4/23/2024	7/23/2024	5.00	66.0	—
Well Drilling	Site Preparation	5/23/2024	6/20/2024	7.00	29.0	—
Well Drilling Continued	Site Preparation	6/21/2024	7/18/2024	7.00	18.0	—
Well Development	Building Construction	7/19/2024	7/31/2024	7.00	13.0	—
Install Test Pump, Well Testing and Sampling	Building Construction	8/1/2024	8/29/2024	5.00	21.0	—
Equipment Installation	Building Construction	12/1/2024	12/1/2025	5.00	261	—
Site Development	Building Construction	12/1/2024	12/1/2025	5.00	261	—
Building Construction	Building Construction	12/1/2024	12/1/2025	5.00	261	—
Paving	Paving	12/1/2024	12/1/2025	5.00	261	—
Architectural Coatings	Architectural Coating	12/1/2024	12/1/2025	5.00	261	—
Linear, Grading & Excavation	Linear, Grading & Excavation	4/1/2024	9/1/2024	5.00	110	—
Linear, Drainage, Utilities, & Sub-Grade	Linear, Drainage, Utilities, & Sub-Grade	4/1/2024	9/1/2024	5.00	110	—
Linear, Paving	Linear, Paving	4/1/2024	9/1/2024	5.00	110	—

5.2. Off-Road Equipment

5.2.1. Unmitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor

Site Preparation/Mobilization	Tractors/Loaders/Backhoes	Diesel	Average	1.00	8.00	84.0	0.37
Site Preparation/Mobilization	Bore/Drill Rigs	Diesel	Average	1.00	8.00	83.0	0.50
Site Preparation/Mobilization	Cranes	Diesel	Average	1.00	8.00	367	0.29
Noise Barriers	Tractors/Loaders/Backhoes	Diesel	Average	2.00	8.00	84.0	0.37
Noise Barriers	Bore/Drill Rigs	Diesel	Average	1.00	8.00	83.0	0.50
Well Drilling	Bore/Drill Rigs	Diesel	Average	1.00	24.0	83.0	0.50
Well Drilling	Air Compressors	Diesel	Average	1.00	24.0	37.0	0.48
Well Drilling	Pumps	Diesel	Average	1.00	24.0	11.0	0.74
Well Drilling	Rough Terrain Forklifts	Diesel	Average	1.00	8.00	96.0	0.40
Well Drilling Continued	Tractors/Loaders/Backhoes	Diesel	Average	2.00	24.0	84.0	0.37
Well Drilling Continued	Bore/Drill Rigs	Diesel	Average	1.00	24.0	83.0	0.50
Well Drilling Continued	Pumps	Diesel	Average	1.00	24.0	11.0	0.74
Well Drilling Continued	Generator Sets	Diesel	Average	1.00	24.0	14.0	0.74
Well Development	Tractors/Loaders/Backhoes	Diesel	Average	1.00	24.0	84.0	0.37
Well Development	Bore/Drill Rigs	Diesel	Average	1.00	24.0	83.0	0.50
Well Development	Pumps	Diesel	Average	1.00	24.0	11.0	0.74
Well Development	Generator Sets	Diesel	Average	1.00	24.0	14.0	0.74
Install Test Pump, Well Testing and Sampling	Pumps	Diesel	Average	1.00	8.00	11.0	0.74
Equipment Installation	Tractors/Loaders/Backhoes	Diesel	Average	2.00	8.00	84.0	0.37
Equipment Installation	Bore/Drill Rigs	Diesel	Average	1.00	8.00	83.0	0.50
Site Development	Tractors/Loaders/Backhoes	Diesel	Average	2.00	8.00	84.0	0.37

Building Construction	Tractors/Loaders/Backhoes	Diesel	Average	2.00	8.00	84.0	0.37
Paving	Cement and Mortar Mixers	Diesel	Average	4.00	6.00	10.0	0.56
Paving	Pavers	Diesel	Average	1.00	7.00	81.0	0.42
Paving	Rollers	Diesel	Average	1.00	7.00	36.0	0.38
Paving	Tractors/Loaders/Backhoes	Diesel	Average	2.00	7.00	84.0	0.37
Architectural Coatings	Air Compressors	Diesel	Average	1.00	6.00	37.0	0.48
Linear, Grading & Excavation	Tractors/Loaders/Backhoes	Diesel	Average	2.00	8.00	84.0	0.37
Linear, Drainage, Utilities, & Sub-Grade	Tractors/Loaders/Backhoes	Diesel	Average	2.00	8.00	84.0	0.37
Linear, Paving	Tractors/Loaders/Backhoes	Diesel	Average	2.00	8.00	84.0	0.37
Linear, Paving	Cement and Mortar Mixers	Diesel	Average	4.00	8.00	10.0	0.56
Linear, Paving	Rollers	Diesel	Average	1.00	8.00	36.0	0.38
Linear, Paving	Pavers	Diesel	Average	1.00	8.00	81.0	0.42

5.3. Construction Vehicles

5.3.1. Unmitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
Site Preparation/Mobilization	—	—	—	—
Site Preparation/Mobilization	Worker	7.50	18.5	LDA,LDT1,LDT2
Site Preparation/Mobilization	Vendor	—	10.2	HHDT,MHDT
Site Preparation/Mobilization	Hauling	2.00	20.0	HHDT
Site Preparation/Mobilization	Onsite truck	—	—	HHDT
Well Drilling Continued	—	—	—	—

Well Drilling Continued	Worker	12.5	18.5	LDA,LDT1,LDT2
Well Drilling Continued	Vendor	—	10.2	HHDT,MHDT
Well Drilling Continued	Hauling	2.11	20.0	HHDT
Well Drilling Continued	Onsite truck	—	—	HHDT
Paving	—	—	—	—
Paving	Worker	20.0	18.5	LDA,LDT1,LDT2
Paving	Vendor	—	10.2	HHDT,MHDT
Paving	Hauling	0.00	20.0	HHDT
Paving	Onsite truck	—	—	HHDT
Linear, Grading & Excavation	—	—	—	—
Linear, Grading & Excavation	Worker	5.00	18.5	LDA,LDT1,LDT2
Linear, Grading & Excavation	Vendor	0.00	10.2	HHDT,MHDT
Linear, Grading & Excavation	Hauling	0.26	20.0	HHDT
Linear, Grading & Excavation	Onsite truck	—	—	HHDT
Linear, Drainage, Utilities, & Sub-Grade	—	—	—	—
Linear, Drainage, Utilities, & Sub-Grade	Worker	5.00	18.5	LDA,LDT1,LDT2
Linear, Drainage, Utilities, & Sub-Grade	Vendor	0.00	10.2	HHDT,MHDT
Linear, Drainage, Utilities, & Sub-Grade	Hauling	0.00	20.0	HHDT
Linear, Drainage, Utilities, & Sub-Grade	Onsite truck	—	—	HHDT
Linear, Paving	—	—	—	—
Linear, Paving	Worker	20.0	18.5	LDA,LDT1,LDT2
Linear, Paving	Vendor	0.00	10.2	HHDT,MHDT
Linear, Paving	Hauling	0.00	20.0	HHDT
Linear, Paving	Onsite truck	—	—	HHDT
Noise Barriers	—	—	—	—
Noise Barriers	Worker	7.50	18.5	LDA,LDT1,LDT2
Noise Barriers	Vendor	—	10.2	HHDT,MHDT

Noise Barriers	Hauling	0.00	20.0	HHDT
Noise Barriers	Onsite truck	—	—	HHDT
Well Drilling	—	—	—	—
Well Drilling	Worker	10.0	18.5	LDA,LDT1,LDT2
Well Drilling	Vendor	—	10.2	HHDT,MHDT
Well Drilling	Hauling	0.66	20.0	HHDT
Well Drilling	Onsite truck	—	—	HHDT
Well Development	—	—	—	—
Well Development	Worker	0.25	18.5	LDA,LDT1,LDT2
Well Development	Vendor	0.10	10.2	HHDT,MHDT
Well Development	Hauling	0.00	20.0	HHDT
Well Development	Onsite truck	—	—	HHDT
Install Test Pump, Well Testing and Sampling	—	—	—	—
Install Test Pump, Well Testing and Sampling	Worker	0.25	18.5	LDA,LDT1,LDT2
Install Test Pump, Well Testing and Sampling	Vendor	0.10	10.2	HHDT,MHDT
Install Test Pump, Well Testing and Sampling	Hauling	0.00	20.0	HHDT
Install Test Pump, Well Testing and Sampling	Onsite truck	—	—	HHDT
Equipment Installation	—	—	—	—
Equipment Installation	Worker	0.25	18.5	LDA,LDT1,LDT2
Equipment Installation	Vendor	0.10	10.2	HHDT,MHDT
Equipment Installation	Hauling	0.00	20.0	HHDT
Equipment Installation	Onsite truck	—	—	HHDT
Site Development	—	—	—	—
Site Development	Worker	0.25	18.5	LDA,LDT1,LDT2

Site Development	Vendor	0.10	10.2	HHDT,MHDT
Site Development	Hauling	0.00	20.0	HHDT
Site Development	Onsite truck	—	—	HHDT
Building Construction	—	—	—	—
Building Construction	Worker	0.25	18.5	LDA,LDT1,LDT2
Building Construction	Vendor	0.10	10.2	HHDT,MHDT
Building Construction	Hauling	0.00	20.0	HHDT
Building Construction	Onsite truck	—	—	HHDT
Architectural Coatings	—	—	—	—
Architectural Coatings	Worker	0.25	18.5	LDA,LDT1,LDT2
Architectural Coatings	Vendor	—	10.2	HHDT,MHDT
Architectural Coatings	Hauling	0.00	20.0	HHDT
Architectural Coatings	Onsite truck	—	—	HHDT

5.4. Vehicles

5.4.1. Construction Vehicle Control Strategies

Non-applicable. No control strategies activated by user.

5.5. Architectural Coatings

Phase Name	Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)
Architectural Coatings	0.00	0.00	900	300	585

5.6. Dust Mitigation

5.6.1. Construction Earthmoving Activities

Phase Name	Material Imported (Cubic Yards)	Material Exported (Cubic Yards)	Acres Graded (acres)	Material Demolished (sq. ft.)	Acres Paved (acres)

Site Preparation/Mobilization	—	250	0.00	0.00	—
Well Drilling	—	150	0.00	0.00	—
Well Drilling Continued	—	300	0.00	0.00	—
Paving	0.00	0.00	0.00	0.00	0.24
Linear, Grading & Excavation	—	230	0.02	0.00	—
Linear, Drainage, Utilities, & Sub-Grade	—	—	0.02	0.00	—

5.6.2. Construction Earthmoving Control Strategies

Control Strategies Applied	Frequency (per day)	PM10 Reduction	PM2.5 Reduction
Water Exposed Area	2	61%	61%
Water Demolished Area	2	36%	36%

5.7. Construction Paving

Land Use	Area Paved (acres)	% Asphalt
Other Asphalt Surfaces	0.22	100%
User Defined Industrial	0.00	0%
User Defined Linear	0.02	100%

5.8. Construction Electricity Consumption and Emissions Factors

kWh per Year and Emission Factor (lb/MWh)

Year	kWh per Year	CO2	CH4	N2O
2024	0.00	1,028	0.03	< 0.005
2025	0.00	1,028	0.03	< 0.005

5.18. Vegetation

5.18.1. Land Use Change

5.18.1.1. Unmitigated

Vegetation Land Use Type	Vegetation Soil Type	Initial Acres	Final Acres

5.18.1. Biomass Cover Type

5.18.1.1. Unmitigated

Biomass Cover Type	Initial Acres	Final Acres

5.18.2. Sequestration

5.18.2.1. Unmitigated

Tree Type	Number	Electricity Saved (kWh/year)	Natural Gas Saved (btu/year)

6. Climate Risk Detailed Report

6.1. Climate Risk Summary

Cal-Adapt midcentury 2040–2059 average projections for four hazards are reported below for your project location. These are under Representation Concentration Pathway (RCP) 8.5 which assumes GHG emissions will continue to rise strongly through 2050 and then plateau around 2100.

Climate Hazard	Result for Project Location	Unit
Temperature and Extreme Heat	25.8	annual days of extreme heat
Extreme Precipitation	10.0	annual days with precipitation above 20 mm
Sea Level Rise	0.00	meters of inundation depth
Wildfire	28.2	annual hectares burned

Temperature and Extreme Heat data are for grid cell in which your project are located. The projection is based on the 98th historical percentile of daily maximum/minimum temperatures from observed historical data (32 climate model ensemble from Cal-Adapt, 2040–2059 average under RCP 8.5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.

Extreme Precipitation data are for the grid cell in which your project are located. The threshold of 20 mm is equivalent to about ¾ an inch of rain, which would be light to moderate rainfall if received over a full day or heavy rain if received over a period of 2 to 4 hours. Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Sea Level Rise data are for the grid cell in which your project are located. The projections are from Radke et al. (2017), as reported in Cal-Adapt (Radke et al., 2017, CEC-500-2017-008), and consider inundation location and depth for the San Francisco Bay, the Sacramento-San Joaquin River Delta and California coast resulting different increments of sea level rise coupled with extreme storm events. Users may select from four scenarios to view the range in potential inundation depth for the grid cell. The four scenarios are: No rise, 0.5 meter, 1.0 meter, 1.41 meters
Wildfire data are for the grid cell in which your project are located. The projections are from UC Davis, as reported in Cal-Adapt (2040–2059 average under RCP 8.5), and consider historical data of climate, vegetation, population density, and large (> 400 ha) fire history. Users may select from four model simulations to view the range in potential wildfire probabilities for the grid cell. The four simulations make different assumptions about expected rainfall and temperature are: Warmer/drier (HadGEM2-ES), Cooler/wetter (CNRM-CM5), Average conditions (CanESM2), Range of different rainfall and temperature possibilities (MIROC5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.

6.2. Initial Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	3	0	0	N/A
Extreme Precipitation	N/A	N/A	N/A	N/A
Sea Level Rise	1	0	0	N/A
Wildfire	1	0	0	N/A
Flooding	N/A	N/A	N/A	N/A
Drought	N/A	N/A	N/A	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	0	0	0	N/A

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores do not include implementation of climate risk reduction measures.

6.3. Adjusted Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	3	1	1	3
Extreme Precipitation	N/A	N/A	N/A	N/A
Sea Level Rise	1	1	1	2
Wildfire	1	1	1	2

Flooding	N/A	N/A	N/A	N/A
Drought	N/A	N/A	N/A	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	1	1	1	2

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores include implementation of climate risk reduction measures.

6.4. Climate Risk Reduction Measures

7. Health and Equity Details

7.1. CalEnviroScreen 4.0 Scores

The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Exposure Indicators	—
AQ-Ozone	82.6
AQ-PM	55.4
AQ-DPM	34.5
Drinking Water	75.4
Lead Risk Housing	72.7
Pesticides	0.00
Toxic Releases	63.7
Traffic	27.7
Effect Indicators	—
CleanUp Sites	68.9
Groundwater	63.4

Haz Waste Facilities/Generators	43.3
Impaired Water Bodies	23.9
Solid Waste	36.5
Sensitive Population	—
Asthma	26.0
Cardio-vascular	7.99
Low Birth Weights	—
Socioeconomic Factor Indicators	—
Education	65.8
Housing	47.6
Linguistic	58.2
Poverty	57.8
Unemployment	36.4

7.2. Healthy Places Index Scores

The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Economic	—
Above Poverty	—
Employed	—
Median HI	—
Education	—
Bachelor's or higher	—
High school enrollment	—
Preschool enrollment	—
Transportation	—
Auto Access	—

Active commuting	—
Social	—
2-parent households	—
Voting	—
Neighborhood	—
Alcohol availability	—
Park access	—
Retail density	—
Supermarket access	—
Tree canopy	—
Housing	—
Homeownership	—
Housing habitability	—
Low-inc homeowner severe housing cost burden	—
Low-inc renter severe housing cost burden	—
Uncrowded housing	—
Health Outcomes	—
Insured adults	—
Arthritis	11.1
Asthma ER Admissions	69.4
High Blood Pressure	3.7
Cancer (excluding skin)	18.5
Asthma	40.2
Coronary Heart Disease	15.5
Chronic Obstructive Pulmonary Disease	40.0
Diagnosed Diabetes	10.7
Life Expectancy at Birth	0.0

Cognitively Disabled	66.4
Physically Disabled	42.3
Heart Attack ER Admissions	88.5
Mental Health Not Good	62.3
Chronic Kidney Disease	10.6
Obesity	34.9
Pedestrian Injuries	0.0
Physical Health Not Good	43.5
Stroke	7.6
Health Risk Behaviors	—
Binge Drinking	89.1
Current Smoker	70.9
No Leisure Time for Physical Activity	54.1
Climate Change Exposures	—
Wildfire Risk	25.0
SLR Inundation Area	0.0
Children	40.5
Elderly	39.0
English Speaking	0.0
Foreign-born	0.0
Outdoor Workers	91.4
Climate Change Adaptive Capacity	—
Impervious Surface Cover	84.2
Traffic Density	0.0
Traffic Access	23.0
Other Indices	—
Hardship	0.0

Other Decision Support	—
2016 Voting	0.0

7.3. Overall Health & Equity Scores

Metric	Result for Project Census Tract
CalEnviroScreen 4.0 Score for Project Location (a)	43.0
Healthy Places Index Score for Project Location (b)	—
Project Located in a Designated Disadvantaged Community (Senate Bill 535)	No
Project Located in a Low-Income Community (Assembly Bill 1550)	No
Project Located in a Community Air Protection Program Community (Assembly Bill 617)	No

a: The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.
b: The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

7.4. Health & Equity Measures

No Health & Equity Measures selected.

7.5. Evaluation Scorecard

Health & Equity Evaluation Scorecard not completed.

7.6. Health & Equity Custom Measures

No Health & Equity Custom Measures created.

8. User Changes to Default Data

Screen	Justification
Characteristics: Project Details	Suburban Area
Land Use	Data provided by applicant.
Construction: Construction Phases	Data Provided by Applicant
Construction: Off-Road Equipment	Data Provided by applicant
Construction: Dust From Material Movement	Data Provided by Applicant

Explorer Well v3 Detailed Report

Table of Contents

1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	Explorer Well v3
Operational Year	2026
Lead Agency	—
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	2.50
Precipitation (days)	5.20
Location	Explorer Rd, Pasadena, CA, USA
County	Los Angeles-South Coast
City	Pasadena
Air District	South Coast AQMD
Air Basin	South Coast
TAZ	4930
EDFZ	7
Electric Utility	Pasadena Water & Power
Gas Utility	Southern California Gas
App Version	2022.1.1.20

1.2. Land Use Types

Land Use Subtype	Size	Unit	Lot Acreage	Building Area (sq ft)	Landscape Area (sq ft)	Special Landscape Area (sq ft)	Population	Description
Other Asphalt Surfaces	9.75	1000sqft	0.22	0.00	—	—	—	—

User Defined Industrial	600	User Defined Unit	0.15	600	0.00	—	—	—
User Defined Linear	0.15	Mile	0.02	0.00	—	—	—	—

1.3. User-Selected Emission Reduction Measures by Emissions Sector

No measures selected

2. Emissions Summary

2.4. Operations Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.03	0.01	0.11	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	< 0.005	292
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.02	0.01	0.08	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	< 0.005	291
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.03	0.01	0.08	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	< 0.005	288
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—
Unmit.	< 0.005	< 0.005	0.02	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	47.7

2.5. Operations Emissions by Sector, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Sector	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—

Mobile	0.01	0.01	0.08	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	< 0.005	21.2
Area	0.02	< 0.005	0.03	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	0.11
Energy	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	271
Water	—	—	—	—	—	—	—	—	—	—	0.00
Waste	—	—	—	—	—	—	—	—	—	—	0.00
Total	0.03	0.01	0.11	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	< 0.005	292
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.01	0.01	0.08	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	< 0.005	20.3
Area	0.02	—	—	—	—	—	—	—	—	—	—
Energy	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	271
Water	—	—	—	—	—	—	—	—	—	—	0.00
Waste	—	—	—	—	—	—	—	—	—	—	0.00
Total	0.02	0.01	0.08	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	< 0.005	291
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.01	0.01	0.07	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	< 0.005	17.6
Area	0.02	< 0.005	0.02	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	0.07
Energy	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	271
Water	—	—	—	—	—	—	—	—	—	—	0.00
Waste	—	—	—	—	—	—	—	—	—	—	0.00
Total	0.03	0.01	0.08	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	< 0.005	288
Annual	—	—	—	—	—	—	—	—	—	—	—
Mobile	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	2.91
Area	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	0.01
Energy	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	44.8
Water	—	—	—	—	—	—	—	—	—	—	0.00
Waste	—	—	—	—	—	—	—	—	—	—	0.00
Total	< 0.005	< 0.005	0.02	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	47.7

4. Operations Emissions Details

4.1. Mobile Emissions by Land Use

4.1.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
User Defined Industrial	0.01	0.01	0.08	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	< 0.005	21.2
Total	0.01	0.01	0.08	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	< 0.005	21.2
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
User Defined Industrial	0.01	0.01	0.08	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	< 0.005	20.3
Total	0.01	0.01	0.08	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	< 0.005	20.3
Annual	—	—	—	—	—	—	—	—	—	—	—
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
User Defined Industrial	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	2.91
Total	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	2.91

4.2. Energy

4.2.1. Electricity Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
User Defined Industrial	—	—	—	—	—	—	—	—	—	—	271
Total	—	—	—	—	—	—	—	—	—	—	271
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
User Defined Industrial	—	—	—	—	—	—	—	—	—	—	271
Total	—	—	—	—	—	—	—	—	—	—	271
Annual	—	—	—	—	—	—	—	—	—	—	—
User Defined Industrial	—	—	—	—	—	—	—	—	—	—	44.8
Total	—	—	—	—	—	—	—	—	—	—	44.8

4.2.3. Natural Gas Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
User Defined Industrial	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
User Defined Industrial	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	0.00

Total	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
User Defined Industrial	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	0.00

4.3. Area Emissions by Source

4.3.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Source	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	0.01	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	< 0.005	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	< 0.005	< 0.005	0.03	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	0.11
Total	0.02	< 0.005	0.03	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	0.11
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	0.01	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	< 0.005	—	—	—	—	—	—	—	—	—	—
Total	0.02	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	< 0.005	—	—	—	—	—	—	—	—	—	—

Architectural Coatings	< 0.005	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	0.01
Total	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	0.01

4.4. Water Emissions by Land Use

4.4.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00
User Defined Industrial	—	—	—	—	—	—	—	—	—	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00
User Defined Industrial	—	—	—	—	—	—	—	—	—	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00
User Defined Industrial	—	—	—	—	—	—	—	—	—	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	0.00

4.5. Waste Emissions by Land Use

4.5.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00
User Defined Industrial	—	—	—	—	—	—	—	—	—	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00
User Defined Industrial	—	—	—	—	—	—	—	—	—	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00
User Defined Industrial	—	—	—	—	—	—	—	—	—	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	0.00

4.6. Refrigerant Emissions by Land Use

4.6.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—

4.7. Offroad Emissions By Equipment Type

4.7.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—

4.8. Stationary Emissions By Equipment Type

4.8.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—

4.9. User Defined Emissions By Equipment Type

4.9.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—

4.10. Soil Carbon Accumulation By Vegetation Type

4.10.1. Soil Carbon Accumulation By Vegetation Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Vegetation	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—

4.10.2. Above and Belowground Carbon Accumulation by Land Use Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—

4.10.3. Avoided and Sequestered Emissions by Species - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Species	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—

Sequestered	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—

5. Activity Data

5.9. Operational Mobile Sources

5.9.1. Unmitigated

Land Use Type	Trips/Weekday	Trips/Saturday	Trips/Sunday	Trips/Year	VMT/Weekday	VMT/Saturday	VMT/Sunday	VMT/Year
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
User Defined Industrial	2.40	2.40	0.00	751	26.6	26.6	0.00	8,335

5.10. Operational Area Sources

5.10.1. Hearths

5.10.1.1. Unmitigated

5.10.2. Architectural Coatings

Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)
0	0.00	900	300	585

5.10.3. Landscape Equipment

Season	Unit	Value
Snow Days	day/yr	0.00
Summer Days	day/yr	250

5.11. Operational Energy Consumption

5.11.1. Unmitigated

Electricity (kWh/yr) and CO2 and CH4 and N2O and Natural Gas (kBTU/yr)

Land Use	Electricity (kWh/yr)	CO2	CH4	N2O	Natural Gas (kBTU/yr)
User Defined Industrial	1,400,000	68.5	0.0330	0.0040	0.00

5.12. Operational Water and Wastewater Consumption

5.12.1. Unmitigated

Land Use	Indoor Water (gal/year)	Outdoor Water (gal/year)
Other Asphalt Surfaces	0.00	0.00
User Defined Industrial	0.00	0.00

5.13. Operational Waste Generation

5.13.1. Unmitigated

Land Use	Waste (ton/year)	Cogeneration (kWh/year)
Other Asphalt Surfaces	0.00	—
User Defined Industrial	0.00	—

5.14. Operational Refrigeration and Air Conditioning Equipment

5.14.1. Unmitigated

Land Use Type	Equipment Type	Refrigerant	GWP	Quantity (kg)	Operations Leak Rate	Service Leak Rate	Times Serviced

5.15. Operational Off-Road Equipment

5.15.1. Unmitigated

Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor

5.16. Stationary Sources

5.16.1. Emergency Generators and Fire Pumps

Equipment Type	Fuel Type	Number per Day	Hours per Day	Hours per Year	Horsepower	Load Factor

5.16.2. Process Boilers

Equipment Type	Fuel Type	Number	Boiler Rating (MMBtu/hr)	Daily Heat Input (MMBtu/day)	Annual Heat Input (MMBtu/yr)

5.17. User Defined

Equipment Type	Fuel Type

5.18. Vegetation

5.18.1. Land Use Change

5.18.1.1. Unmitigated

Vegetation Land Use Type	Vegetation Soil Type	Initial Acres	Final Acres

5.18.1. Biomass Cover Type

5.18.1.1. Unmitigated

Biomass Cover Type	Initial Acres	Final Acres

5.18.2. Sequestration

5.18.2.1. Unmitigated

Tree Type	Number	Electricity Saved (kWh/year)	Natural Gas Saved (btu/year)

6. Climate Risk Detailed Report

6.1. Climate Risk Summary

Cal-Adapt midcentury 2040–2059 average projections for four hazards are reported below for your project location. These are under Representation Concentration Pathway (RCP) 8.5 which assumes GHG emissions will continue to rise strongly through 2050 and then plateau around 2100.

Climate Hazard	Result for Project Location	Unit
Temperature and Extreme Heat	25.8	annual days of extreme heat
Extreme Precipitation	10.0	annual days with precipitation above 20 mm
Sea Level Rise	0.00	meters of inundation depth
Wildfire	28.2	annual hectares burned

Temperature and Extreme Heat data are for grid cell in which your project are located. The projection is based on the 98th historical percentile of daily maximum/minimum temperatures from observed historical data (32 climate model ensemble from Cal-Adapt, 2040–2059 average under RCP 8.5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Extreme Precipitation data are for the grid cell in which your project are located. The threshold of 20 mm is equivalent to about ¾ an inch of rain, which would be light to moderate rainfall if received over a full day or heavy rain if received over a period of 2 to 4 hours. Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Sea Level Rise data are for the grid cell in which your project are located. The projections are from Radke et al. (2017), as reported in Cal-Adapt (Radke et al., 2017, CEC-500-2017-008), and consider inundation location and depth for the San Francisco Bay, the Sacramento-San Joaquin River Delta and California coast resulting different increments of sea level rise coupled with extreme storm events. Users may select from four scenarios to view the range in potential inundation depth for the grid cell. The four scenarios are: No rise, 0.5 meter, 1.0 meter, 1.41 meters
Wildfire data are for the grid cell in which your project are located. The projections are from UC Davis, as reported in Cal-Adapt (2040–2059 average under RCP 8.5), and consider historical data of climate, vegetation, population density, and large (> 400 ha) fire history. Users may select from four model simulations to view the range in potential wildfire probabilities for the grid cell. The four simulations make different assumptions about expected rainfall and temperature are: Warmer/drier (HadGEM2-ES), Cooler/wetter (CNRM-CM5), Average conditions (CanESM2), Range of different rainfall and temperature possibilities (MIROC5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.

6.2. Initial Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	3	0	0	N/A
Extreme Precipitation	N/A	N/A	N/A	N/A
Sea Level Rise	1	0	0	N/A
Wildfire	1	0	0	N/A
Flooding	N/A	N/A	N/A	N/A
Drought	N/A	N/A	N/A	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	0	0	0	N/A

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores do not include implementation of climate risk reduction measures.

6.3. Adjusted Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	3	1	1	3
Extreme Precipitation	N/A	N/A	N/A	N/A
Sea Level Rise	1	1	1	2
Wildfire	1	1	1	2
Flooding	N/A	N/A	N/A	N/A
Drought	N/A	N/A	N/A	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	1	1	1	2

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores include implementation of climate risk reduction measures.

6.4. Climate Risk Reduction Measures

7. Health and Equity Details

7.1. CalEnviroScreen 4.0 Scores

The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Exposure Indicators	—
AQ-Ozone	82.6

AQ-PM	55.4
AQ-DPM	34.5
Drinking Water	75.4
Lead Risk Housing	72.7
Pesticides	0.00
Toxic Releases	63.7
Traffic	27.7
Effect Indicators	—
CleanUp Sites	68.9
Groundwater	63.4
Haz Waste Facilities/Generators	43.3
Impaired Water Bodies	23.9
Solid Waste	36.5
Sensitive Population	—
Asthma	26.0
Cardio-vascular	7.99
Low Birth Weights	—
Socioeconomic Factor Indicators	—
Education	65.8
Housing	47.6
Linguistic	58.2
Poverty	57.8
Unemployment	36.4

7.2. Healthy Places Index Scores

The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

Indicator	Result for Project Census Tract

Economic	—
Above Poverty	—
Employed	—
Median HI	—
Education	—
Bachelor's or higher	—
High school enrollment	—
Preschool enrollment	—
Transportation	—
Auto Access	—
Active commuting	—
Social	—
2-parent households	—
Voting	—
Neighborhood	—
Alcohol availability	—
Park access	—
Retail density	—
Supermarket access	—
Tree canopy	—
Housing	—
Homeownership	—
Housing habitability	—
Low-inc homeowner severe housing cost burden	—
Low-inc renter severe housing cost burden	—
Uncrowded housing	—
Health Outcomes	—

Insured adults	—
Arthritis	11.1
Asthma ER Admissions	69.4
High Blood Pressure	3.7
Cancer (excluding skin)	18.5
Asthma	40.2
Coronary Heart Disease	15.5
Chronic Obstructive Pulmonary Disease	40.0
Diagnosed Diabetes	10.7
Life Expectancy at Birth	0.0
Cognitively Disabled	66.4
Physically Disabled	42.3
Heart Attack ER Admissions	88.5
Mental Health Not Good	62.3
Chronic Kidney Disease	10.6
Obesity	34.9
Pedestrian Injuries	0.0
Physical Health Not Good	43.5
Stroke	7.6
Health Risk Behaviors	—
Binge Drinking	89.1
Current Smoker	70.9
No Leisure Time for Physical Activity	54.1
Climate Change Exposures	—
Wildfire Risk	25.0
SLR Inundation Area	0.0
Children	40.5

Elderly	39.0
English Speaking	0.0
Foreign-born	0.0
Outdoor Workers	91.4
Climate Change Adaptive Capacity	—
Impervious Surface Cover	84.2
Traffic Density	0.0
Traffic Access	23.0
Other Indices	—
Hardship	0.0
Other Decision Support	—
2016 Voting	0.0

7.3. Overall Health & Equity Scores

Metric	Result for Project Census Tract
CalEnviroScreen 4.0 Score for Project Location (a)	43.0
Healthy Places Index Score for Project Location (b)	—
Project Located in a Designated Disadvantaged Community (Senate Bill 535)	No
Project Located in a Low-Income Community (Assembly Bill 1550)	No
Project Located in a Community Air Protection Program Community (Assembly Bill 617)	No

a: The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.
b: The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

7.4. Health & Equity Measures

No Health & Equity Measures selected.

7.5. Evaluation Scorecard

Health & Equity Evaluation Scorecard not completed.

7.6. Health & Equity Custom Measures

No Health & Equity Custom Measures created.

8. User Changes to Default Data

Screen	Justification
Characteristics: Project Details	Suburban Area
Land Use	Data provided by applicant.
Construction: Construction Phases	Data Provided by Applicant
Construction: Off-Road Equipment	Data Provided by applicant
Construction: Dust From Material Movement	Data Provided by Applicant
Operations: Vehicle Data	1 trip per day M-S
Operations: Energy Use	Data provided by applicant

Appendix B

Energy Calculations

APPENDIX B
ENERGY CALCULATIONS

Energy Use Summary

Construction Phase (gallons/construction perioc	Gasoline	Diesel
Construction Vehicles	4,969	25,486
Worker Trips	7,659	19
Vendor Trips	28	0
Haul Trucks	0	352
Total	**12,657**	**25,857**

Offroad Construction Equipment Energy Use

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per	Hours Per Da	Horsepower	Load Factor	Horsepower Category	Num Days	Year	Fuel Consumption Rate (gal/hour)	Fuel Type	Total Fuel Consumption (gal/construction period)
Site Preparation/Mobilization	Tractors/Loaders/Backhoes	Diesel	Average	1	8	84	0.37	100	16	2024	1.6	Diesel	75
Site Preparation/Mobilization	Bore/Drill Rigs	Diesel	Average	1	8	83	0.5	100	16	2024	2.2	Diesel	138
Site Preparation/Mobilization	Cranes	Diesel	Average	1	8	367	0.29	300	16	2024	3.3	Diesel	121
Noise Barriers	Tractors/Loaders/Backhoes	Diesel	Average	2	8	84	0.37	100	66	2024	1.6	Diesel	623
Noise Barriers	Bore/Drill Rigs	Diesel	Average	1	8	83	0.5	100	66	2024	2.2	Diesel	568
Well Drilling	Bore/Drill Rigs	Diesel	Average	1	24	83	0.5	100	29	2024	2.2	Diesel	749
Well Drilling	Air Compressors	Diesel	Average	1	24	37	0.48	100	29	2024	1.3	Diesel	442
Well Drilling	Pumps	Diesel	Average	1	24	11	0.74	100	29	2024	1.3	Diesel	691
Well Drilling	Rough Terrain Forklifts	Diesel	Average	1	8	96	0.4	100	29	2024	0.9	Diesel	79
Well Drilling Continued	Tractors/Loaders/Backhoes	Diesel	Average	2	24	84	0.37	100	18	2024	1.6	Diesel	509
Well Drilling Continued	Bore/Drill Rigs	Diesel	Average	1	24	83	0.5	100	18	2024	2.2	Diesel	465
Well Drilling Continued	Pumps	Diesel	Average	1	24	11	0.74	100	18	2024	1.3	Diesel	429
Well Drilling Continued	Generator Sets	Diesel	Average	1	24	14	0.74	100	18	2024	5.2	Gasoline	1,659
Well Development	Tractors/Loaders/Backhoes	Diesel	Average	1	24	84	0.37	100	13	2024	1.6	Diesel	184
Well Development	Bore/Drill Rigs	Diesel	Average	1	24	83	0.5	100	13	2024	2.2	Diesel	336
Well Development	Pumps	Diesel	Average	1	24	11	0.74	100	13	2024	1.3	Diesel	310
Well Development	Generator Sets	Diesel	Average	1	24	14	0.74	100	13	2024	5.2	Gasoline	1,198
Install Test Pump, Well Testing ar	Pumps	Diesel	Average	1	8	11	0.74	100	21	2024	1.3	Diesel	167
Equipment Installation	Tractors/Loaders/Backhoes	Diesel	Average	2	8	84	0.37	100	261	2024	1.6	Diesel	2,462
Equipment Installation	Bore/Drill Rigs	Diesel	Average	1	8	83	0.5	100	261	2024	2.2	Diesel	2,246
Site Development	Tractors/Loaders/Backhoes	Diesel	Average	2	8	84	0.37	100	261	2024	1.6	Diesel	2,462
Building Construction	Tractors/Loaders/Backhoes	Diesel	Average	2	8	84	0.37	100	261	2024	1.6	Diesel	2,462
Paving	Cement and Mortar Mixers	Diesel	Average	4	6	10	0.56	25	261	2024	0.4	Gasoline	1,352
Paving	Pavers	Diesel	Average	1	7	81	0.42	100	261	2024	1.7	Diesel	1,327
Paving	Rollers	Diesel	Average	1	7	36	0.38	100	261	2024	1.7	Diesel	1,176
Paving	Tractors/Loaders/Backhoes	Diesel	Average	2	7	84	0.37	100	261	2024	1.6	Diesel	2,154
Architectural Coatings	Air Compressors	Diesel	Average	1	6	37	0.48	100	261	2024	1.3	Diesel	995
Linear, Grading & Excavation	Tractors/Loaders/Backhoes	Diesel	Average	2	8	84	0.37	100	110	2024	1.6	Diesel	1,038
Linear, Drainage, Utilities, & Sub-(	Tractors/Loaders/Backhoes	Diesel	Average	2	8	84	0.37	100	110	2024	1.6	Diesel	1,038
Linear, Paving	Tractors/Loaders/Backhoes	Diesel	Average	2	8	84	0.37	100	110	2024	1.6	Diesel	1,038
Linear, Paving	Cement and Mortar Mixers	Diesel	Average	4	8	10	0.56	25	110	2024	0.4	Gasoline	760
Linear, Paving	Rollers	Diesel	Average	1	8	36	0.38	100	110	2024	1.7	Diesel	567
Linear, Paving	Pavers	Diesel	Average	1	8	81	0.42	100	110	2024	1.7	Diesel	639

Total	**Gasoline**	**4,969**
Total	**Diesel**	**25,486**

Onroad Construction Energy Use

Year 2024

Vehicle Types	MPG by Fuel Type					Population by Fuel Type					
	Gasoline	Diesel	Electricity	Natural Gas	Plug-in Hybrid	Gasoline	Diesel	Electricity	Natural Gas	Plug-in Hybrid	Total
LDA	29.3	41.2	0.4	0.000	28.2	5,451,205	15,009	284,963	0	152,679	5,903,856
LDT1	24.4	23.4	0.4	0.000	28.0	505,255	186	1,243	0	739	507,423
LDT2	23.9	31.9	0.4	0.000	27.9	2,551,917	8,409	16,572	0	21,729	2,598,626
LHDT1	13.6	20.5	0.6	0.000	0.0	205,772	107,344	793	0	0	313,909
LHDT2	11.9	17.3	0.6	0.000	0.0	32,210	47,494	205	0	0	79,909
MCY	41.5	0.0	0.0	0.000	0.0	248,270	0	0	0	0	248,270
MDV	19.5	23.7	0.4	0.000	27.6	1,622,854	20,420	18,088	0	13,081	1,674,443
MH	4.9	10.1	0.0	0.000	0.0	30,227	12,282	0	0	0	42,510
MHDT	5.2	8.9	1.0	8.3	0.0	25,496	117,140	365	1,526	0	144,526
HHDT	4.0	6.1	1.8	6.0	0.0	66	101,735	317	10,386	0	112,504
OBUS	5.1	7.0	1.1	8.8	0.0	5,427	3,049	12	487	0	8,975
SBUS	8.9	7.3	1.2	4.2	0.0	2,859	3,436	23	3,247	0	9,564
UBUS	7.0	6.6	2.1	3.2	0.0	894	14	132	5,035	0	6,076
						10,682,454	436,518	322,712	20,681	188,228	11,650,593

Daily Trips

Phase Name	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Gasoline Consumption			Diesel Consumption		
							Worker	Vendor	Haul	Worker	Vendor	Haul
Site Preparation/Mobilization	7.5	0	2	18.5	10.2	20						
Well Drilling Continued	12.5	0	2.11	18.5	10.2	20						
Paving	20	0	0	18.5	10.2	20						
Linear, Grading & Excavation	5	0	0.26	18.5	10.2	20						
Linear, Drainage, Utilities, & Sub-Grade	5	0	0	18.5	10.2	20						
Linear, Paving	20	0	0	18.5	10.2	20						
Noise Barriers	7.5	0	0	18.5	10.2	20						
Well Drilling	7.5	0	0.66	18.5	10.2	20						
Well Development	7.5	0.1	0	18.5	10.2	20						
Install Test Pump, Well Testing and Sampling	7.5	0.1	0	18.5	10.2	20						
Equipment Installation	0.25	0.1	0	18.5	10.2	20						
Site Development	0.25	0.1	0	18.5	10.2	20						
Building Construction	0.25	0.1	0	18.5	10.2	20						
Architectural Coatings	0.25	0	0	18.5	10.2	20						
Total Trips												
Site Preparation/Mobilization	120	0	32	18.5	10.2	20	91	0	0	0	0	96
Well Drilling Continued	225	0	37.98	18.5	10.2	20	171	0	0	0	0	113
Paving	5220	0	0	18.5	10.2	20	3,961	0	0	10	0	0
Linear, Grading & Excavation	550	0	28.6	18.5	10.2	20	417	0	0	1	0	85
Linear, Drainage, Utilities, & Sub-Grade	550	0	0	18.5	10.2	20	417	0	0	1	0	0
Linear, Paving	2200	0	0	18.5	10.2	20	1,669	0	0	4	0	0
Noise Barriers	495	0	0	18.5	10.2	20	376	0	0	1	0	0
Well Drilling	217.5	0	19.14	18.5	10.2	20	165	0	0	0	0	57
Well Development	97.5	1.3	0	18.5	10.2	20	74	1	0	0	0	0
Install Test Pump, Well Testing and Sampling	157.5	2.1	0	18.5	10.2	20	120	1	0	0	0	0
Equipment Installation	65.25	26.1	0	18.5	10.2	20	50	13	0	0	0	0
Site Development	65.25	26.1	0	18.5	10.2	20	50	13	0	0	0	0
Building Construction	65.25	26.1	0	18.5	10.2	20	50					
Architectural Coatings	65.25	0	0	18.5	10.2	20	50					
Total							**7,659**	**28**	**0**	**19**	**0**	**352**

Appendix C

Geotechnical Report

APPENDIX C
GEOTECHNICAL REPORT

GEOTECHNICAL EXPLORATION
JET PROPULSION LABORATORY
MONK HILL TREATMENT SYSTEM OPTIMIZATION
EXPLORER WELL & BEHNER WATER TREATMENT PLANT
HAHAMONGNA WATERSHED PARK
JPL EAST PARKING LOT, 3200± EXPLORER ROAD
PASADENA, CALIFORNIA
CIVILTEC PROJECT NO. 2017170.00

Prepared For:

CIVILTEC ENGINEERING, INC
118 West Lime Avenue, Second Floor
Monrovia, California 91016-2841

Project No. 11877.001

January 16, 2018

Leighton Consulting, Inc.
A LEIGHTON GROUP COMPANY

Leighton Consulting, Inc.
A LEIGHTON GROUP COMPANY

Tuesday, January 16, 2018

Project No. 11877.001

Civiltec Engineering, Inc.
118 West Lime Avenue, Second Floor
Monrovia, California 91016-2841

Attention: Mr. Bed P. Dawadi, PE
Project Manager

Subject: Geotechnical Exploration
Jet Propulsion Laboratory Monk Hill Treatment System Optimization
Explorer Well and Behner Water Treatment Plant
Hahamongna Watershed Park
JPL East Parking Lot, 3200± Explorer Road
Pasadena, California
Civiltec Project No. 2017170.00

In accordance with our August 21, 2017 proposal authorized on December 8, 2017, Leighton Consulting, Inc. is pleased to present results of our geotechnical exploration to support design of the new Explorer Well and treatment vessels to be installed at the Behner Water Treatment Plant (WTP) southeast of the Jet Propulsion Laboratory (JPL) in Pasadena, California.

This site is **not** located within a currently designated Alquist-Priolo Earthquake Fault Zone. However, strong seismic ground shaking has and will occur at this site. This site **is** located within a potential liquefaction hazard zone. However, groundwater was not encountered in our December 22, 2017 test pits excavated to a maximum depth of 8 feet at the Explorer Well site. Historical high groundwater levels were mapped at 20 feet below the ground surface at the Explorer Well site and at least (≥) 50 feet deep at the Behner Water Treatment Plant. Potential for liquefaction occurring at the Behner WTP site is extremely low due to the lack of shallow groundwater and high density of old alluvium on this terrace located slightly above the Arroyo Seco wash. Potential for liquefaction occurring at the Explorer Well site is low due to the coarse and well graded alluvium with cobbles and boulders.

Based on our findings, conventional spread footings and/or mat foundations (integrated footings and slab-on-grade), bearing on undisturbed gravel alluvium and/or new properly compacted fill over undisturbed alluvium, may be used to support the proposed masonry well house at the new well.

We appreciate the opportunity to be of additional service to Civiltec Engineering, Inc. If you have any questions about this report, or if we can be of further service, please contact the undersigned at either (909) 484-2205 or **(866) *LEIGHTON***, directly at the phone extension and/or e-mail address listed below.

Respectfully submitted,

LEIGHTON CONSULTING, INC.

Thomas C. Benson, Jr, GE 2091
President and CEO
Extension 8771, tbenson@leightonconsulting.com

TCB:tcb

Distribution: (1) addressee (via e-mail PDF)

Leighton

TABLE OF CONTENTS

List of Tables **Page**

List of Figures

List of Plates

List of Appendices

1.0 INTRODUCTION

1.1 Site Location and Description

As depicted on Figure 1, *Site Location Map*, this site is located in northwestern Pasadena on the east bank of the Arroyo Seco southeast of the Jet Propulsion Laboratory (JPL); at the northern portion of the Hahamongna Watershed Park. There are two components and sites for this project, depicted on Plate 1, *Geotechnical Map* (in pocket), described as follows:

- **Explorer Well (Test Pit 1)**: This proposed Explorer Well site is currently vacant within a relatively flat area located just west of Explorer Road, on the east bank of the Arroyo Seco infiltration basins. This site is down within the Arroyo Seco wash at elevation 1,108-feet. There were east-west trending power lines aligned over this site. This proposed well head will be located 40-feet south of these power lines.

- **Behner Water Treatment Plant (Test Pit 2)**: The existing Behner Water Treatment Plant (WTP) is currently inactive, located on a terrace at the east bank of the Arroyo Seco; northeast of the Explorer Well site. New vessels are to be installed on the south end of the plant on an existing reinforced concrete mat that supports existing vessels, which are to be removed. December 7, 1971 "as-built" plans show the plan pad at elevation 1,163 feet (presumably NGVD29 datum).

1.2 Proposed Wellhouse and Vessels

This new well and modifications to the inactive Behner WTP are proposed as follows:

- **Explorer Wellhouse**: A masonry well house will be designed to house this new well pump and other necessary equipment for operation of the pump. Preliminary Civiltec plans show a rectangular footprint for this wellhouse as 36-feet aligned roughly north 36° east by 12-feet wide. We also assume that the well house finish floor elevation will be at or within 5 feet above existing grade. Masonry bearing wall loads are not expected to exceed 3-kips-per-foot.

- **Treatment Vessels at Behner Water Treatment Plant (WTP)**: New water treatment equipment is to be installed at the existing inactive Behner WTP. The current Behner chemical storage area will be modified to house new ion-exchange and liquid-phase granular activated carbon (LGAC) treatment vessels. These vessels are expected to have an 8-foot-diameter footprint,

weighing 10-kips or less. One possibility will be to install both vessels atop an existing mat foundation, which is currently supporting 8-foot-high, 12-foot-diameter "caustic soda" and "alum" storage tanks. Grade changes are **not** expected to be required at this plant, and the intent is to salvage the existing reportedly 8-inch-thick elongated-octagonal mat supporting these existing tanks. December 7, 1971 "As Built" plans by James M. Montgomery show that this 8-inch-thick mat foundation is reinforced with No. 4 bars spaced 12-inches on center "both ways."

1.3 Purpose and Scope of Evaluation

Our scope of work was performed in accordance with our August 21, 2017 proposal authorized on December 8, 2017 by Civiltec Engineering, Inc. This geotechnical exploration has included the following tasks:

- **Research:** We reviewed available in-house geotechnical reports, literature and maps relevant to this site to look for potential geotechnical issues that may impact these proposed improvements. Key documents reviewed are referenced at the end of this report.

- **Subsurface Exploration (Two Test Pits):** Prior to excavation, we marked proposed test pit locations for Underground Service Alert (USA), so they would mark known public underground utilities to avoid at our proposed test pit locations. Two shallow test pits were excavated with a rubber-tire backhoe to depths of approximately 5 and 8 feet. These test pits were logged by a member of our technical staff during excavation. Bulk soil samples were obtained from these test pits at selected depth intervals and transported to our in-house geotechnical laboratory for testing. Exposed conditions were digitally photographed. All test pits were then backfilled with excavated soil. A description of field procedures, test pit logs and photos are presented in Appendix A, *Field Exploration*. Test pit locations are shown on Plate 1, *Geotechnical Map*.

- **Geotechnical Laboratory Tests:** Geotechnical laboratory tests were performed at our in-house laboratory on recovered bulk soil samples obtained from our field exploration. Undisturbed drive sampling was not possible due to cobbles and boulders at this site. This laboratory-testing program was designed to classify and measure physical/engineering characteristics of sampled soils. Test procedures and results are presented in Appendix B, *Geotechnical Laboratory Testing*.

- **Geotechnical Analyses:** Data from our background review, test pits and geotechnical laboratory testing was evaluated and analyzed to develop geotechnical conclusions and provide geotechnical recommendations for the proposed wellhouse and vessels.

- **Report Preparation:** Results of this evaluation have been summarized in this report, presenting our findings, conclusions and geotechnical recommendations for the proposed improvements.

This report does **not** address the potential for hazardous materials in soil and/or groundwater.

2.0 FINDINGS

2.1 Regional Geotechnical Setting

This site is located within the Pasadena Quadrangle, and there are **not** any currently (early January 2018) designated Alquist-Priolo Fault Zones within the Pasadena Quadrangle, as can be seen here:

http://gmw.conservation.ca.gov/SHP/EZRIM/Maps/PASADENA_EZRIM.pdf

However, this site is near the southern margin of the San Gabriel Mountains, and the Sierra Madre Fault Zone trends east-west along the southern margin of the San Gabriel Mountains. Locally, the United States Geological Survey's (USGS's) Professional Paper 1339, Plate 2.6 (1987) depicts the Bridge Fault segment of the Sierra Madre Fault Zone as being located north of and at the Explorer Road Bridge over the Arroyo Seco; which is north of this site. Faulting would not be visible within the alluvium of the Arroyo Seco and fault studies were beyond the scope of this foundation exploration scope of work. However, we are unaware of anything that would suggest active faulting through this wellhouse, at this time.

Figure 2, *Regional Geology Map*, shows that the wellhouse is located within young alluvial wash (Qw) materials of the Arroyo Seco, while the Behner Plant is located within old alluvial valley (Qoa) deposits, which had been uplifted and incised by the Arroyo Seco. Dibblee (DF-23, 1989) is consistent with this regional mapping depicted on Figure 2 for this site.

2.2 Subsurface Soil Conditions

Fill soils were encountered at Test Pit TP-1 (wellhouse site) to a depth of 3 feet below existing ground surface. Fill soils were also encountered to depths of 2-feet within Test Pit TP-2 at the Behner Plant; but based on as-built plans for this plant, basin/vault (retaining wall) backfill could be as deep as 18 feet in the central portion of the plant, which was constructed in or around 1969 to 1971 (not likely compacted to modified Proctor relative compaction densities). We are

unaware of any fill placement documentation for this site, so all encountered fill soils are classified as undocumented fill (Afu).

Topsoil was encountered at the surface of TP-2 (east edge of Behner Plant). Below topsoil and fill soils, young and old alluvial soils (Qw and Qoa), consisting of very well graded sand, gravel, cobbles and boulders, with up to 6-percent fines (silt, measured) were encountered in our test pit excavations to the maximum depths explored of 5 feet and 8 feet. We encountered refusal at Test Pit TP-1 at a depth of 8 feet. At this refusal depth, large boulders up to 3-feet in diameter could not be removed with a backhoe. Based on observations during excavation, the subsurface granular soils appear to be medium dense to very dense. Boulders and cobbles appeared to be well graded and nestled in a dense matrix, but ranged from angular to sub-rounded (see photos in Appendix A). Undisturbed drive sampling or nuclear gauge density testing was not possible within this cobble and boulder alluvium matrix. Clays were **not** encountered and expansive native soils were not encountered and are **not** expected in this area of Pasadena.

More detailed descriptions of soil encountered are provided on test pit logs in Appendix A.

2.3 Groundwater

Groundwater was not encountered within our test pits excavated on December 22, 2017 to a maximum depth of 8 feet. Historically high groundwater levels have been mapped in the Arroyo Seco at approximately 20 feet deep (CGS, 1998), see:

http://gmw.conservation.ca.gov/SHP/EZRIM/Reports/SHZR/SHZR_014_Pasadena.pdf

Data collected from a nearby groundwater well was utilized to assess the potential for shallow groundwater at the Behner WTP (Department of Water Resources, 2017). Groundwater was recorded on October 13, 2017 at an elevation of 955.73 feet. Based on information from the groundwater well, groundwater at the Behner WTP is expected to be greater-than (>) 200 feet below ground surface. CGS maps historic high groundwater as greater-than (>) 50 feet deep below the Behner WTP.

2.4 Seismicity

Most important seismic hazard that has and will impact this site is ground shaking resulting from an earthquake occurring along several major active or potentially active faults within southern California. Following ASCE 7-10 procedures, the site-specific Peak Horizontal Ground Acceleration (PGA) is 0.994g, and the PGA_M is also 0.994g (F_{PGA}=1 for Site Class D). As an added check, the PGA and hazard deaggregation were also estimated using the United States Geological Survey's (USGS) 2008 Interactive Deaggregations utility. Results of this analysis indicate that the predominant modal earthquake has a Peak Horizontal Ground Acceleration (PHGA) of 1.055g with a modal Magnitude of approximately 7.7 (M_W) at a distance on the order of 5½ kilometers for the Maximum Considered Earthquake (MCE, 2% probability of exceedance in 50 years; 2,475-year recurrence interval). Corresponding PGA for the design earthquake (two-thirds of the MCE) from the deaggregation tool would be 0.70g. Note that 2016 CBC seismic coefficients for building design are presented later in this report.

2.5 Secondary Seismic Hazards

In general, secondary seismic hazards for sites in this region could include soil liquefaction, earthquake-induced settlement, lateral displacement, landsliding and earthquake-induced flooding. The potential for secondary seismic hazards at this site is discussed below.

2.5.1 Liquefaction Potential: Liquefaction is the loss of soil shear strength due to a buildup of pore-water pressure during severe and sustained ground shaking. Liquefaction is associated primarily with loose (low density), saturated, fine-to-medium grained, cohesionless soils. As shaking action of an earthquake progresses, soil grains are rearranged and densify within a short period of time. Rapid densification of soil results in a buildup of pore-water pressure within saturated soils. When the pore-water pressure approaches the total overburden pressure, then soil shear strength reduces greatly and this soil temporarily behaves similarly to a fluid. Effects of liquefaction can include sand boils, settlement and bearing capacity failures below structural foundations.

As depicted on Figure 3, *Seismic Hazard Map*, this site **is** located within a potential liquefaction hazard zone. However, groundwater was not encountered in our December 22, 2017 test pits excavated to a maximum depth of 8 feet at the Explorer Well site. Historical high groundwater levels were mapped at 20 feet below the ground surface at the Explorer Well site and at least (≥) 50 feet deep at the Behner Water Treatment Plant. Potential

for liquefaction occurring at the Behner WTP site is extremely low due to the lack of shallow groundwater and high density (N>30) of old alluvium on this terrace located slightly above the Arroyo Seco wash. Potential for liquefaction occurring at the Explorer Well site is low due to the coarse and well graded alluvium with cobbles and boulders.

Note that due to the cobbles and boulders, conventional hollow-stem auger drilling and Standard Penetration Test (SPT) sampling is futile; but this material would obviously have SPT blow counts (N-values) greater-than (>) 30; which is, by definition, not liquefiable.

2.5.2 Seismically Induced Settlement: During a strong seismic event, seismically induced settlement can occur within loose to moderately dense, dry or saturated granular soil. Settlement caused by ground shaking is often non-uniformly distributed, which can result in differential settlement.

The potential total settlement resulting from seismic shaking associated with a peak ground acceleration of 0.70g is estimated to be negligible based on the gravelly nature of soils underlying this site with cobbles and boulders, which were deposited in a dense, high-energy environment.

2.5.3 Seismically Induced Landslides: Both sites are generally level without significant slopes. These sites are **not** considered susceptible to either static or seismically-induced slope instability.

2.5.4 Earthquake-Induced Seiches and Tsunamis: Seiches are large waves generated in enclosed bodies of water in response to ground shaking. Tsunamis are predominately ocean waves generated by undersea large magnitude fault displacement or major ground movement.

Based on separation of the site from any body of water, seiche impact at this site is highly unlikely. Also, due to the inland location of this site and finish floor elevation at 1,108 feet above mean sea level, relative to the Pacific Ocean (see California Geological Survey, 2009) tsunami risks at this site is **nil**.

2.5.5 Earthquake-Induced Inundation: Earthquake-induced flooding can be caused by failure of dams or other water-retaining structures as a result of earthquakes. This upper portion of the Arroyo Seco (upstream of Devil's Gate Dam) is **not** located within a dam failure inundation zone (although various upstream and uphill water tanks and relatively small enclosed reservoirs could fail and flood the low-lying Arroyo Seco area on the order of a foot deep). Therefore, the potential for earthquake-induced flooding to occur at this pad due to a failure of a dam is considered **nil**.

3.0 CONCLUSIONS AND RECOMMENDATIONS

3.1 Conclusions

This site is **not** located within a currently designated Alquist-Priolo Earthquake Fault Zone. However, strong seismic ground shaking has and will occur at this site. This site **is** located within a potential liquefaction hazard zone. However, groundwater was not encountered in our December 22, 2017 test pits excavated to a maximum depth of 8 feet at the Explorer Well site. Historical high groundwater levels were mapped at 20 feet below the ground surface at the Explorer Well site and at least (≥) 50 feet deep at the Behner Water Treatment Plant. Potential for liquefaction occurring at the Behner WTP site is extremely low due to the lack of shallow groundwater and high density of old alluvium on this terrace located slightly above the Arroyo Seco wash. Potential for liquefaction occurring at the Explorer Well site is low due to the coarse and well graded alluvium with cobbles and boulders.

3.2 Recommendations Summary

Based on our findings, conventional spread footings and/or mat foundations (integrated footings and slab-on-grade), bearing on new properly compacted fill over undisturbed alluvium, may be used to support the proposed well house. However, existing undocumented fill should **not** be used for new structure support. Undocumented fill soils were encountered in our test pits to depths of 2 to 3 feet below existing grades. Therefore, up to 3-feet of overexcavation and recompaction of undocumented fill will be required below existing grade within building footprint areas, extending approximately 3-feet horizontally out beyond the outside perimeter of proposed building footprints. Cobbles and boulders larger-than (>) 6-inches in largest dimension should not be used in new engineered/compacted fill. Cobbles and boulders can be placed upstream of the wellhouse as rip-rap protection for possible flooding of the low-lying Arroyo Seco. It is conceptually recommended to raise the wellhouse finish floor elevation above existing grade in this area, to avoid probable flooding in this area.

Specific design recommendations are provided in the following subsections, followed by a discussion of construction considerations later in this report.

3.3 Salvaging the Behner Plant Tank Mat Foundation

The current Behner chemical storage area (south side of plant) will be modified to house new ion-exchange and liquid-phase granular activated carbon (LGAC)

treatment vessels. These vessels are expected to have an 8-foot-diameter footprint, weighing 10-kips or less. One possibility will be to install both vessels atop an existing mat foundation, which is currently supporting 8-foot-high, 12-foot-diameter "caustic soda" and "alum" storage tanks. Grade changes are not expected to be required at this plant, and the intent is to salvage the existing reportedly 8-inch-thick elongated-octagonal mat supporting these existing tanks. December 7, 1971 "As Built" plans by James M. Montgomery show that this 8-inch-thick mat foundation is reinforced with No. 4 bars spaced 12-inches on center "both ways."

Empirically, if the new tanks weigh less-than existing tanks to be removed, then this approach to salvage the octagonal mat foundation is reasonable. Also, if the new tank contact pressure is <200 pounds-per-square-foot (psf) dead load, then salvaging the existing octagonal mat foundation is reasonable. However, after demolition is completed and the existing tanks are removed, then this mat should be carefully observed at the surface for cracking and deterioration. Both the project Structural Engineer (SE) and our Geotechnical Engineer (GE) should view this mat once completely exposed. If modest cracking and/or concrete deterioration is observed, then perhaps some concrete coring and testing may be required; and epoxy repairs and/or other repairs may be required. If excessive cracking is observed, then the mat may need to be replaced.

3.4 Earthwork

Primary earthwork is expected to consist solely of undocumented fill overexcavation down approximately 3-feet below existing grade, within the wellhouse footprint and 3-feet beyond the proposed wellhouse footprint, followed by backfill under and adjacent the wellhouse. Earthwork should be performed in accordance with Appendix C, *Earthwork and Grading Guide Specifications*. Project-specific earthwork recommendations are provided in the following subsections.

3.4.1 Site Preparation: Prior to construction, areas of proposed improvements should be stripped of pavements, landscaping (trees, shrubs and irrigation systems), trash and debris. Any underground utilities or other obstructions onsite that interfere with proposed foundations should be removed/rerouted. Efforts should be made to locate any existing buried utilities or substructures in areas of proposed improvements, before earthwork begins. Utilities should be removed and rerouted where interfering with proposed construction, and resulting cavities should be backfilled and compacted as recommended in the following subsections.

3.4.2 Undocumented Fill Soil Overexcavation: Undocumented fill soils were encountered at the proposed wellhouse pad to depths of up to 3 feet below existing grade. Thus, it is anticipated that up to 3-feet of overexcavation and recompaction of undocumented fill will be required below the proposed wellhouse building, extending approximately 3-feet horizontally beyond the outside perimeter of the building footprint. At a minimum, 3-feet of soils below existing grade should be overexcavated and recompacted within the wellhouse footprint.

3.4.3 Subgrade Preparation: After undocumented fill soils have been excavated under proposed developments, exposed surfaces should be scarified to a depth of 6-inches, moisture-conditioned to or slightly above optimum moisture content, and compacted in accordance with the recommendations for fill presented in Section 3.3.4, below. Finished compacted subgrade should be firm and non-yielding under weight of compaction equipment.

3.4.4 Fill Placement and Compaction: Onsite soils **free of** organics, debris and oversized material greater-than (>) 6 inches in largest dimension, are suitable for use as compacted structural fill; but should be carefully blended to a uniform gradation. Soil to be placed as fill, whether onsite or import material, should be reviewed by Leighton Consulting, Inc., and tested if and as necessary. Any imported soils must be non-expansive.

Relative compaction should be measured using the modified Proctor ASTM D 1557 laboratory maximum density. Fill should be placed in thin, loose lifts, sufficiently and uniformly moisture-conditioned at or slightly above optimum moisture, and compacted to a minimum of **95 percent** of the ASTM D 1557 laboratory maximum density where supporting the new wellhouse.

3.4.5 Utility Trench Backfill: Utility trenches should be backfilled in accordance with Section 306-12.2 (for narrow trenches) or Section 306-12.3 (for mechanically compacted backfill) of the *Standard Specifications for Public Works Construction* ("Greenbook"), 2015 Edition. Utility trenches can be backfilled with on-site soils free of debris, organic and oversized material up to (≤) 3 inches in largest dimension. Prior to backfilling trenches, pipes should be bedded in and covered with either:

(1) **Sand:** A uniform, granular material that has a Sand Equivalent (SE) of 30 or greater and a maximum particle size of ¾ inches (or as specified by the pipe manufacturer), water densified in place, or

(2) **CLSM:** Controlled Low Strength Material (CLSM) conforming to Section 201-6 of the *Standard Specifications for Public Works Construction*, ("Greenbook"), 2015 Edition.

Pipe bedding should extend at least 4 inches below any pipeline invert and at least 12 inches over the top of the pipeline. Native soils (free of large cobbles and boulders) can be used as backfill over the pipe-bedding zone, and should be placed in thin lifts, moisture conditioned above optimum, and mechanically compacted to at least 90-percent relative compaction, relative to the ASTM D 1557 modified Proctor laboratory maximum density outside of the wellhouse footprint, or 95-percent within the wellhouse footprint.

3.4.6 Surface Drainage: Surface drainage should be designed to direct water away from the wellhouse and toward approved drainage devices. Surface drainage should be provided to prevent ponding of water adjacent to structures or on pavements. In general, areas around buildings should slope away from buildings. Roof runoff should be carried to suitable drainage outlets by watertight drainpipes or other paved areas.

Irrigation of landscaping adjacent to buildings (if any) should be controlled to maintain, as much as possible, consistent soil moisture content sufficient to provide healthy plant growth without over-watering and over-saturating the subgrade. Drought-resistant landscaping with drip-irrigation is suggested in areas adjacent to buildings, to reduce the potential for saturating slab-on-grade subgrades, which can result in moisture damage within buildings.

3.5 Seismic Design Parameters

Seismic parameters presented in Table 1, below, are intended for site-specific structural design of the wellhouse in accordance with the 2016 CBC:

Table 1. 2016 CBC Site Categorization/Coefficients

2016 CBC Categorization/Coefficient	Design Value
Site Longitude (decimal degrees)	-118.16603
Site Latitude (decimal degrees)	34.20029
Site Class Definition (ASCE 7 Table 20.3-1)	D
Mapped Spectral Response Acceleration at 0.2s Period, S_s (Figure 1613.3.1(1))	2.661g
Mapped Spectral Response Acceleration at 1s Period, S_1 (Figure 1613.3.1(2))	0.964g
Short Period Site Coefficient at 0.2s Period, F_a (Table 1613.3.3(1))	1.0
Long Period Site Coefficient at 1s Period, F_v (Table 1613.3.3(2)	1.5
Adjusted Spectral Response Acceleration at 0.2s Period, S_{MS} (Eq. 16-37)	2.661g
Adjusted Spectral Response Acceleration at 1s Period, S_{M1} (Eq. 16-38)	1.446g
Design Spectral Response Acceleration at 0.2s Period, S_{DS} (Eq. 16-39)	1.774g
Design Spectral Response Acceleration at 1s Period, S_{D1} (Eq. 16-40)	0.964g
Long Period (T_L, seconds)	8
Seismic Design Category	**E**

3.6 Conventional Shallow Spread Footing and/or Mat Foundations

Conventional spread footings and/or mat foundations (integrated footings and slabs-on-grade) can be used to support the proposed wellhouse, if bearing on at least 3 feet of new, properly compacted fill as described previously in this report. Specific spread-footing or mat design recommendations are presented in the following subsections.

3.6.1 Minimum Embedment and Width: Conventional shallow spread footings may be used, bearing solely on newly placed properly compacted fill as described previously in this report. Footings should be embedded at least 12-inches below lowest adjacent grade, with a minimum width of 12-inches for continuous bearing wall footings or 24-inches for isolated column footings. If flooding scour is expected, then spread footings should be embedded at least (≥) 12-inches below the anticipated scour depth. Lowest adjacent finished grade may be taken as either (1) the lowest adjacent interior slab-on-grade surface, or (2) finished exterior grade below anticipated scour depth, whichever is lower. All footings located adjacent to utility trenches should be embedded below an imaginary 1:1 (horizontal:vertical) plane projected upward and outward from the bottom edge of the trench up to the footing. This need not be the case for perpendicular aligned conduits, properly backfilled, penetrating under continuous footings.

3.6.2 Allowable Bearing Pressure: A net allowable bearing pressure of 3,000 pounds-per-square-foot (psf) may be used for static and sustained live loads, based on minimum embedment depth and widths described above. This allowable bearing value may be increased by 600 psf for each additional foot of embedment below lowest adjacent grade, up to a maximum allowable bearing pressure of 6,000 psf. These allowable bearing pressures are for total dead loads and frequently applied live loads, and can be increased by one-third for short duration wind and seismic loads.

3.6.3 Lateral Load Resistance: Lateral (horizontal) loads on foundations may be resisted by both frictional resistance along the base of the footing and the passive resistance in properly compacted fill adjacent to the sides of footings. Frictional resistance between the base of footings poured (cast) on undisturbed native sands may be computed using a coefficient of friction of 0.5, or 50-percent of sustained dead loads. Passive resistance may be computed using an equivalent fluid pressure of 300 pounds-per-square-foot per foot of embedment below lowest adjacent grade (pcf), assuming there is constant contact between the footing and properly compacted fill soil. Passive pressure should not exceed 3,000 psf. These values may be increased by one-third when considering wind and seismic forces. Both friction and passive values have already been reduced by a factor-of-safety of 1.5, and can be used in combination.

3.6.4 Settlement Estimates: Our recommended allowable bearing capacity is generally based on a total allowable, post construction settlement of approximately 1 inch. Differential settlement is estimated at approximately ½ inch over a horizontal distance of 30 feet. Since settlement is a function of footing size and contact bearing pressure, larger differential settlements can be expected between adjacent columns or walls where a large differential loading condition exists. Conceptually, our settlement estimates are based on foundations bearing on 3-feet of properly compacted fill over dense/coarse alluvium. These settlement estimates should be reevaluated by Leighton Consulting, Inc. for unusual loading condition, and when foundation plans and loads for the proposed structures become available.

3.7 Retaining Walls

At the time of writing this report, need for new retaining wall was not identified and retaining walls may not be required. However, basement or vaults could be required, so recommendations presented in this section are based on a basement or vault height (retained earth height) no-greater-than (≤) 12 feet. Retaining wall geotechnical design parameters are presented in the following subsections:

3.7.1 Design Static Lateral (Horizontal) Earth Pressures: For drained retaining walls with level backfill, the following parameters may be used for retaining wall design:

Table 2. Retaining Wall Design Earth Pressures

Retaining Wall Condition (Level Backfill)	Equivalent Fluid Pressure (pounds-per-cubic-foot)*
Active (cantilever)	30
At-Rest (braced)	45
Passive Resistance (compacted fill)	300**

*Only for level and drained properly compacted backfill.
**Allowable passive resistance should not exceed 3,000 psf in any event.

The project Structural Engineer should apply the applicable factors of safety and/or load factors during design, as specified by the California Building Code.

Cantilever walls that are designed to yield at least 0.001H, where H is equal to the wall height, may be designed using the active condition. Rigid walls and walls braced at the top should be designed using the at-rest condition. Passive pressure is used to compute soil resistance to lateral structural movement. In addition, for sliding resistance, a frictional resistance coefficient of 0.5 may be used for concrete cast directly on soil. Lateral

passive resistance should be taken into account only where soil providing passive resistance, embedded against the foundation elements, will remain intact during the design life of the retaining wall.

3.7.2 Retaining Wall Surcharges: In addition to the above lateral forces due to retained earth, surcharge due to above grade loads on wall backfill, such as existing building foundations, should be considered in design of retaining walls. Vertical surcharge loads behind a retaining wall on or in backfill within a 1:1 (horizontal:vertical) plane projection up and out from the retaining wall toe, should be considered as lateral and vertical surcharge. Unrestrained (cantilever) retaining walls should be designed to resist one-third of these surcharge loads applied as a uniform horizontal pressure on the wall. Braced walls should also be designed to resist an additional uniform horizontal-pressure equivalent to one-half of uniform vertical surcharge-loads.

In areas where autos and pickup trucks will drive, we suggest assuming a uniform vertical surcharge of 300 psf, which would result in active and at-rest horizontal surcharges of 100 psf and 150 psf, respectively. This should be doubled in areas of heavy construction traffic (such as concrete trucks, heavy equipment delivery-trucks, etc.). If crane outrigger loads or other point load sources are applied as wall surcharge, this will require additional analyses based on load magnitude and location relative to the wall.

3.7.3 Retaining Wall Incremental Seismic Loads: Seismic incremental loads need **not** be added to retaining walls with stem heights on the order of (≤) 6-feet or less, with adjacent level backfill. However, for taller walls, incremental seismic earth pressures of 25 pounds-per-cubic-foot (pcf) can be applied for design, at the discretion of the Structural Engineer, in addition to static earth and surcharge pressures presented above. This is based on traditional Mononobe-Okabe (1929) equations. Traditionally, this incremental seismic earth pressure has been applied as an inverted triangle (inverted equivalent fluid pressure), with largest dynamic earth pressure occurring at the top of the wall (upper ground surface). Resultant seismic earth pressure force has traditionally been applied at approximately 0.6H from the bottom of the wall, where H is the wall (stem) height (e.g. Seed and Whitman, 1970).

However, recent studies (Sitar, et. al., 2010, U.C. Berkeley) suggest a uniform pressure distribution is likely closer to actual lateral seismic loads, so a uniform pressure of 12H (psf) applied as a uniform/rectangular pressure distribution can also be considered (based on current research and observations), at the discretion of the Structural Engineer. It is important to consider that for level backfill and in areas without shallow groundwater, both case history reviews and centrifuge test results suggest all of these approaches above are conservative, particularly for retaining walls with modest heights such as we expect for this project. Seismic incremental loads

need only be added to active earth pressures, rather than at-rest earth pressures.

3.7.4 Sliding and Overturning: Total depth of retained earth for design of walls and for uplift resistance, should be measured as the vertical height of the stem below the ground surface at the wall face for stem design, or measured at the heel of the footing for overturning and sliding. A soil total unit weight of 120 pounds-per-cubic-foot (pcf) may be assumed for calculating surcharge weight of backfill over the wall footing, if drained, or 60 pcf if submerged, for properly compacted backfill.

3.7.5 Drainage: Adequate drainage may be provided by a subdrain system positioned behind the walls. Typically, this system consists of a 4-inch minimum diameter perforated pipe placed near the base of the wall (perforations placed downward). The pipe should be bedded and backfilled with pervious backfill material described in Section 300-3.5.2 of the *Standard Specifications for Public Works Construction* (Greenbook), 2015 Edition. This pervious backfill should extend at least 2 feet out from the wall and to within 2 feet of the outside finished grade. This pervious backfill and pipe should be wrapped in filter fabric, such as Mirafi 140N or equivalent, placed as described in Section 300-8.1 of the *Standard Specifications for Public Works Construction* (Green Book), 2015 Edition. The subdrain outlet should be connected to a free-draining outlet or sump.

Miradrain, Geotech Drainage Panels, or Enkadrain drainage geocomposites, or similar, may be used for wall drainage as an alternative to the Class 2 Permeable Material or drain rock backfill, particularly where horizontal space is limited adjacent to shoring (where walls are cast against shoring). These drainage panels should be connected to the perforated drainpipe at the base of the wall.

3.8 Concrete Slab-On-Grade

Concrete slabs-on-grade should be designed by the project Structural Engineer in accordance with the 2016 CBC for a soil with a very low expansion potential. The following are minimum slab recommendations. Requirements that are more stringent may be required by local agencies, the Structural Engineer, Architect and/or CBC. Slabs-on-grade should have the following minimum recommended components:

- **Subgrade:** Slab-on-grade subgrade soil should be moisture conditioned to slightly above optimum moisture content to a minimum depth of 18 inches within improvement footprints, prior to placing steel and/or concrete.

- **Moisture Barrier:** A moisture barrier consisting of at least 15-mil-thick Stego-wrap vapor barriers (see: http://www.stegoindustries.com/products/stego_wrap_vapor_barrier.php), or equivalent, should then be placed below slabs where moisture-sensitive floor coverings or equipment will be placed. More stringent moisture vapor barriers may be required for specialized floor coverings (e.g. parquetry wood veneer), as specified by the project Architect.

- **Reinforced Concrete**: A conventionally reinforced concrete slab-on-grade with a thickness of at least 5-inches should be placed in areas without heavy loads. Reinforcing steel should be designed by the structural engineer, but as a minimum should be No. 3 rebar placed at 24-inches on center, each direction, mid-depth in the slab. A modulus of subgrade reaction (k) as a linear spring constant, of 250 pounds-per-square-inch per inch deflection (pci) can be used for design of heavily loaded slabs-on-grade, assuming a linear response up to deflections on the order of ¾-inch.

Minor cracking of concrete after curing due to expansion, drying and shrinkage is normal, and should be expected. However, cracking is often aggravated by a high water-to-cement ratio, high concrete temperature at the time of placement, small nominal aggregate size, and rapid moisture loss due to hot, dry, and/or windy weather conditions during placement and curing. Cracking due to temperature and moisture fluctuations can also be expected. The use of low-slump concrete or low water/cement ratios can reduce the potential for shrinkage cracking.

3.9 Sulfate Attack and Ferrous Corrosion Protection

3.9.1 Sulfate Exposure: Sulfate ions in the soil can lower the soil resistivity and can be highly aggressive to Portland cement concrete by combining chemically with certain constituents of the concrete, principally tricalcium aluminate. This reaction is accompanied by expansion and eventual disruption of the concrete matrix. A potentially high sulfate content could also cause corrosion of reinforcing steel in concrete. Section 1904A of the 2016 California Building Code (CBC) defers to the American Concrete Institute's (ACI's) ACI 318-14 for concrete durability requirements. Table 19.3.1.1 of ACI 318-14 lists "*Exposure categories and classes*," including sulfate exposure as follows:

Table 3. Sulfate Concentration and Exposure

Soluble Sulfate in Water (parts-per-million)	Water-Soluble Sulfate (SO_4) in soil (percentage by weight)	ACI 318-14 Sulfate Class
0-150	0.00 - 0.10	S0 (negligible)
150-1,500	0.10 - 0.20	S1 (moderate*)
1,500-10,000	0.20 - 2.00	S2 (severe)
>10,000	>2.00	S3 (very severe)

*or seawater

3.9.2 Ferrous Corrosivity: Many factors can modify corrosion potential of soil including soil moisture content, resistivity, permeability and pH, as well as chloride and sulfate concentration. In general, soil resistivity, which is a measure of how easily electrical current flows through soils, is the most influential factor. Based on the findings of studies presented in ASTM STP 1013 titled "*Effects of Soil Characteristics on Corrosion*" (February 1989), the approximate relationship between soil resistivity and soil corrosiveness was developed as follows:

Table 4. Soil Resistivity and Soil Corrosivity

Soil Resistivity (ohm-cm)	Classification of Soil Corrosiveness
0 to 900	Very Severely Corrosive
900 to 2,300	Severely Corrosive
2,300 to 5,000	Moderately Corrosive
5,000 to 10,000	Mildly Corrosive
10,000 to >100,000	Very Mildly Corrosive

Acidity is an important factor of soil corrosivity. The lower the pH (the more acidic the environment), the higher the soil corrosivity will be with respect to buried metallic structures and utilities. As soil pH increases above 7 (the neutral value), the soil is increasingly more alkaline and less corrosive to buried steel structures, due to protective surface films, which form on steel in high pH environments. A pH between 5 and 8.5 is generally considered relatively passive from a corrosion standpoint. Chloride and sulfate ion concentrations, and pH appear to play secondary roles in modifying corrosion potential. High chloride levels tend to reduce soil resistivity and break down otherwise protective surface deposits, which can result in corrosion of buried steel or reinforced concrete structures.

3.9.3 Corrosivity Test Results: To evaluate corrosion potential of soils sampled from this site, we tested a bulk soil sample for soluble sulfate content, soluble chloride content, pH and resistivity. Results of these tests are summarized below:

Table 5. Results of Corrosivity Testing

Boring Number	Sample Depth (feet)	Sulfate (mg/kg)	Chloride (mg/kg)	pH	Minimum Resistivity (ohm-cm)
TP-2	½ to 2	59	124	5.6	28,000

Note: mg/kg = milligrams per kilogram, or parts-per-million (ppm)

These results are discussed as follows:

- **Sulfate Exposure**: Based on Table 19.3.1.1 of ACI 318-14, sulfate exposure should be considered **Exposure Class S0** for near-surface soils (upper 2 feet below existing grade) sampled at this site. Based on Table 19.3.2.1 of ACI 318-14, for this Exposure Category S0, requires no cement type restrictions, and an f_c' (28-day compressive strength) of at least 2,500 pounds-per-square-inch (psi) is required at a minimum for structural concrete.
- **Ferrous Corrosivity**: As shown above, minimum soil resistivity of 28,000 ohm-centimeters was measured in our laboratory test. In our opinion, based on resistivity correlation presented in Table 4, it appears for site soils that corrosion potential to buried steel may be characterized as "**very mildly corrosive**" at the site. No special soils-induced-corrosion mitigations are required. However, ferrous pipe can be protected by polyethylene bags, tap or coatings, di-electric fittings or other means to separate the pipe from on-site earth materials.

4.0 CONSTRUCTION CONSIDERATIONS

4.1 Temporary Excavations

Based on our field observations, caving of cohesionless alluvial soils will likely be encountered in unshored excavations. To protect workers entering excavations, excavations should be performed in accordance with OSHA and Cal-OSHA requirements, and the current (2015) edition of the California Construction Safety Orders:

(http://www.dir.ca.gov/title8/sb4a6.html)

Contractors should be advised that fill and cohesionless alluvial soils should be considered Type C soils as defined in the California Construction Safety Orders. As indicated in Table B-1 of Article 6, Section 1541.1, Appendix B, of the California Construction Safety Orders, excavations less-than (<) 20 feet deep within Type C soils should be sloped back no steeper than 1½:1 (horizontal:vertical), where workers are to enter the excavation. This may be

impractical near adjacent existing utilities and structures; so shoring may be required depending on trench locations.

During construction, soil conditions should be regularly evaluated to verify that conditions are as anticipated. The contractor is responsible for providing the "competent person" required by OSHA standards to evaluate soil conditions. Close coordination between the competent person and Leighton Consulting, Inc. should be maintained to facilitate construction while providing safe excavations.

4.2 Temporary Trench Shoring

Typical cantilever shoring can be designed based on the active equivalent fluid pressure presented in the retaining wall section (e.g. 30 pcf). If excavations are braced at the top and at specific depth intervals, then braced earth pressure may be approximated by a uniform rectangular soil pressure distribution. This uniform pressure expressed in pounds-per-square-foot (psf), may be assumed to be 15 multiplied by H for design, where H is equal to the depth of the excavation being shored, in feet. These recommendations are valid only for trenches not exceeding 12 feet in depth at this site.

4.3 Geotechnical Services During Construction

Our geotechnical recommendations presented in this report are based on subsurface conditions as interpreted (interpolated and extrapolated) from two exploratory test pits. Our geotechnical recommendations provided in this report are based on information available at the time the report was prepared and may change as plans are developed. Additional geotechnical exploration, testing and/or analysis may be required based on final plans. Leighton Consulting, Inc. should review site grading, foundation and shoring (if any) plans when available, to comment further on geotechnical aspects of this project and check to see general conformance of final project plans to recommendations presented in this report.

Geotechnical observation and testing should be conducted during excavation and all phases of earthwork. Our conclusions and recommendations should be reviewed and verified by us during construction and revised accordingly if geotechnical conditions encountered vary from our initial findings and interpretations. Geotechnical observation and testing should be provided:

- During overexcavation,

- During compaction of all fill materials,
- During utility trench backfilling and compaction, and/or
- When any unusual geotechnical conditions are encountered.

5.0 LIMITATIONS

This report was based in part on data obtained from a limited number of observations, site visits, soil excavations, samples and tests. Such information is, by necessity, incomplete. The nature of many sites is such that differing soil or geologic conditions can be present within small distances and under varying climatic conditions. Changes in subsurface conditions can and do occur over time. Therefore, our findings, conclusions and recommendations presented in this report are based on the assumption that Leighton Consulting, Inc. will provide geotechnical observation and testing during construction.

This report was prepared for the sole use of Civiltec Engineering, Inc. for application to the design of the proposed improvements in accordance with generally accepted geotechnical engineering practices at this time in southern California.

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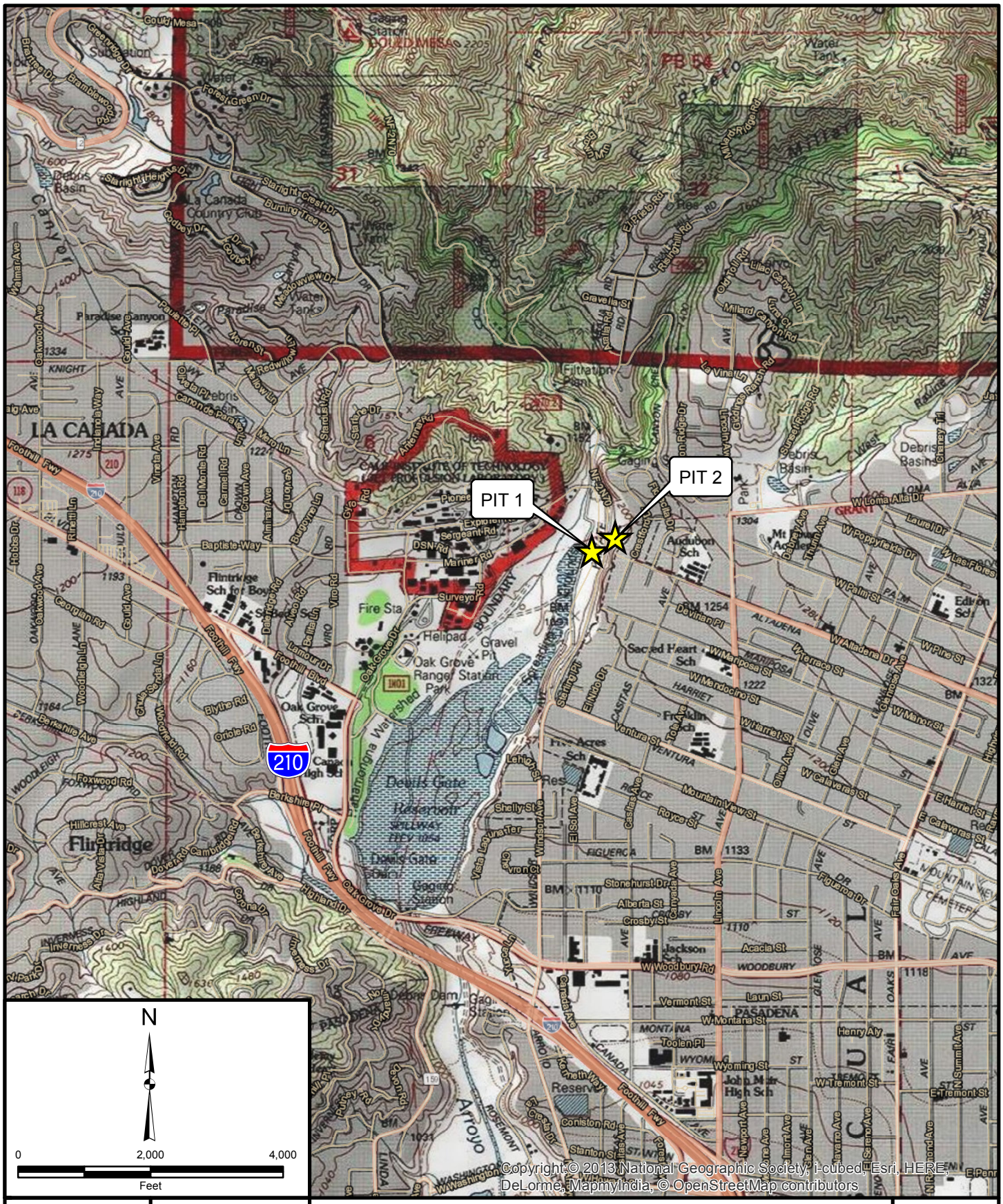

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Scale: 1 " = 2,000 '	Date: January 2018

Base Map: ESRI ArcGIS Online 2018
Thematic Information: Leighton
Author: Leighton Geomatics (mmurphy)

SITE LOCATION MAP

JPL Explorer Well and Behner WTP Improvements
Hahamongna Watershed Park
JPL East Parking Lot, 3200 ± Explorer Road
Pasadena, California

Figure 1

Leighton

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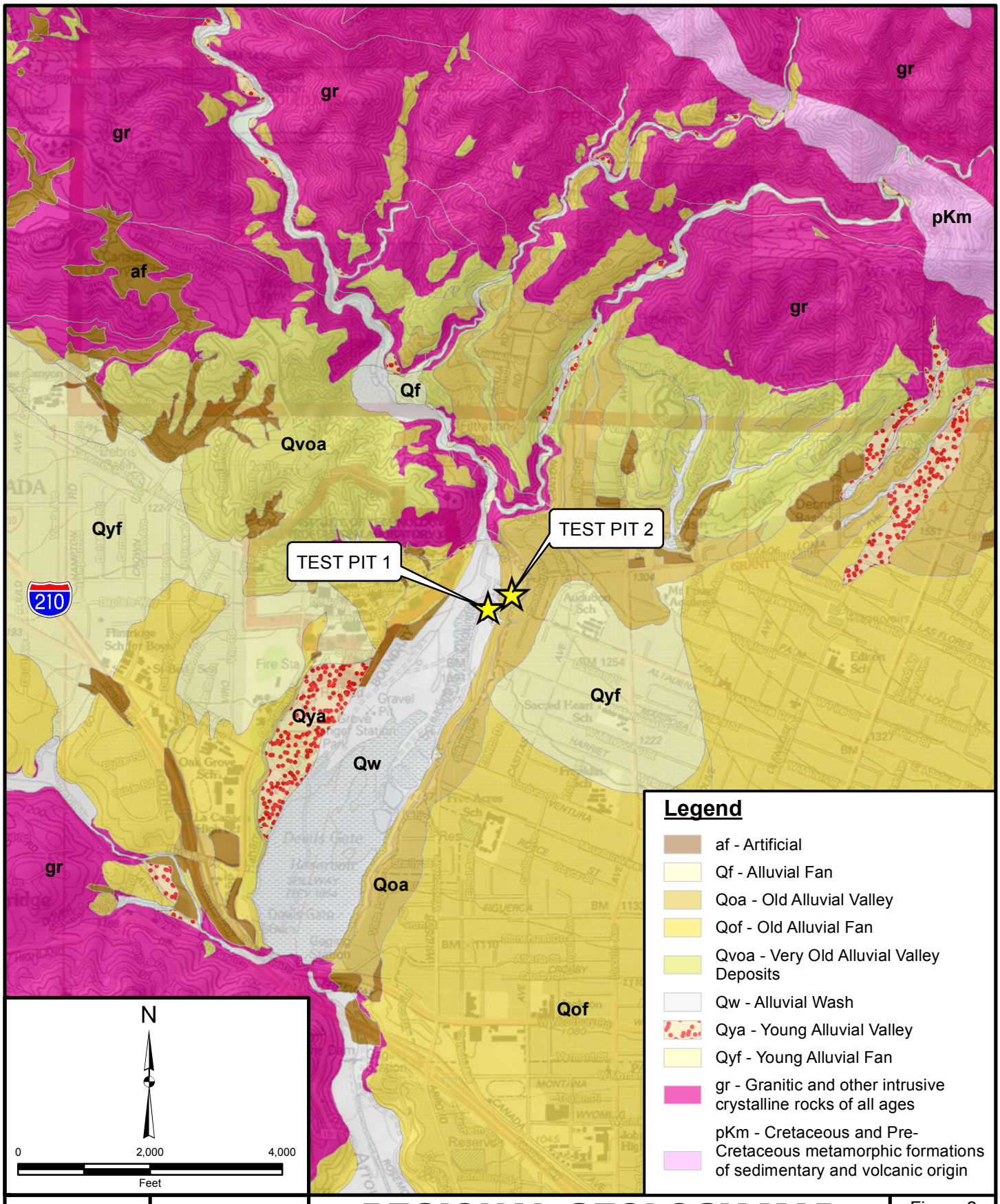

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Scale: 1 " = 2,000 '	Date: January 2018

Base Map: ESRI ArcGIS Online 2018
Thematic Information: Leighton, USGS
Author: Leighton Geomatics (mmurphy)

REGIONAL GEOLOGY MAP

JPL Explorer Well and Behner WTP Improvements
Hahamongna Watershed Park
JPL East Parking Lot, 3200 ± Explorer Road
Pasadena, California

Figure 2

Leighton

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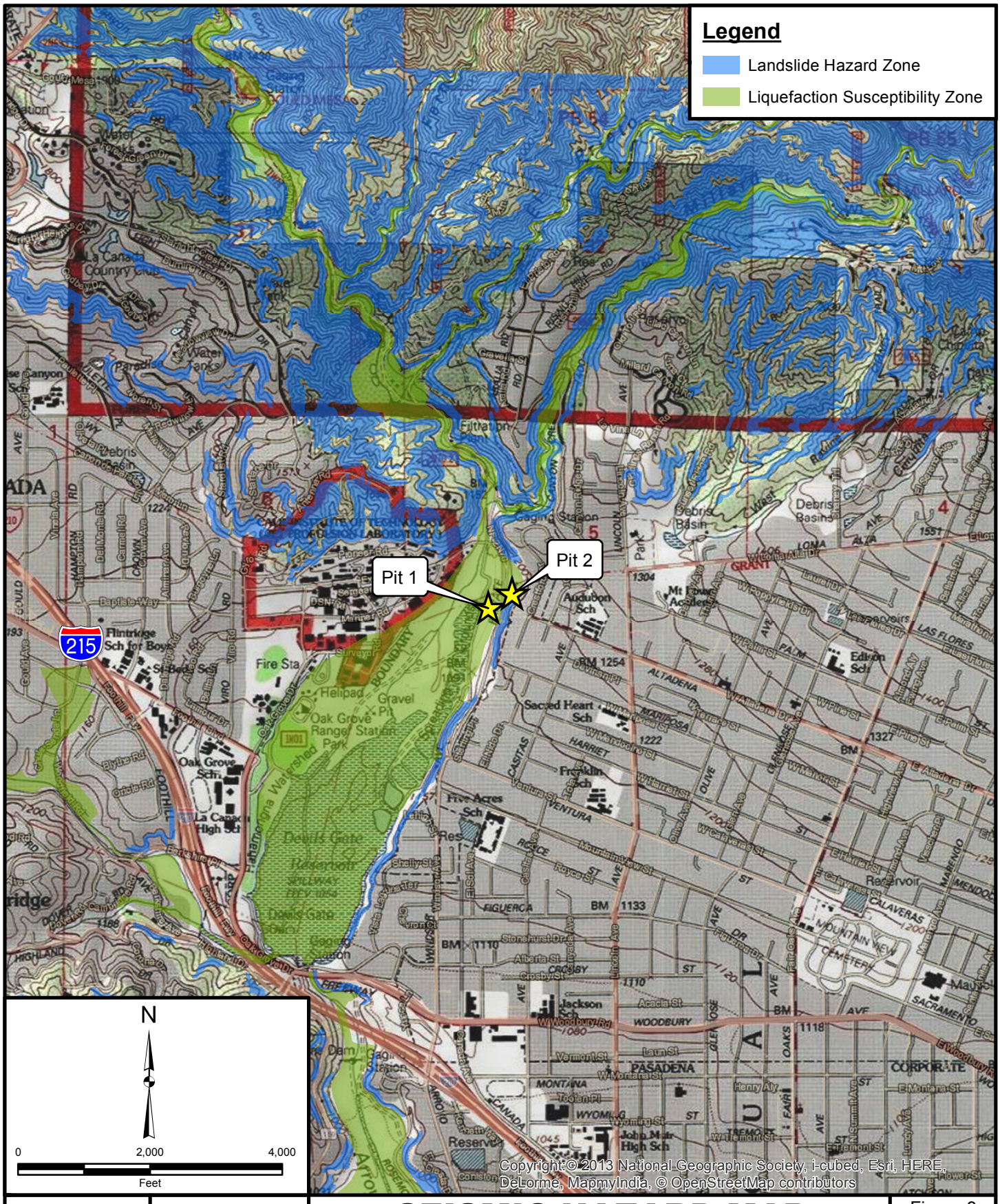

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Scale: 1 " = 2,000 '	Date: January 2018

Base Map: ESRI ArcGIS Online 2018
Thematic Information: Leighton, CGS
Author: Leighton Geomatics (mmurphy)

SEISMIC HAZARD MAP

JPL Explorer Well and Behner WTP Improvements
Hahamongna Watershed Park
JPL East Parking Lot, 3200 ± Explorer Road
Pasadena, California

Figure 3

Leighton

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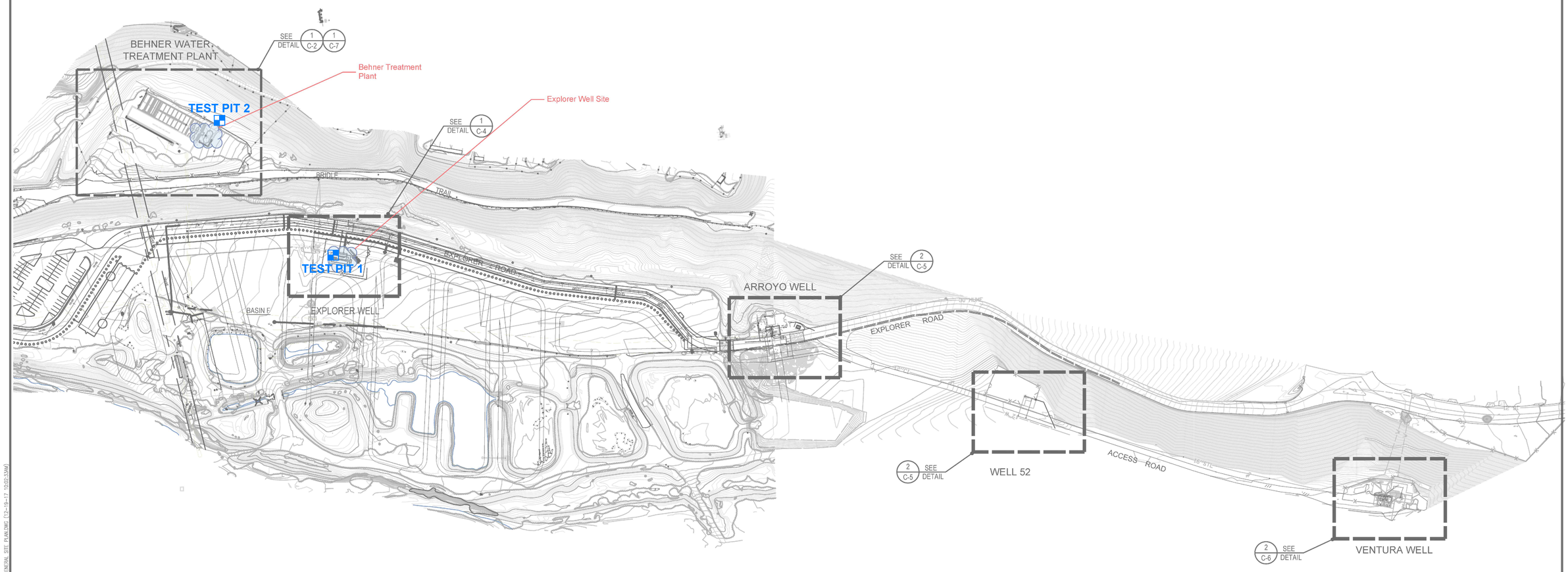
GENERAL NOTES:

1. CONTRACTOR TO FIELD VERIFY EXISTING UTILITY LOCATIONS AND TIE-IN CONNECTION POINTS. SUBMIT FIELD DATA TO ENGINEER.
2. CONTRACTOR SHALL NOT DISRUPT WATER SERVICE TO JPL AND PROTECT MAIN WHILE WORK OCCURS.
3. ALL WORK ON THE POTABLE WATER SYSTEM SHALL BE IN ACCORDANCE WITH PWP STANDARDS.
4. CONTRACTOR SHALL PROVIDE AT ALL TIMES NORTH BOUND AND SOUTH BOUND VEHICLE ACCESS AROUND EXPLORER WELL SITE.



SCALE 1" = 100'

100' 0 100' 200'

GRAPHIC SCALE

LEGEND

TEST PIT 2 — APPROXIMATE TEST PIT LOCATION (DECEMBER 22, 2017, LEIGHTON CONSULTING, INC.)

GEOTECHNICAL MAP

JPL Explorer Well and Behner WTP Improvements
Hahamongna Watershed Park
JPL East Parking Lot, 3200 +/- Explorer Road
Pasadena, California

PLATE 1

Proj: 11877.001	Eng/Geol: TCB
Scale: 1"=100'	Date: January 2018
Drafted By: BQT	Checked By: BQT

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Leighton

811 Know what's below. Call before you dig. DIGALERT

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING ITEMS ARE NOT TO SCALE

NOTICE TO CONTRACTORS:
THE CONTRACTOR IS REQUIRED TO TAKE DUE PRECAUTIONARY MEASURES TO PROTECT THE UTILITY LINES SHOWN AND ANY OTHER LINES NOT OF RECORD OR NOT SHOWN ON THESE PLANS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING "BLUE STAKE" AT 1-800-STAKE IT (1-800-782-5348) TWO WORKING DAYS PRIOR TO ANY EXCAVATION OR CONSTRUCTION.

REVISION

NO.	DESCRIPTION	DATE

50% PROGRESS

APPROVED BY:

79112
BED P. DAWADI RCE DATE

APPROVED: DATE

APPROVED: DATE

PLANS PREPARED BY:

CIVILTEC engineering inc.
Civil, Water, Wastewater, Drainage, and Transportation Engineering Construction Management ★ Surveying
California ★ Arizona

118 West Lime Avenue
Monrovia, CA 91016
Phone: 626.357.0588
Fax: 626.303.7957
Web: www.civiltec.com

TIDEWATER INC

CITY OF PASADENA INCORPORATED JUNE 1886

D.S.-XX

DATE	NOVEMBER 2017
SCALE	AS SHOWN
DRAWN BY	JAM/CIVILTEC
DESIGNED BY	BPD CIVILTEC
CHECKED BY	BPD/CSH/CIVILTEC
SUBMITTED BY	CIVILTEC
FIELD BOOKS	
CALC BOOKS	
APPROVED	
APPROVED	

PASADENA WATER & POWER
CITY OF PASADENA

EXPLORER WELL AND BEHNER TREATMENT PLANT
GENERAL SITE PLAN

SHEET NO 5 OF X SHEETS | C-1
WORK ORDER XX
FILE NUMBER
REVISION

K:\2017\2017170.00-TIDEWATER-EXPLORER WELL AND BEHNER PLANT\DRAWINGS\SHEETS\WELL\2017170.00 SHTS C-1 GENERAL SITE PLAN.DWG (12-19-17 10:02:53AM)

APPENDIX A

FIELD EXPLORATION

Prior to excavation, we marked proposed test pit locations for use by Underground Service Alert (USA) and the City of Pasadena to identify buried utilities at these locations. On December 22, 2017, our field exploration consisted of excavating two shallow test pits with a rubber-tire backhoe to depths of 5 and 8 feet below existing ground surface. Test pit locations are depicted on Plate 1, *Geotechnical Map* (in pocket). Test pit logs and photos are also included in this appendix.

During excavation, encountered earth materials were logged and sampled by a member of our technical staff, and soil samples reviewed later in our geotechnical laboratory. Soils were described in accordance with the Unified Soil Classification System (ASTM D 2488). Representative bulk soil samples were obtained. These soil samples were transported to our in-house geotechnical laboratory for further evaluation and geotechnical testing. After logging and sampling, these test pits were backfilled with excavated soil.

Our attached subsurface exploration logs and related information depict subsurface conditions only at locations indicated and at the particular date designated on the logs. Subsurface conditions at other locations may differ from conditions occurring at these locations. The passage of time may result in altered subsurface conditions due to environmental changes; particularly changes in groundwater. In addition, any stratification lines on these logs represent an approximate boundary between soil types and these transitions may be gradual.

GEOTECHNICAL TEST PIT LOG TP-1

Project No.	11877.001	**Date Excavated**	12-22-17
Project	Explorer Well and Behner Plant Improvements	**Logged By**	RSM
Excavation Comp.	Garrett Concrete Coring and Sawing, Inc.	**Pit Width**	3' x 11'
Excavation Method	Backhoe Excavation	**Ground Elevation**	1110'
Location	Explorer Well Site, Altadena, CA	**Sampled By**	RSM

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
1110	0						SP	@ Surface - **ARTIFICIAL FILL (Afu)** SAND with gravel (SP), loose, dry, light tan, fine to course-grained sand, some fine subangular gravel, non-plastic.	
				B-1		3	SW	@ 1' - Well-graded SAND (SW) with gravel and cobbles, medium dense, moist, brown to dark brown, fine to coarse-grained sand, fine to coarse subangular gravel, subrounded cobbles up to 12 inches, some boulders up to 15 inches wide, non-plastic fines.	-200, AL
				B-2		3	GW	@ 3' - **ALLUVIUM (Qal)** GRAVEL (GW) with Sand, cobbles, and boulders, dense, moist, light brown/tan, fine to coarse-grained sand, fine to coarse subangular gravel, subrounded to subangular cobbles up to 12 inches, rounded boulders up to 3 feet wide.	SA, MD
1105	5								
								TOTAL EXCAVATED DEPTH = 8 FEET **TOTAL SAMPLED DEPTH = 8 FEET** **NO GROUNDWATER ENCOUNTERED** **BACKFILLED AND TAMPED ON 12/22/2017** **ELEVATIONS NOT SURVEYED.**	
1100	10								
1095	15								

This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

SAMPLE TYPES:

B	BULK SAMPLE
C	CORE SAMPLE
G	GRAB SAMPLE
R	RING SAMPLE
S	SPLIT SPOON SAMPLE
T	TUBE SAMPLE

TYPE OF TESTS:

-200	% FINES PASSING	DS	DIRECT SHEAR	SA	SIEVE ANALYSIS
AL	ATTERBERG LIMITS	EI	EXPANSION INDEX	SE	SAND EQUIVALENT
CN	CONSOLIDATION	H	HYDROMETER	SG	SPECIFIC GRAVITY
CO	COLLAPSE	MD	MAXIMUM DENSITY	UC	UNCONFINED COMPRESSIVE STRENGTH
CR	CORROSION	PP	POCKET PENETROMETER		
CU	UNDRAINED TRIAXIAL	RV	R VALUE		

Project: 11877.001	Eng/Geol: TCB
Scale: NTS	Date: January 2018
Reference:	
Author: MAM	

TEST PIT 1 PHOTOS

JPL Explorer Well and Behner WTP Improvements
Hahamongna Watershed Park
JPL East Parking Lot, 3200 ± Explorer Road
Pasadena, California

Figure A-1

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GEOTECHNICAL TEST PIT LOG TP-2

Project No.	11877.001	**Date Excavated**	12-12-17
Project	Explorer Well and Behner Plant Improvements	**Logged By**	RSM
Excavation Comp.	Garrett Concrete Coring and Sawing, Inc.	**Pit Width**	5' x 5'
Excavation Method	Backhoe Excavation	**Ground Elevation**	1165'
Location	Behner WTP, Altadena, CA	**Sampled By**	RSM

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
								This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.	
1165	0						SM	@ Surface - **TOPSOIL** shrubs, leaves, roots, organics.	
				B-1		2	SM	@ 0.5' - **ARTIFICIAL FILL (Afu)** SILTY SAND (SM), loose, moist, brown, fine-grained sand, subangular gravel up to 3 inches, some subangular to subrounded cobbles.	CR
				B-2		2	GW	@ 2' - **ALLUVIUM (Qal)** GRAVEL (GW) with Sand, medium dense, moist, brown, fine- to coarse-grained sand, angular to subangular fine to coarse gravel, subangular to subrounded cobbes up to 12 inches, boulders up to 2 feet wide.	SA, MD
1160	5							**TOTAL EXCAVATED DEPTH = 5 FEET** **TOTAL SAMPLED DEPTH = 5 FEET** **NO GROUNDWATER ENCOUNTERED** **BACKFILLED AND TAMPED ON 12/22/2017** **ELEVATIONS NOT SURVEYED.**	
1155	10								
1150	15								

SAMPLE TYPES:

- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:

-200	% FINES PASSING	DS	DIRECT SHEAR	SA	SIEVE ANALYSIS
AL	ATTERBERG LIMITS	EI	EXPANSION INDEX	SE	SAND EQUIVALENT
CN	CONSOLIDATION	H	HYDROMETER	SG	SPECIFIC GRAVITY
CO	COLLAPSE	MD	MAXIMUM DENSITY	UC	UNCONFINED COMPRESSIVE STRENGTH
CR	CORROSION	PP	POCKET PENETROMETER		
CU	UNDRAINED TRIAXIAL	RV	R VALUE		

*** This log is a part of a report by Leighton and should not be used as a stand-alone document. ***

Project: 11877.001	Eng/Geol: TCB
Scale: NTS	Date: January 2018
Reference:	
Author: MAM	

TEST PIT 2 PHOTOS

JPL Explorer Well and Behner WTP Improvements
Hahamongna Watershed Park
JPL East Parking Lot, 3200 ± Explorer Road
Pasadena, California

Figure A-2

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APPENDIX B

GEOTECHNICAL LABORATORY TESTING

Our geotechnical laboratory-testing program was directed toward a quantitative and qualitative evaluation of physical and mechanical properties of sampled soils at this site, and to aid in verifying Unified Soil Classification System (USCS) soil classification.

Moisture Content: Moisture content determinations were performed in general accordance with ASTM D2216 Test Methods, on samples obtained from our test pits. Results of these tests are presented on test pit logs in Appendix A.

Grain Size (Sieve) Analyses: Bulk soil samples were subjected to mechanical grain-size analysis by sieving from U.S. Standard brass screens (sieves; ASTM Test Methods D6913 and D1140). Results were evaluated to establish tested soil Unified Soil Classification System (USCS) classifications. Grain-size distribution curves are presented in this appendix on the "*Particle-Size Distribution*" sheets, and percent fines (percent passing the No. 200 U.S. Standard Sieve) are listed on test pit logs in Appendix A.

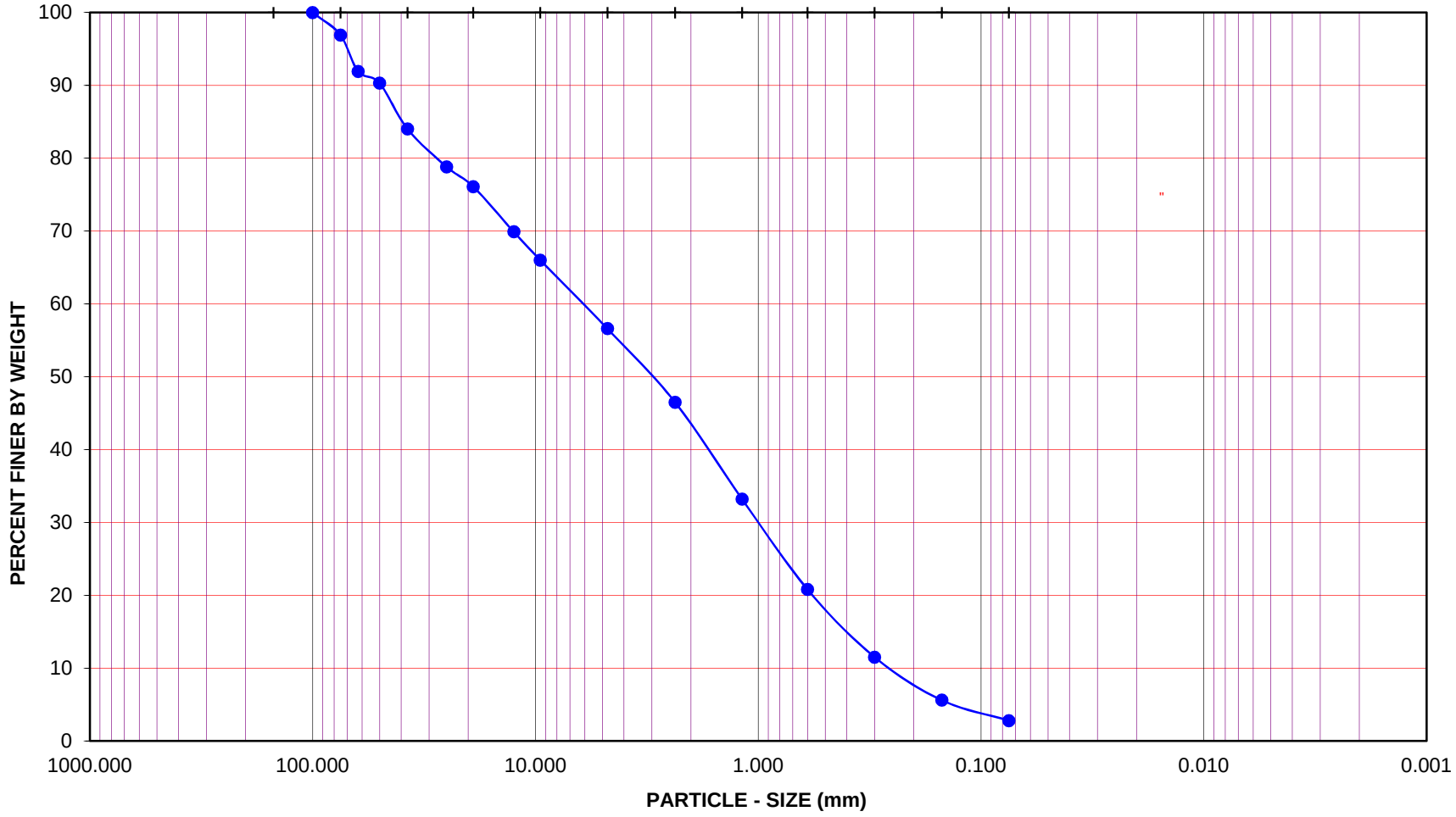
Atterberg Limits: Liquid Limit (LL), Plastic Limit (PL) and Plasticity Index (PI) were determined for a soil sample suspected to contain clay, in accordance with ASTM D4318. Specimens were air-dried, passed through a No. 40 sieve and then wetted to different moisture contents. These liquid and plastic limit tests were performed on the soil fraction passing the No. 40 sieve. Results of these tests are presented on the "*Atterberg Limits*" sheets in this appendix.

Modified Proctor Compaction Curve: A laboratory compaction curve (ASTM D1557) was completed for bulk soil samples to determine the modified Proctor laboratory maximum dry density and optimum moisture content. Results of this test are presented on the "*Modified Proctor Compaction Test*" plot in this appendix.

Soil Corrosivity: A representative sample of soil was tested for corrosivity. Test for water-soluble sulfate, water-soluble chloride, pH and minimum resistivity were performed in accordance with State of California Standard Methods CTM 417 Part II, CTM 422, and CTM 532/643, respectively. These test results are presented at the end of this appendix.

BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY

U.S. STANDARD SIEVE OPENING: 6.0" 3.0" 1 1/2" 3/4" 3/8"
U.S. STANDARD SIEVE NUMBER: #4 #8 #16 #30 #50 #100 #200
HYDROMETER



Project Name: Civiltec/PWP Explorer Well and Behner Plant Improvements

Project No.: 11877.001

Boring No.: TP-1 Sample No.: B-2

Depth (ft.): 3-8 Soil Type : (SP)g

Soil Identification: Yellowish brown poorly-graded sand with gravel (SP)g

GR:SA:FI : (%) 43 : 54 : 3

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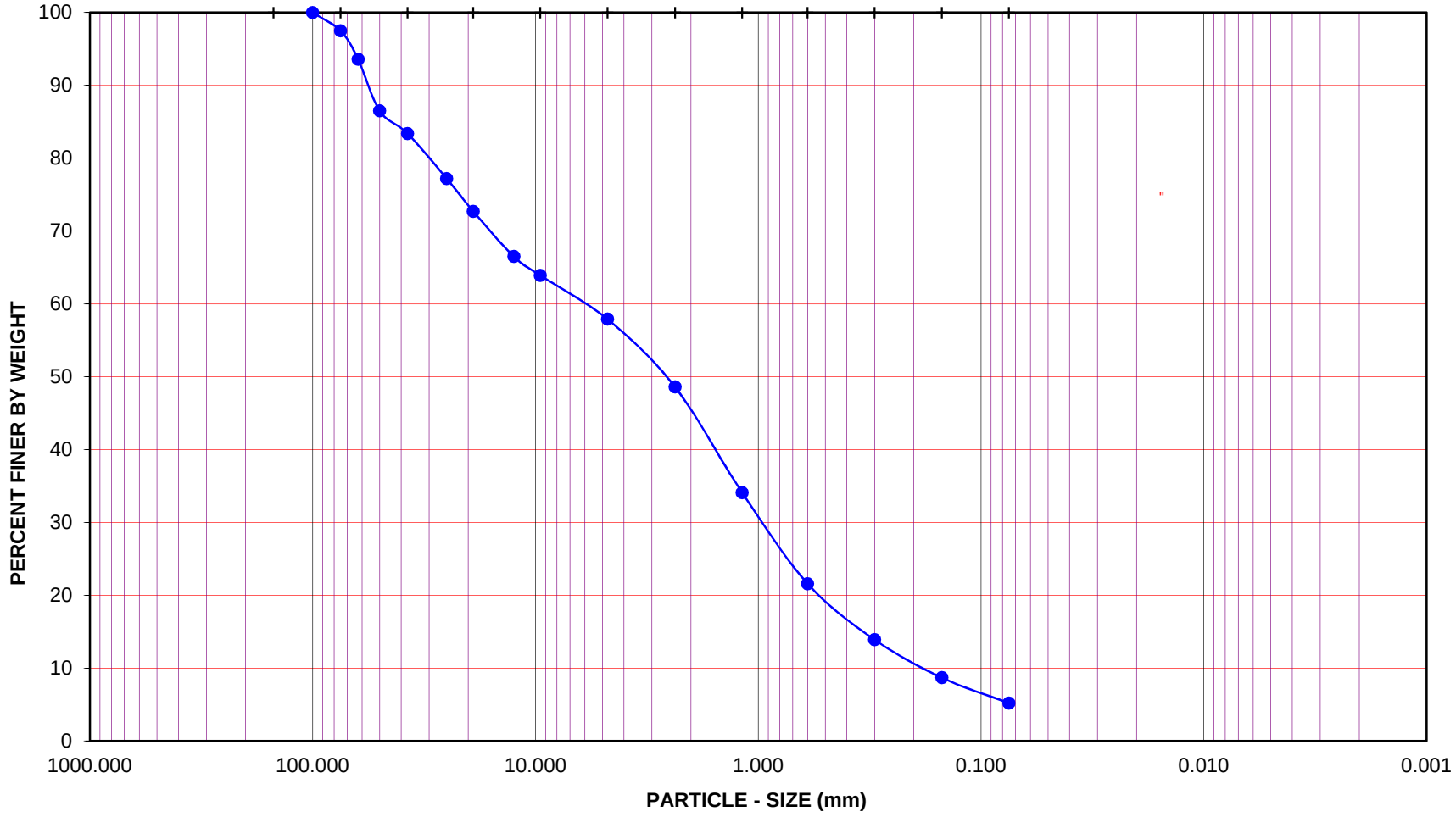
PARTICLE - SIZE DISTRIBUTION ASTM D 6913

Jan-18

BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY

U.S. STANDARD SIEVE OPENING: 6.0" 3.0" 1 1/2" 3/4" 3/8"
U.S. STANDARD SIEVE NUMBER: #4 #8 #16 #30 #50 #100 #200
HYDROMETER



Project Name: Civiltec/PWP Explorer Well and Behner Plant Improvements

Project No.: 11877.001

Boring No.: TP-2 Sample No.: B-2

Depth (ft.): 2-5 Soil Type : (SP-SM)g

Soil Identification: Dark brown poorly-graded sand with silt and gravel (SP-SM)g

GR:SA:FI : (%) 42 : 53 : 5

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PARTICLE - SIZE DISTRIBUTION ASTM D 6913

Jan-18

Boring No.	TP-1							
Sample No.	B-1							
Depth (ft.)	1-3							
Sample Type	Bulk							
Soil Identification	Olive brown poorly-graded sand with silt and gravel (SP-SM)g							
No Moisture Correction; ASTM D 1140 modified to include splitting the sample on the #4 sieve								
Total Sample Dry Weight Determination								
Dry Weight of Soil + Container (g)	4229.5							
Weight of Container (g)	225.7							
Dry Weight of Soil (g)	4003.8							
Sample Dry Weight Determination, Retained on Sieve #4								
Dry Weight of Sample + Cont. (g)	1952.2							
Weight of Container (g)	108.4							
Weight of Dry Sample (g)	1843.8							
Sample Dry Weight Determination, Passing Sieve #4								
Dry Weight of Sample + Cont. (g)	669.7							
Weight of Container (g)	206.3							
Weight of Dry Sample (g)	463.4							
After Wash								
Method (A or B)	B							
Dry Weight of Sample + Cont. (g)	620.3							
Weight of Container (g)	206.3							
Weight of Dry Sample (g)	414.0							
% Passing No. 4 Sieve	53.9							
% Retained No. 4 Sieve	46.1							
% Passing No. 200 Sieve	**5.8**							

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PERCENT PASSING
No. 200 SIEVE
ASTM D 1140

Project Name: Civiltec/PWP Explorer Well and Behner Plant Improvements
Project No.: 11877.001
Tested By: O. Figueroa Date: 01/04/18

ATTERBERG LIMITS

ASTM D 4318

Project Name:	Civiltec/PWP Explorer Well and Behner Plant Improvements	Tested By:	S. Felter	Date:	01/08/18
Project No. :	11877.001	Input By:	J. Ward	Date:	01/09/18
Boring No.:	TP-1	Checked By:	J. Ward		
Sample No.:	B-1	Depth (ft.)	1-3		
Soil Identification:	Olive brown poorly-graded sand with silt and gravel (SP-SM)g				

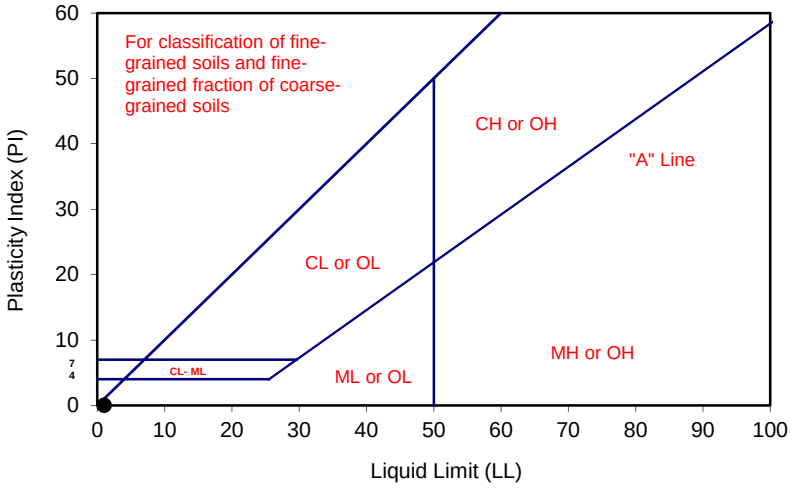
TEST	PLASTIC LIMIT		LIQUID LIMIT			
NO.	1	2	1	2	3	4
Number of Blows [N]			5			
Wet Wt. of Soil + Cont. (g)	**Cannot be rolled:**		95.40	**Cannot get more than 5 blows:**		
Dry Wt. of Soil + Cont. (g)	**NonPlastic**		88.30	**NonPlastic**		
Wt. of Container (g)			59.20			
Moisture Content (%) [Wn]			24.40			

Liquid Limit	**NP**
Plastic Limit	**NP**
Plasticity Index	**NP**
Classification	**NP**

PI at "A" - Line = 0.73(LL-20) =

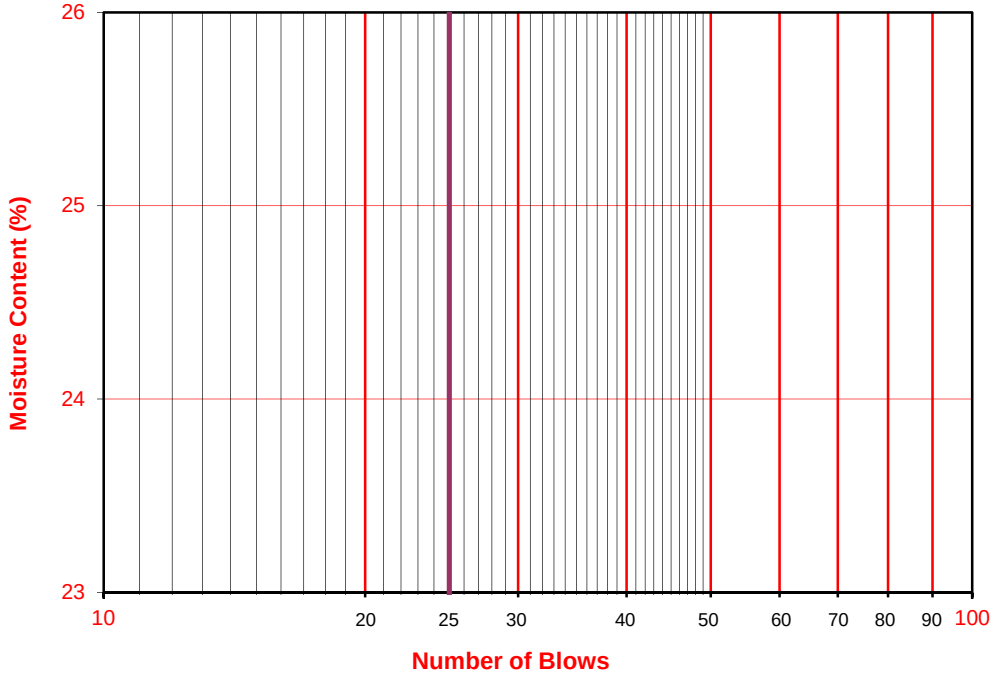
One - Point Liquid Limit Calculation

$LL = Wn(N/25)^{0.121}$



PROCEDURES USED

	Wet Preparation
	Multipoint - Wet
X	Dry Preparation
	Multipoint - Dry
X	Procedure A
	Multipoint Test
	Procedure B
	One-point Test



MODIFIED PROCTOR COMPACTION TEST

ASTM D 1557

Leighton

Project Name:	Civiltec/PWP Explorer Well and Behner Plant Improvements	Tested By:	O. Figueroa	Date:	01/04/18
Project No.:	11877.001	Input By:	J. Ward	Date:	01/09/18
Boring No.:	TP-1	Depth (ft.):	3-8		
Sample No.:	B-2				
Soil Identification:	Yellowish brown poorly-graded sand with gravel (SP)g				

Note: Corrected dry density calculation assumes specific gravity of 2.70 and moisture content of 1.0% for oversize material

Preparation Method:	X	Moist	
		Dry	
Compaction Method	X	Mechanical Ram	
		Manual Ram	

Scalp Fraction (%)	
#3/4	23.9
#3/8	
#4	

Rammer Weight (lb.) = 10.0

Height of Drop (in.) = 18.0

Mold Volume (ft³) 0.07450

TEST NO.	1	2	3	4	5	6
Wt. Compacted Soil + Mold (g)	7178	7318	7447	7425		
Weight of Mold (g)	2672	2672	2672	2672		
Net Weight of Soil (g)	4506	4646	4775	4753		
Wet Weight of Soil + Cont. (g)	767.3	857.0	958.5	970.0		
Dry Weight of Soil + Cont. (g)	733.7	802.0	880.9	874.5		
Weight of Container (g)	72.5	74.3	82.8	77.8		
Moisture Content (%)	5.08	7.56	9.72	11.99		
Wet Density (pcf)	133.3	137.5	141.3	140.6		
Dry Density (pcf)	126.9	127.8	128.8	125.6		

Maximum Dry Density (pcf) 129.0

Corrected Dry Density (pcf) 136.5

Optimum Moisture Content (%) 9.5

Corrected Moisture Content (%) 7.5

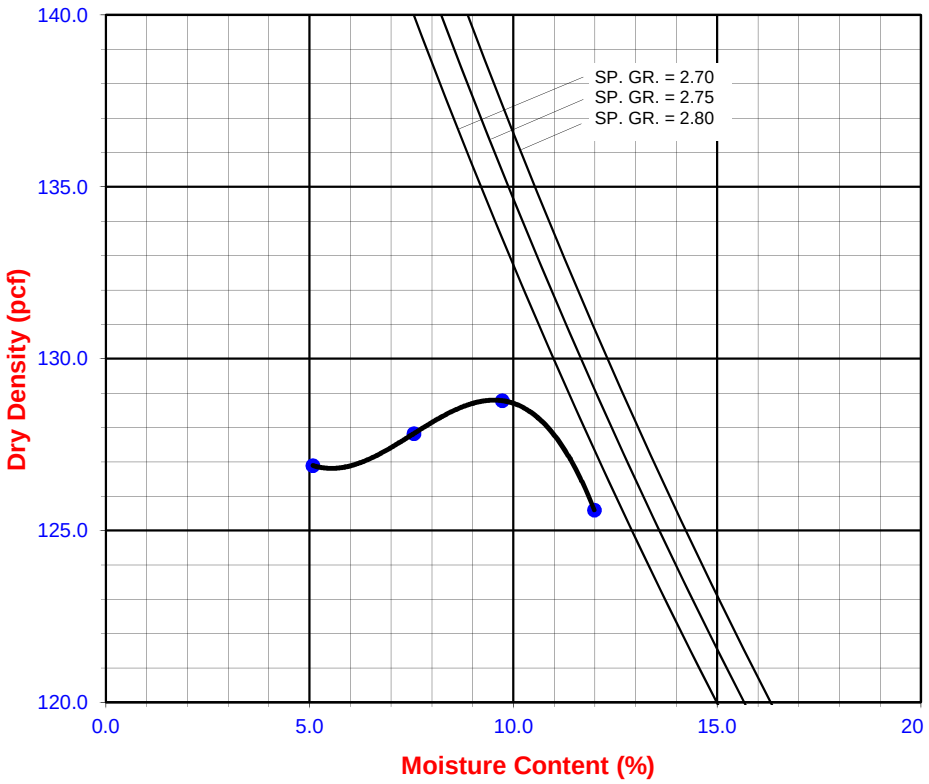
☐ **Procedure A**
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
May be used if +#4 is 20% or less

☐ **Procedure B**
Soil Passing 3/8 in. (9.5 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
Use if +#4 is >20% and +3/8 in. is 20% or less

☒ **Procedure C**
Soil Passing 3/4 in. (19.0 mm) Sieve
Mold : 6 in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)
Use if +3/8 in. is >20% and +¾ in. is <30%

Particle-Size Distribution:
43:54:3
GR:SA:FI

Atterberg Limits:
LL,PL,PI



MODIFIED PROCTOR COMPACTION TEST

ASTM D 1557

Leighton

Project Name:	Civiltec/PWP Explorer Well and Behner Plant Improvements	Tested By:	O. Figueroa	Date:	01/04/18
Project No.:	11877.001	Input By:	J. Ward	Date:	01/09/18
Boring No.:	TP-2	Depth (ft.):	2-5		
Sample No.:	B-2				
Soil Identification:	Dark brown poorly-graded sand with silt and gravel (SP-SM)g				

Note: Corrected dry density calculation assumes specific gravity of 2.70 and moisture content of 1.0% for oversize material

Preparation Method:	X	Moist	
		Dry	
Compaction Method	X	Mechanical Ram	
		Manual Ram	

Scalp Fraction (%)	
#3/4	27.3
#3/8	
#4	

Rammer Weight (lb.) = 10.0

Height of Drop (in.) = 18.0

Mold Volume (ft³) 0.07450

TEST NO.	1	2	3	4	5	6
Wt. Compacted Soil + Mold (g)	7114	7313	7445	7449		
Weight of Mold (g)	2672	2672	2672	2672		
Net Weight of Soil (g)	4442	4641	4773	4777		
Wet Weight of Soil + Cont. (g)	760.9	742.6	803.8	880.9		
Dry Weight of Soil + Cont. (g)	732.7	699.5	744.0	797.4		
Weight of Container (g)	82.7	75.6	77.8	76.8		
Moisture Content (%)	4.34	6.91	8.98	11.59		
Wet Density (pcf)	131.4	137.3	141.2	141.4		
Dry Density (pcf)	126.0	128.5	129.6	126.7		

Maximum Dry Density (pcf) 129.5

Optimum Moisture Content (%) 9.0

Corrected Dry Density (pcf) 138.0

Corrected Moisture Content (%) 7.0

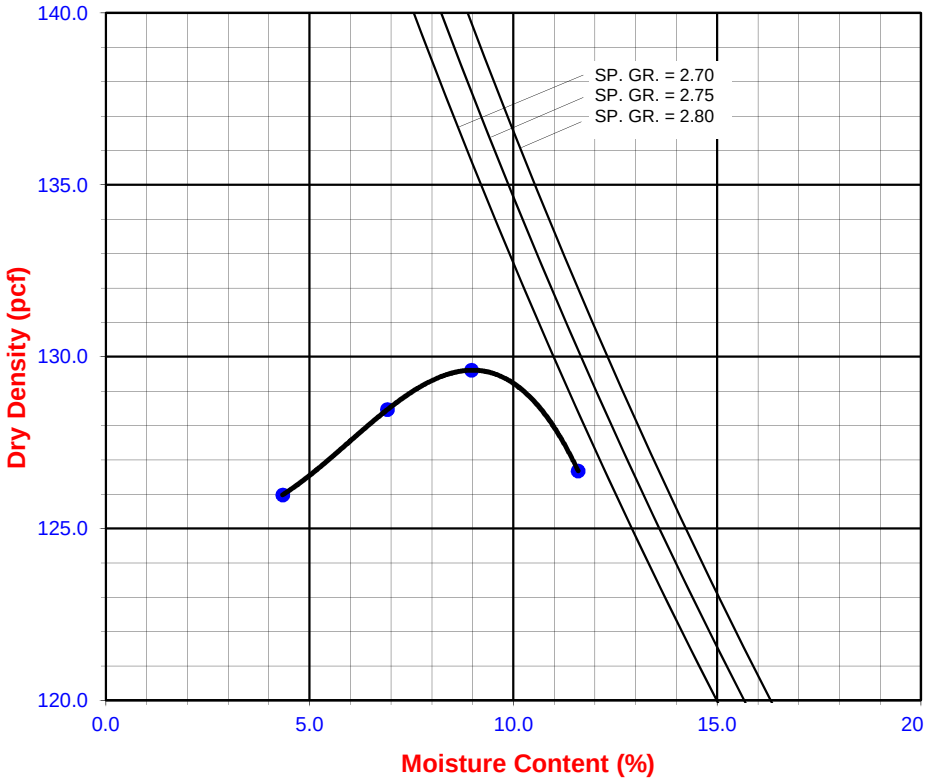
☐ **Procedure A**
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
May be used if +#4 is 20% or less

☐ **Procedure B**
Soil Passing 3/8 in. (9.5 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
Use if +#4 is >20% and +3/8 in. is 20% or less

☒ **Procedure C**
Soil Passing 3/4 in. (19.0 mm) Sieve
Mold : 6 in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)
Use if +3/8 in. is >20% and +¾ in. is <30%

Particle-Size Distribution:
42:53:5
GR:SA:FI

Atterberg Limits:
LL,PL,PI



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TESTS for SULFATE CONTENT
CHLORIDE CONTENT and pH of SOILS

Civiltec/PWP Explorer Well and Behner Plant

Project Name: Improvements | Tested By : G. Berdy | Date: 01/03/18

Project No. : 11877.001 | Data Input By: J. Ward | Date: 01/09/18

Boring No.	TP-2			
Sample No.	B-1			
Sample Depth (ft)	0.5-2			
Soil Identification:	Dark brown SM			
Wet Weight of Soil + Container (g)	225.23			
Dry Weight of Soil + Container (g)	220.84			
Weight of Container (g)	69.74			
Moisture Content (%)	2.91			
Weight of Soaked Soil (g)	100.12			

SULFATE CONTENT, DOT California Test 417, Part II

Beaker No.	15			
Crucible No.	17			
Furnace Temperature (°C)	860			
Time In / Time Out	8:00/8:45			
Duration of Combustion (min)	45			
Wt. of Crucible + Residue (g)	22.2088			
Wt. of Crucible (g)	22.2074			
Wt. of Residue (g) (A)	0.0014			
PPM of Sulfate (A) x 41150	57.61			
PPM of Sulfate, Dry Weight Basis	**59**			

CHLORIDE CONTENT, DOT California Test 422

ml of Extract For Titration (B)	15			
ml of AgNO3 Soln. Used in Titration (C)	0.8			
PPM of Chloride (C -0.2) * 100 * 30 / B	120			
PPM of Chloride, Dry Wt. Basis	**124**			

pH TEST, DOT California Test 643

pH Value	**5.57**			
Temperature °C	21.3			

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SOIL RESISTIVITY TEST

DOT CA TEST 643

Project Name:	Civiltec/PWP Explorer Well and Behner Plant Improvements	Tested By :	G. Berdy	Date:	01/03/18
Project No. :	11877.001	Data Input By:	J. Ward	Date:	01/09/18
Boring No.:	TP-2	Depth (ft.) :	0.5-2		
Sample No. :	B-1				

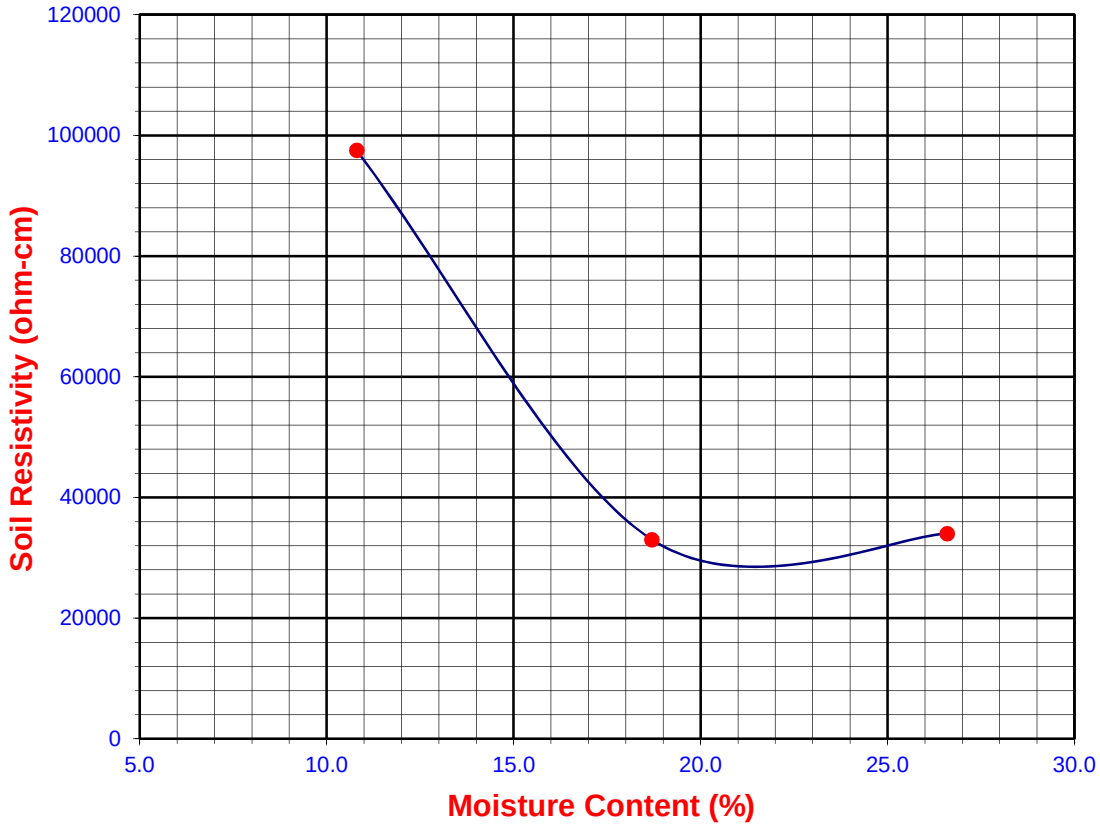
Soil Identification:* Dark brown SM

*California Test 643 requires soil specimens to consist only of portions of samples passing through the No. 8 US Standard Sieve before resistivity testing. Therefore, this test method may not be representative for coarser materials.

Specimen No.	Water Added (ml) (Wa)	Adjusted Moisture Content (MC)	Resistance Reading (ohm)	Soil Resistivity (ohm-cm)
1	10	10.80	97500	97500
2	20	18.70	33000	33000
3	30	26.60	34000	34000
4				
5				

Moisture Content (%) (MCi)	2.91
Wet Wt. of Soil + Cont. (g)	225.23
Dry Wt. of Soil + Cont. (g)	220.84
Wt. of Container (g)	69.74
Container No.	
Initial Soil Wt. (g) (Wt)	130.30
Box Constant	1.000
MC =(((1+Mci/100)x(Wa/Wt+1))-1)x100	

Min. Resistivity (ohm-cm)	Moisture Content (%)	Sulfate Content (ppm)	Chloride Content (ppm)	Soil pH	
				pH	Temp. (°C)
DOT CA Test 643		DOT CA Test 417 Part II	DOT CA Test 422	DOT CA Test 643	
28000	**21.5**	**59**	**124**	**5.57**	**21.3**



APPENDIX C

EARTHWORK AND GRADING GUIDE SPECIFICATIONS

Leighton

APPENDIX C

LEIGHTON CONSULTING, INC.
EARTHWORK AND GRADING GUIDE SPECIFICATIONS

TABLE OF CONTENTS

C-1.0 GENERAL

C-1.1 Intent

These Earthwork and Grading Guide Specifications are for grading and earthwork shown on the current, approved grading plan(s) and/or indicated in the Leighton Consulting, Inc. geotechnical report(s). These Guide Specifications are a part of the recommendations contained in the geotechnical report(s). In case of conflict, the project-specific recommendations in the geotechnical report shall supersede these Guide Specifications. Leighton Consulting, Inc. shall provide geotechnical observation and testing during earthwork and grading. Based on these observations and tests, Leighton Consulting, Inc. may provide new or revised recommendations that could supersede these specifications or the recommendations in the geotechnical report(s).

C-1.2 Role of Leighton Consulting, Inc.

Prior to commencement of earthwork and grading, Leighton Consulting, Inc. shall meet with the earthwork contractor to review the earthwork contractor's work plan, to schedule sufficient personnel to perform the appropriate level of observation, mapping and compaction testing. During earthwork and grading, Leighton Consulting, Inc. shall observe, map, and document subsurface exposures to verify geotechnical design assumptions. If observed conditions are found to be significantly different than the interpreted assumptions during the design phase, Leighton Consulting, Inc. shall inform the owner, recommend appropriate changes in design to accommodate these observed conditions, and notify the review agency where required. Subsurface areas to be geotechnically observed, mapped, elevations recorded, and/or tested include (1) natural ground after clearing to receiving fill but before fill is placed, (2) bottoms of all "remedial removal" areas, (3) all key bottoms, and (4) benches made on sloping ground to receive fill.

Leighton Consulting, Inc. shall observe moisture-conditioning and processing of the subgrade and fill materials, and perform relative compaction testing of fill to determine the attained relative compaction. Leighton Consulting, Inc. shall provide *Daily Field Reports* to the owner and the Contractor on a routine and frequent basis.

C-1.3 The Earthwork Contractor

The earthwork contractor (Contractor) shall be qualified, experienced and knowledgeable in earthwork logistics, preparation and processing of ground to receive fill, moisture-conditioning and processing of fill, and compacting fill. The Contractor shall review and accept the plans, geotechnical report(s), and these Guide

Specifications prior to commencement of grading. The Contractor shall be solely responsible for performing grading and backfilling in accordance with the current, approved plans and specifications.

The Contractor shall inform the owner and Leighton Consulting, Inc. of changes in work schedules at least one working day in advance of such changes so that appropriate observations and tests can be planned and accomplished. The Contractor shall not assume that Leighton Consulting, Inc. is aware of all grading operations.

The Contractor shall have the sole responsibility to provide adequate equipment and methods to accomplish earthwork and grading in accordance with the applicable grading codes and agency ordinances, these Guide Specifications, and recommendations in the approved geotechnical report(s) and grading plan(s). If, in the opinion of Leighton Consulting, Inc., unsatisfactory conditions, such as unsuitable soil, improper moisture condition, inadequate compaction, adverse weather, etc., are resulting in a quality of work less than required in these specifications, Leighton Consulting, Inc. shall reject the work and may recommend to the owner that earthwork and grading be stopped until unsatisfactory condition(s) are rectified.

C-2.0 PREPARATION OF AREAS TO BE FILLED

C-2.1 Clearing and Grubbing

Vegetation, such as brush, grass, roots and other deleterious material shall be sufficiently removed and properly disposed of in a method acceptable to the owner, governing agencies and Leighton Consulting, Inc.. Care should be taken not to encroach upon or otherwise damage native and/or historic trees designated by the Owner or appropriate agencies to remain. Pavements, flatwork or other construction should not extend under the “drip line” of designated trees to remain.

Leighton Consulting, Inc. shall evaluate the extent of these removals depending on specific site conditions. Earth fill material shall not contain more than 3 percent of organic materials (by dry weight: ASTM D 2974). Nesting of the organic materials shall not be allowed.

If potentially hazardous materials are encountered, the Contractor shall stop work in the affected area, and a hazardous material specialist shall be informed immediately for proper evaluation and handling of these materials prior to continuing to work in that area. As presently defined by the State of California, most refined petroleum products (gasoline, diesel fuel, motor oil, grease, coolant, etc.) have chemical constituents that

are considered to be hazardous waste. As such, the indiscriminate dumping or spillage of these fluids onto the ground may constitute a misdemeanor, punishable by fines and/or imprisonment, and shall not be allowed.

C-2.2 Processing

Existing ground that has been declared satisfactory for support of fill, by Leighton Consulting, Inc., shall be scarified to a minimum depth of 6 inches (15 cm). Existing ground that is not satisfactory shall be over-excavated as specified in the following Section C-2.3. Scarification shall continue until soils are broken down and free of large clay lumps or clods and the working surface is reasonably uniform, flat, and free of uneven features that would inhibit uniform compaction.

C-2.3 Overexcavation

In addition to removals and over-excavations recommended in the approved geotechnical report(s) and the grading plan, soft, loose, dry, saturated, spongy, organic-rich, highly fractured or otherwise unsuitable ground shall be over-excavated to competent ground as evaluated by Leighton Consulting, Inc. during grading. All undocumented fill soils under proposed structure footprints should be excavated

C-2.4 Benching

Where fills are to be placed on ground with slopes steeper than 5:1 (horizontal to vertical units), (>20 percent grade) the ground shall be stepped or benched. The lowest bench or key shall be a minimum of 15 feet (4.5 m) wide and at least 2 feet (0.6 m) deep, into competent material as evaluated by Leighton Consulting, Inc.. Other benches shall be excavated a minimum height of 4 feet (1.2 m) into competent material or as otherwise recommended by Leighton Consulting, Inc.. Fill placed on ground sloping flatter than 5:1 (horizontal to vertical units), (<20 percent grade) shall also be benched or otherwise over-excavated to provide a flat subgrade for the fill.

C-2.5 Evaluation/Acceptance of Fill Areas

All areas to receive fill, including removal and processed areas, key bottoms, and benches, shall be observed, mapped, elevations recorded, and/or tested prior to being accepted by Leighton Consulting, Inc. as suitable to receive fill. The Contractor shall obtain a written acceptance (*Daily Field Report*) from Leighton Consulting, Inc. prior to fill placement. A licensed surveyor shall provide the survey control for determining elevations of processed areas, keys and benches.

C-3.0 FILL MATERIAL

C-3.1 Fill Quality

Material to be used as fill shall be essentially free of organic matter and other deleterious substances evaluated and accepted by Leighton Consulting, Inc. prior to placement. Soils of poor quality, such as those with unacceptable gradation, high expansion potential, or low strength shall be placed in areas acceptable to Leighton Consulting, Inc. or mixed with other soils to achieve satisfactory fill material.

C-3.2 Oversize

Oversize material defined as rock, or other irreducible material with a maximum dimension greater than 6 inches (15 cm), shall not be buried or placed in fill unless location, materials and placement methods are specifically accepted by Leighton Consulting, Inc.. Placement operations shall be such that nesting of oversized material does not occur and such that oversize material is completely surrounded by compacted or densified fill. Oversize material shall not be placed within 10 feet (3 m) measured vertically from finish grade, or within 2 feet (0.61 m) of future utilities or underground construction.

C-3.3 Import

If importing of fill material is required for grading, proposed import material shall meet the requirements of Section C-3.1, and be free of hazardous materials ("contaminants") and rock larger than 3-inches (8 cm) in largest dimension. All import soils shall have an Expansion Index (EI) of 20 or less and a sulfate content no greater than ($\leq$) 500 parts-per-million (ppm). A representative sample of a potential import source shall be given to Leighton Consulting, Inc. at least four full working days before importing begins, so that suitability of this import material can be determined and appropriate tests performed.

C-4.0 FILL PLACEMENT AND COMPACTION

C-4.1 Fill Layers

Approved fill material shall be placed in areas prepared to receive fill, as described in Section C-2.0, above, in near-horizontal layers not exceeding 8 inches (20 cm) in loose thickness. Leighton Consulting, Inc. may accept thicker layers if testing indicates the grading procedures can adequately compact the thicker layers, and only if the building officials with the appropriate jurisdiction approve. Each layer shall be spread evenly and mixed thoroughly to attain relative uniformity of material and moisture throughout.

C-4.2 Fill Moisture Conditioning

Fill soils shall be watered, dried back, blended and/or mixed, as necessary to attain a relatively uniform moisture content at or slightly over optimum. Maximum density and optimum soil moisture content tests shall be performed in accordance with the American Society of Testing and Materials (ASTM) Test Method D 1557.

C-4.3 Compaction of Fill

After each layer has been moisture-conditioned, mixed, and evenly spread, each layer shall be uniformly compacted to not-less-than (≥) 90 percent of the maximum dry density as determined by ASTM Test Method D 1557. In some cases, structural fill may be specified (see project-specific geotechnical report) to be uniformly compacted to at-least (≥) 95 percent of the ASTM D 1557 modified Proctor laboratory maximum dry density. For fills thicker than (>) 15 feet (4.5 m), the portion of fill deeper than 15 feet below proposed finish grade shall be compacted to 95 percent of the ASTM D 1557 laboratory maximum density. Compaction equipment shall be adequately sized and be either specifically designed for soil compaction or of proven reliability to efficiently achieve the specified level of compaction with uniformity.

C-4.4 Compaction of Fill Slopes

In addition to normal compaction procedures specified above, compaction of slopes shall be accomplished by back rolling of slopes with sheepsfoot rollers at increments of 3 to 4 feet (1 to 1.2 m) in fill elevation, or by other methods producing satisfactory results acceptable to Leighton Consulting, Inc.. Upon completion of grading, relative compaction of the fill, out to the slope face, shall be at least 90 percent of the ASTM D 1557 laboratory maximum density.

C-4.5 Compaction Testing

Field-tests for moisture content and relative compaction of the fill soils shall be performed by Leighton Consulting, Inc.. Location and frequency of tests shall be at our field representative(s) discretion based on field conditions encountered. Compaction test locations will not necessarily be selected on a random basis. Test locations shall be selected to verify adequacy of compaction levels in areas that are judged to be prone to inadequate compaction (such as close to slope faces and at the fill/bedrock benches).

C-4.6 Compaction Test Locations

Leighton Consulting, Inc. shall document the approximate elevation and horizontal coordinates of each density test location. The Contractor shall coordinate with the project surveyor to assure that sufficient grade stakes are established so that Leighton

Consulting, Inc. can determine the test locations with sufficient accuracy. Adequate grade stakes shall be provided.

C-5.0 EXCAVATION

Excavations, as well as over-excavation for remedial purposes, shall be evaluated by Leighton Consulting, Inc. during grading. Remedial removal depths shown on geotechnical plans are estimates only. The actual extent of removal shall be determined by Leighton Consulting, Inc. based on the field evaluation of exposed conditions during grading. Where fill-over-cut slopes are to be graded, the cut portion of the slope shall be made, then observed and reviewed by Leighton Consulting, Inc. prior to placement of materials for construction of the fill portion of the slope, unless otherwise recommended by Leighton Consulting, Inc..

C-6.0 TRENCH BACKFILLS

C-6.1 Safety

The Contractor shall follow all OSHA and Cal/OSHA requirements for safety of trench excavations. Work should be performed in accordance with Article 6 of the *California Construction Safety Orders*, 2015 Edition or more current (see also: http://www.dir.ca.gov/title8/sb4a6.html).

C-6.2 Bedding and Backfill

All utility trench bedding and backfill shall be performed in accordance with applicable provisions of the 2015 Edition of the *Standard Specifications for Public Works Construction* (Green Book). Bedding material shall have a Sand Equivalent greater than 30 (SE>30). Bedding shall be placed to 1-foot (0.3 m) over the top of the conduit, and densified by jetting in areas of granular soils, if allowed by the permitting agency. Otherwise, the pipe-bedding zone should be backfilled with Controlled Low Strength Material (CLSM) consisting of at least one sack of Portland cement per cubic-yard of sand, and conforming to Section 201-6 of the 2015 Edition of the *Standard Specifications for Public Works Construction* (Green Book). Backfill over the bedding zone shall be placed and densified mechanically to a minimum of 90 percent of relative compaction (ASTM D 1557) from 1 foot (0.3 m) above the top of the conduit to the surface. Backfill above the pipe zone shall **not** be jetted. Jetting of the bedding around the conduits shall be observed by Leighton Consulting, Inc. and backfill above the pipe zone (bedding) shall be observed and tested by Leighton Consulting, Inc..

C-6.3 Lift Thickness

Lift thickness of trench backfill shall not exceed those allowed in the Standard Specifications of Public Works Construction unless the Contractor can demonstrate to Leighton Consulting, Inc. that the fill lift can be compacted to the minimum relative compaction by his alternative equipment and method, and only if the building officials with the appropriate jurisdiction approve.

Appendix D

Noise Calculations

APPENDIX D
NOISE CALCULATIONS

Summary

File Name on Meter	831_Data.590.s
File Name on PC	831_0001742-20230726 113759-831_Data.590.ldbin
Serial Number	0001742
Model	Model 831
Firmware Version	2.300
User	
Location	
Job Description	
Note	

Measurement

Description	
Start	2023-07-26 11:37:59
Stop	2023-07-27 12:04:53
Duration	24:26:54.195
Run Time	24:26:51.797
Pause	00:00:02.4
Pre-Calibration	2023-07-26 11:36:43
Post-Calibration	None
Calibration Deviation	---

Overall Settings

RMS Weight	A Weighting
Peak Weight	A Weighting
Detector	Slow
Preamplifier	PRM831
Microphone Correction	Off
Integration Method	Linear
Gain	0.0 dB
Overload	141.9 dB

	A	**C**	**Z**
Under Range Peak	**74.3**	71.3	76.3 dB
Under Range Limit	**25.9**	26.1	31.2 dB
Noise Floor	16.8	16.9	22.0 dB

Results

L_{Aeq}	54.6	
LAE	104.0	
EA	2.812	mPa^2h
$L_{Apeak\ (max)}$	2023-07-27 12:04:46	111.7 dB
LAS_{max}	2023-07-27 12:04:46	82.3 dB
LAS_{min}	2023-07-26 18:40:46	47.3 dB
SEA	-99.94	dB
LAS > 60.0 dB (Exceedance Counts / Duration)	169	1329.9 s
LAS > 90.0 dB (Exceedance Counts / Duration)	0	0.0 s
L_{Apeak} > 135.0 dB (Exceedance Counts / Duration)	0	0.0 s
L_{Apeak} > 137.0 dB (Exceedance Counts / Duration)	0	0.0 s
L_{Apeak} > 140.0 dB (Exceedance Counts / Duration)	0	0.0 s

Community Noise	**Ldn**	**LDay 07:00-22:00**	**LNight 22:00-07:00**	**Lden**	**LDay 07:00-19:00**	**LEvening 19:00-22:00**	**LNight 22:00-07:00**
	60.4	55.0	53.7	60.6	55.2	54.3	53.7

L_{Ceq}	63.0	dB
L_{Aeq}	54.6	dB
L_{Ceq} - L_{Aeq}	8.4	dB
L_{AIeq}	57.5	dB
L_{Aeq}	54.6	dB
L_{AIeq} - L_{Aeq}	2.9	dB

	A		**C**		**Z**	
	dB	**Time Stamp**	**dB**	**Time Stamp**	**dB**	**Time Stamp**
L_{eq}	54.6		63.0		72.4	
$L_{S(max)}$	82.3	2023/07/27 12:04:46	97.1	2023/07/26 11:38:29	118.9	2023/07/26 11:38:29
$L_{F(max)}$	89.1	2023/07/27 12:04:46	104.8	2023/07/26 11:38:28	124.7	2023/07/26 11:38:29
$L_{I(max)}$	93.2	2023/07/27 12:04:46	109.3	2023/07/26 11:38:28	127.0	2023/07/26 11:38:29
$L_{S(min)}$	47.3	2023/07/26 18:40:46	57.8	2023/07/27 2:41:20	60.1	2023/07/27 2:41:20
$L_{F(min)}$	45.8	2023/07/27 12:04:48	56.6	2023/07/26 18:40:44	58.4	2023/07/26 23:54:04
$L_{I(min)}$	47.2	2023/07/27 11:54:51	57.9	2023/07/27 2:41:19	60.6	2023/07/26 23:54:31
$L_{Peak(max)}$	111.7	2023/07/27 12:04:46	117.6	2023/07/26 11:38:28	128.2	2023/07/26 11:38:29

Overload Count	0	
Overload Duration	0.0	s

Statistics

LAI1.70	58.7	dB
LAI8.30	56.3	dB
LAI10.00	56.0	dB
LAI25.00	54.6	dB
LAI50.00	53.1	dB
LAI75.00	52.0	dB

Calibration History

Preamp	**Date**	**dB re. 1V/Pa**	**6.3**	**8.0**	**10.0**	**12.5**
PRM831	2023-07-26 11:36:43	-24.33				
PRM831	2023-07-26 09:12:03	-24.39				
PRM831	2023-04-12 17:02:15	-24.62				
PRM831	2023-04-12 15:24:12	-24.75				
PRM831	2023-01-05 15:03:02	-24.38				
PRM831	2023-01-05 14:37:59	-24.32				
PRM831	2022-02-04 11:33:49	-24.44				
PRM831	2022-02-04 11:09:37	-24.43				
PRM831	2022-02-03 21:24:11	-24.42				
PRM831	2022-02-03 21:05:22	-24.39				
PRM831	2021-09-21 15:55:26	-24.26				

Summary

File Name on Meter	831_Data.591.s
File Name on PC	831_0001742-20230727 123941-831_Data.591.ldbin
Serial Number	0001742
Model	Model 831
Firmware Version	2.300
User	
Location	
Job Description	
Note	

Measurement

Description	
Start	2023-07-27 12:39:41
Stop	2023-07-28 14:14:48
Duration	25:35:07.102
Run Time	25:35:03.102
Pause	00:00:04.0
Pre-Calibration	2023-07-26 11:36:43
Post-Calibration	None
Calibration Deviation	---

Overall Settings

RMS Weight	A Weighting
Peak Weight	A Weighting
Detector	Slow
Preamplifier	PRM831
Microphone Correction	Off
Integration Method	Linear
Gain	0.0 dB
Overload	141.9 dB

	A	C	Z
Under Range Peak	**74.3**	71.3	76.3 dB
Under Range Limit	**25.9**	26.1	31.2 dB
Noise Floor	16.8	16.9	22.0 dB

Results

L_{Aeq}	55.5	
LAE	105.1	
EA	3.611	mPa^2h
$L_{Apeak\ (max)}$	2023-07-27 12:40:14	124.4 dB
L_{ASmax}	2023-07-27 12:40:14	90.4 dB
L_{ASmin}	2023-07-28 11:14:55	46.8 dB
SEA	134.4 dB	
LAS > 60.0 dB (Exceedance Counts / Duration)	119	2836.7 s
LAS > 90.0 dB (Exceedance Counts / Duration)	1	0.7 s
L_{Apeak} > 135.0 dB (Exceedance Counts / Duration)	0	0.0 s
L_{Apeak} > 137.0 dB (Exceedance Counts / Duration)	0	0.0 s
L_{Apeak} > 140.0 dB (Exceedance Counts / Duration)	0	0.0 s

Community Noise	**Ldn**	**LDay 07:00-22:00**	**LNight 22:00-07:00**	**Lden**	**LDay 07:00-19:00**	**LEvening 19:00-22:00**	**LNight 22:00-07:00**	
	60.2	56.3	53.2	60.5	56.7	54.3	53.2	dB

L_{Ceq}	66.9	dB
L_{Aeq}	55.5	dB
L_{Ceq} - L_{Aeq}	11.4	dB
L_{AIeq}	60.8	dB
L_{Aeq}	55.5	dB
L_{AIeq} - L_{Aeq}	5.3	dB

	A		C		Z	
	dB	**Time Stamp**	**dB**	**Time Stamp**	**dB**	**Time Stamp**
L_{eq}	55.5		66.9		74.8	
$L_{S(max)}$	90.4	2023/07/27 12:40:14	111.4	2023/07/27 12:40:14	118.4	2023/07/27 12:40:14
$L_{F(max)}$	97.6	2023/07/27 12:40:14	119.7	2023/07/27 12:40:14	125.2	2023/07/27 12:40:14
$L_{I(max)}$	102.2	2023/07/27 12:40:14	124.6	2023/07/27 12:40:14	130.1	2023/07/27 12:40:14
$L_{S(min)}$	46.8	2023/07/28 11:14:55	58.8	2023/07/27 22:56:53	60.4	2023/07/27 22:56:53
$L_{F(min)}$	46.1	2023/07/28 11:14:51	57.6	2023/07/28 0:07:14	59.0	2023/07/28 0:02:15
$L_{I(min)}$	46.8	2023/07/28 11:14:51	58.9	2023/07/27 22:56:53	60.9	2023/07/27 22:56:53
$L_{Peak(max)}$	124.4	2023/07/27 12:40:14	132.3	2023/07/27 12:40:14	137.9	2023/07/27 12:40:14

Overload Count	0	
Overload Duration	0.0	s

Statistics

LAI1.70	61.3	dB
LAI8.30	54.7	dB
LAI10.00	54.2	dB
LAI25.00	52.4	dB
LAI50.00	51.3	dB
LAI75.00	50.5	dB

Calibration History

Preamp	**Date**	**dB re. 1V/Pa**	**6.3**	**8.0**	**10.0**	**12.5**	**16.0**
PRM831	2023-07-26 11:36:43	-24.33					
PRM831	2023-07-26 09:12:03	-24.39					
PRM831	2023-04-12 17:02:15	-24.62					
PRM831	2023-04-12 15:24:12	-24.75					
PRM831	2023-01-05 15:03:02	-24.38					
PRM831	2023-01-05 14:37:59	-24.32					
PRM831	2022-02-04 11:33:49	-24.44					
PRM831	2022-02-04 11:09:37	-24.43					
PRM831	2022-02-03 21:24:11	-24.42					
PRM831	2022-02-03 21:05:22	-24.39					
PRM831	2021-09-21 15:55:26	-24.26					

Summary

File Name on Meter	LxT_Data.087.s
File Name on PC	LxT_0004615-20230612 095539-LxT_Data.087.ldbin
Serial Number	0004615
Model	SoundTrack LxT®
Firmware Version	2.301
User	
Location	
Job Description	
Note	

Measurement

Description	
Start	2023-06-12 09:55:39
Stop	2023-07-27 13:15:04
Duration	24:56:18.898
Run Time	24:56:16.0
Pause	00:00:02.9
Pre-Calibration	2023-06-09 18:45:43
Post-Calibration	None
Calibration Deviation	---

Overall Settings

RMS Weight	A Weighting
Peak Weight	A Weighting
Detector	Slow
Preamplifier	PRMLxT1
Microphone Correction	Off
Integration Method	Linear
Overload	142.1 dB

	A	C	Z	
Under Range Peak	**98.3**	95.3	100.3	dB
Under Range Limit	**36.2**	34.2	42.2	dB
Noise Floor	23.5	24.0	31.4	dB

Results

L_{Aeq}	75.3		
LAE	124.8		
EA	334.858	mPa²h	
EA8	107.422	mPa²h	
EA40	537.109	mPa²h	
$L_{Apeak\ (max)}$	2023-07-26 10:14:43	125.0	dB
L_{ASmax}	2023-07-26 10:14:54	114.0	dB
L_{ASmin}	2023-06-12 09:57:37	35.3	dB
SEA	135.0	dB	

LAS > 85.0 dB (Exceedance Counts / Duration)	3	14.5 s
LAS > 115.0 dB (Exceedance Counts / Duration)	0	0.0 s
L_{Apeak} > 135.0 dB (Exceedance Counts / Duration)	0	0.0 s
L_{Apeak} > 137.0 dB (Exceedance Counts / Duration)	0	0.0 s
L_{Apeak} > 140.0 dB (Exceedance Counts / Duration)	0	0.0 s

L_{Ceq}	65.7	dB
L_{Aeq}	75.3	dB
L_{Ceq} - L_{Aeq}	-9.6	dB
L_{AIeq}	60.5	dB
L_{Aeq}	75.3	dB
L_{AIeq} - L_{Aeq}	-14.8	dB

	A		C		Z	
	dB	**Time Stamp**	**dB**	**Time Stamp**	**dB**	**Time Stamp**
L_{eq}	75.3		65.7			
$L_{S(max)}$	114.0	2023/07/26 10:14:54				

$L_{S(min)}$	35.3	2023/06/12 9:57:37				
$L_{Peak(max)}$	125.0	2023/07/26 10:14:43				

Overload Count	0	
Overload Duration	0.0	s

Dose Settings

Dose Name	OSHA-1	OSHA-2	
Exchange Rate	5	5	dB
Threshold	90	80	dB
Criterion Level	90	90	dB
Criterion Duration	8	8	h

Results

Dose	1.09	1.11	%
Projected Dose	0.35	0.36	%
TWA (Projected)	49.2	49.3	dB
TWA (t)	57.4	57.5	dB
Lep (t)	80.2	80.2	dB

Statistics

LAI1.70	59.7	dB
LAI8.30	57.0	dB
LAI25.00	54.2	dB
LAI50.00	52.0	dB
LAI75.00	51.0	dB
LAI90.00	50.2	dB

Calibration History

Preamp	**Date**	**dB re. 1V/Pa**	**6.3**	**8.0**	**10.0**
PRMLxT1	2023-07-26 10:15:07	-48.36			
PRMLxT1	2023-07-21 14:00:25	-48.38			
PRMLxT1	2023-06-09 18:45:43	-48.39			
PRMLxT1	2023-06-09 16:29:48	-48.32			
PRMLxT1	2023-06-09 14:28:31	-48.33			
PRMLxT1	2023-06-09 12:27:59	-48.38			
PRMLxT1	2023-06-08 13:24:00	-48.34			
PRMLxT1	2023-06-08 11:05:59	-48.36			
PRMLxT1	2023-06-08 10:50:55	-48.32			
PRMLxT1	2023-05-09 09:32:24	-48.31			
PRMLxT1	2022-06-01 16:13:21	-48.06			

Summary

File Name on Meter	LxT_Data.088.s
File Name on PC	LxT_0004615-20230727 135602-LxT_Data.088.ldbin
Serial Number	0004615
Model	SoundTrack LxT®
Firmware Version	2.301
User	
Location	
Job Description	
Note	

Measurement

Description	
Start	2023-07-27 13:56:02
Stop	2023-07-28 15:30:40
Duration	25:33:03.94
Run Time	25:32:58.297
Pause	00:00:04.8
Pre-Calibration	2023-07-26 10:15:07
Post-Calibration	None
Calibration Deviation	---

Overall Settings

RMS Weight	A Weighting
Peak Weight	A Weighting
Detector	Slow
Preamplifier	PRMLxT1
Microphone Correction	Off
Integration Method	Linear
Overload	142.1 dB

	A	**C**	**Z**
Under Range Peak	**98.3**	95.3	100.3
Under Range Limit	**36.2**	34.2	42.2
Noise Floor	23.5	24.0	31.4

Results

LA_{eq}	55.8		
LAE	105.4		
EA	3.870 mPa²h		
EA8	1.212 mPa²h		
EA40	6.059 mPa²h		
$LA_{peak\ (max)}$	2023-07-27 13:59:15	109.5 dB	
LAS_{max}	2023-07-28 05:58:53	89.0 dB	
LAS_{min}	2023-07-27 13:57:59	46.8 dB	
SEA	-99.94 dB		
LAS > 85.0 dB (Exceedance Counts / Duration)	1	5.7 s	
LAS > 115.0 dB (Exceedance Counts / Duration)	0	0.0 s	
LA_{peak} > 135.0 dB (Exceedance Counts / Duration)	0	0.0 s	
LA_{peak} > 137.0 dB (Exceedance Counts / Duration)	0	0.0 s	
LA_{peak} > 140.0 dB (Exceedance Counts / Duration)	0	0.0 s	

L_{Ceq}	64.6	dB
L_{Aeq}	55.8	dB
L_{Ceq} - L_{Aeq}	8.8	dB
L_{AIeq}	60.0	dB
L_{Aeq}	55.8	dB
L_{AIeq} - L_{Aeq}	4.2	dB

	A		C
	dB	**Time Stamp**	**dB**
L_{eq}	55.8		64.6
$L_{S(max)}$	89.0	2023/07/28 5:58:53	
$L_{S(min)}$	46.8	2023/07/27 13:57:59	
$L_{Peak(max)}$	109.5	2023/07/27 13:59:15	

Overload Count	0	
Overload Duration	0.0	s

Dose Settings

Dose Name	OSHA-1	OSHA-2	
Exchange Rate	5	5	dB
Threshold	90	80	dB
Criterion Level	90	90	dB
Criterion Duration	8	8	h

Results

Dose	-99.94	0.03	%
Projected Dose	-99.94	0.01	%
TWA (Projected)	-99.94	23.1	dB
TWA (t)	-99.94	31.4	dB
Lep (t)	60.8	60.8	dB

Statistics

LAI1.70	60.0	dB
LAI8.30	55.3	dB
LAI25.00	52.8	dB
LAI50.00	51.6	dB
LAI75.00	50.9	dB
LAI90.00	50.3	dB

Calibration History

Preamp	**Date**	**dB re. 1V/Pa**
PRMLxT1	2023-07-26 10:15:07	-48.36
PRMLxT1	2023-07-21 14:00:25	-48.38
PRMLxT1	2023-06-09 18:45:43	-48.39
PRMLxT1	2023-06-09 16:29:48	-48.32
PRMLxT1	2023-06-09 14:28:31	-48.33
PRMLxT1	2023-06-09 12:27:59	-48.38
PRMLxT1	2023-06-08 13:24:00	-48.34
PRMLxT1	2023-06-08 11:05:59	-48.36
PRMLxT1	2023-06-08 10:50:55	-48.32
PRMLxT1	2023-05-09 09:32:24	-48.31
PRMLxT1	2022-06-01 16:13:21	-48.06

Sensitive Receptor to Project Site	Approximate Distance (ft.)	Anticipated Noise Level, dBA
Explorer Well		
Gabrielino Trail (Explorer Road)	90	
Asphalt Demolition		79
Drilling & Well Development		80
Equipment Installation		79
Site Development		79
Noise Barriers		79
Nearest House	195	
Asphalt Demolition		72
Drilling & Well Development		73
Equipment Installation		73
Site Development		72
Noise Barriers		73
Odyssey Charter School	1230	
Asphalt Demolition		56
Drilling & Well Development		57
Equipment Installation		57
Site Development		56
Noise Barriers		57
Hathaway-Sycamores (El Nido Campus)	1190	
Asphalt Demolition		56
Drilling & Well Development		57
Equipment Installation		57
Site Development		56
Noise Barriers		57
Altadena Staples	580	
Asphalt Demolition		63
Drilling & Well Development		63
Equipment Installation		63
Site Development		63
Noise Barriers		63
Sacred Heart Catholic Church	2130	
Asphalt Demolition		51
Drilling & Well Development		52
Equipment Installation		52
Site Development		51
Noise Barriers		52
JPL East P.L.	600	
Asphalt Demolition		62
Drilling & Well Development		63
Equipment Installation		63
Site Development		62
Noise Barriers		63

Noise Element suggest CNEL is 65 dBA at Residential (multi)/Mixed Commercial locations, CNEL 60 dBA (low density), 65 for Churches/Schools, 70 for Playgrounds, 75 for Riding Staples and Industrial manufacturing land-uses. Based on 8 hr work site, noise levels are capped to 69 dBA, 64 dBA, 69 dBA, 74 dBA and 79 dBA for compliance with clearly acceptable.

Normally Acceptable per the Noise Element suggests CNEL is 70 dBA for Residential/Schools land-uses.
There is no threshold for Playrounds/Riding Staples and Industrial has an 80 dBA threshold.

Sensitive Receptor to Project Site	Approximate Distance (ft.)	Anticipated Noise Level, dBA
Raw Water Pipelines		
Gabrielino Trail (Explorer Road)	90	
Asphalt Demolition		79
Excavation/Trenching		79
Well Site Piping Construction		79
Nearest House	195	
Asphalt Demolition		72
Excavation/Trenching		73
Well Site Piping Construction		73
Odyssey Charter School	1230	
Asphalt Demolition		56
Excavation/Trenching		57
Well Site Piping Construction		57
Hathaway-Sycamores (El Nido Campus)	1190	
Asphalt Demolition		56
Excavation/Trenching		57
Well Site Piping Construction		57
Altadena Staples	580	
Asphalt Demolition		63
Excavation/Trenching		63
Well Site Piping Construction		63
Sacred Heart Catholic Church	2130	
Asphalt Demolition		51
Excavation/Trenching		52
Well Site Piping Construction		52
JPL East P.L.	600	
Asphalt Demolition		62
Excavation/Trenching		63
Well Site Piping Construction		63

Noise Element suggest CNEL is 65 dBA at Residential (multi)/Mixed Commercial locations, CNEL 60 dBA (low density), 65 for Churches/Schools, 70 for Playgrounds, 75 for Riding Staples and Industrial manufacturing land-uses. Based on 8 hr work site, noise levels are capped to 69 dBA, 64 dBA, 69 dBA, 74 dBA and 79 dBA for compliance with clearly acceptable.

Normally Acceptable per the Noise Element suggests CNEL is 70 dBA for Residential/Schools land-uses.
There is no threshold for Playrounds/Riding Staples and Industrial has an 80 dBA threshold.

Appendix E

Special Status Species Potentially Occurring in the Region

APPENDIX E
SPECIAL STATUS SPECIES POTENTIALLY OCCURRING IN THE REGION

Appendix E – Special Status Species Potentially Occurring in the Region

TABLE E-1
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	Not expected to occur; no suitable habitat.
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; no suitable habitat.

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Scientific Name	Common Name	USFWS	CDFW	CRPR	Species Background	Potential
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; no suitable habitat.
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; no 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.
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; no suitable habitat.

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Scientific Name	Common Name	USFWS	CDFW	CRPR	Species Background	Potential
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; no suitable habitat.
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; no suitable habitat.
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; no suitable habitat.
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; no suitable habitat.
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; no suitable habitat.
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.

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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; no suitable habitat.
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; no suitable habitat.
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; no suitable habitat.
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.

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POTENTIALLY OCCURRING IN THE PROJECT REGION

Scientific Name	Common Name	USFWS	CDFW	CRPR	Species Background	Potential
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; no 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; no 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; no suitable habitat.
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; no suitable habitat.
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; no suitable habitat.

Appendix E – Special Status Species Potentially Occurring in the Region

TABLE E-1
SPECIAL STATUS PLANT SPECIES
POTENTIALLY OCCURRING IN THE PROJECT REGION

Scientific Name	Common Name	USFWS	CDFW	CRPR	Species Background	Potential
Symphyotrichum greatae	Greata's aster			1B.3	Perennial rhizomatous herb. Mesic soils in chaparral, cismontane and riparian woodland, broadleaved upland and lower montane coniferious 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). 2023 (accessed November 7). Inventory of Rare and Endangered Plants (online edition, v9.5). Sacramento, CA: CNPS. http://www.rareplants.cnps.org/.

Listing Status: California Department of Fish and Wildlife (CDFW). 2023 (October). 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)

TABLE E-2
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
Invertebrates					
Bombus crotchii Crotch bumble bee	Occurs in open grassland and scrub habitats; nests underground. Feeds on milkweed (*Asclepias* sp.), pincushion (*Chaenactis* sp,), lupine (*Lupinus* sp.), alfalfa (*Medicago* sp.), phacelia (*Phacelia* sp.), and sage (*Salvia* sp.).	–	CE	–	Not expected to occur; no suitable habitat.
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.

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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
Anaxyrus 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.
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.	FC	SSC	–	Not expected to occur; no suitable habitat.

TABLE E-2
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
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~~coastal 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 adjacent to Project boundary.
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	–	Not expected to occur; no 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	–	Not expected to occur; no suitable habitat.

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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	–	Not expected to occur; no 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 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; no suitable habitat.

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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
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 or foraging; may occur as a migrant fly-over.
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 or foraging; 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	Not expected to occur; no 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.

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Species	General Habitat/Range Description	USFWS	CDFW	Critical Habitat Present in the Study Area[a]	Potential for Occurrence
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; no suitable habitat.
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.
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.	–	ST, 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	–	Not expected to occur; no suitable habitat.

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Species	General Habitat/Range Description	USFWS	CDFW	Critical Habitat Present in the Study Area[a]	Potential for Occurrence
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	–	Not expected to occur; no 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	–	Not expected to occur; no 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	–	Not expected to occur; no suitable habitat.

TABLE E-2
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; no suitable habitat.
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; no suitable habitat..
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	–	Not expected to occur; no 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	–	Not expected to occur; no suitable habitat.
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	–	Not expected to occur; no suitable habitat.

TABLE E-2
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
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	–	Not expected to occur; no suitable habitat.
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	–	Not expected to occur; no suitable 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; no suitable habitat.
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	–	Not expected to occur; no suitable habitat.

TABLE E-2
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
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 2023) 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 "–".