Appendix A

Incidental Take Permit Application

Application for
California Endangered Species Act
Section 2081(b) Incidental Take Permit

Nipton Communication Site

In Accordance with California Code of Regulations
Title 14, Division 1, Subdivision 3, Chapter 6, Article 1, Section 783.2

Submitted to:
California Department of Fish and Wildlife
Contact:
Ali Aghili
Senior Environmental Scientist (Supervisor)
California Department of Fish and Wildlife
Region 6 (Inland Deserts Region)
3602 Inland Empire Blvd.
Ontario, California 91764

Prepared on behalf of:
InterConnect Towers, LLC
27762 Antonio Parkways, #471
Ladera Ranch, California 92694
Contact:
Tom Gammon

February 2020

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Acronyms and Abbreviations

ACEC	Area of Critical Environmental Concern
BMP	best management practice
BLM	U.S. Bureau of Land Management
CCR	California Code of Regulations
CDFG	California Department of Fish and Game
CDFW	California Department of Fish and Wildlife
CESA	California Endangered Species Act
CNDDB	California Natural Diversity Database
DRECP	Desert Renewable Energy Conservation Plan
ERMA	Extensive Recreation Management Area
FCR	Field Contact Representative
HVAC	heating, ventilation, and air conditioning
I-15	Interstate 15
LUPA	Land Use Plan Amendment
O&M	operations and maintenance
OHV	off-highway vehicle
PAR	Property Analysis Record
ROW	right-of-way
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WEAP	Worker Environmental Awareness Program

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CALIFORNIA CODE OF REGULATIONS
TITLE 14, NATURAL RESOURCES, DIVISION 1, FISH AND GAME COMMISSION – DEPARTMENT OF FISH AND GAME

SUBDIVISION 3. GENERAL REGULATIONS

CHAPTER 6. REGULATIONS FOR IMPLEMENTATION OF THE CALIFORNIA ENDANGERED SPECIES ACT

ARTICLE 1. TAKE PROHIBITION; PERMITS FOR INCIDENTAL TAKE OF ENDANGERED SPECIES, THREATENED SPECIES, AND CANDIDATE SPECIES

§ 783.2. Incidental Take Permit Applications.

(a) Permit applications. Applications for permits under this article must be submitted to the Regional Manager.

The following application for incidental take of endangered and threatened species under the California Endangered Species Act is being submitted to:

Ali Aghili
Senior Environmental Scientist (Supervisor)
California Department of Fish and Wildlife
Region 6 (Inland Deserts Region)
3602 Inland Empire Blvd.
Ontario, CA 91764

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1. APPLICANT INFORMATION

14 California Code of Regulations (CCR) § 783.2(a)(1): Applicant's full name, mailing address, and telephone number(s). If the applicant is a corporation, firm, partnership, association, institution, or public or private agency, the name and address of the person responsible for the project or activity requiring the permit, the president or principal officer, and the registered agent for the service of process.

1.1 APPLICANT

InterConnect Towers, LLC
27762 Antonio Parkway, #471
Ladera Ranch, California 92694
Contact: Tom Gammon

InterConnect Towers, LLC (herein "Applicant") is proposing to construct and operate a communication site (hereafter "Project") including a communication tower, equipment cabinets, backup generators, solar arrays, and access road with gate on federal lands administered by the Bureau of Land Management (BLM).

1.2 APPLICANT'S REPRESENTATIVES

Principal Officer and Contact Person

Principal Officer: Tom Gammon
Title: CEO

Contact Person: Tom Gammon
Title: CEO
Phone: (202) 255-7777
Email: Tom@ICTowers.Com

2. PROJECT LOCATION

14 CCR § 783.2(a)(4): The location where the project or activity is to occur or to be conducted.

The Project would be located within federal land administered by BLM in San Bernardino County, California, approximately 10 miles south of the California-Nevada state line, immediately southwest of the junction of Interstate-15 (I-15) (Figure 1) (all figures are included in Appendix A). More specifically, the proposed communication tower would be located approximately 1.25 miles southwest of Nipton Road and in the northeast southeast quarter of Section 33, Township 16 North, Range 14 East, as depicted on the Mineral Hill, California, U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle. Elevations range from approximately 3,412 to 4,460 feet above mean sea level. Topography is generally steep only at the abrupt incline of the Clark Mountain foothills, with a slope of approximately 10% with a southeastern aspect.

The Project is located in the Mojave Desert, immediately southwest of the junction of I-15 and Nipton Road and southeast of Clark Mountain. The access road follows a low ridgeline towards the lease area; the area northwest of the access road and lease area is rugged mountainous terrain. The climate of this desert region is a typical arid desert climate within the Mediterranean climate classification. Summers are hot, winters are cold, and there are strong fluctuations in daily temperatures. Precipitation is generally bimodal, with winter/spring rains in December through March and a spike in precipitation in August during the monsoon season (NOAA 2013; USGS 2013).

3. PROJECT DESCRIPTION

14 CCR § 783.2(a)(3): A complete description of the project or activity for which the permit is sought.

3.1 PROJECT OVERVIEW

The Project would provide improved, consistent, and reliable communication capability within the I-15 corridor and surrounding lands in the Ivanpah Valley and Mountain Pass areas. This segment of I-15 and adjacent lands has been identified as having inadequate cellular transmission coverage, largely due to signal shadowing caused by topographic features. Of particular concern are the areas where I-15 passes through the Clark Mountains before entering the Ivanpah Valley.

The Project would include a rectangular 0.39-acre lease area, an existing access road measuring 270 feet in length and averaging 14 feet in width, an all-new access road segment measuring 8,953 feet in length and averaging 25 feet in width, and a 0.18-acre temporary staging area measuring 80 feet by 100 feet located in a previously disturbed area adjacent to the I-15/Nipton Road interchange.

As described in Table 1, areas of new, permanent disturbance would include the communication site lease area and the length and width of the new access road as described above. All new disturbances would be considered permanent given the sensitivity of desert ecosystems to ground-disturbing activities. Areas of new disturbance would total approximately 5.86 acres.

Table 1. Acreage of Permanent Impacts

Project Component	Total BLM Lands	New Disturbance	Already Disturbed
Communication Site ROW Area[1]	0.39	0.39	0.0
Proposed Access Road[2]	5.56	5.46	0.10
Staging Area[3]	0.18	0.01	0.17
TOTAL	**6.13**	**5.86**	**0.27**

1 Communication site lease area would be 17,248 square feet.
2 The existing access road acreage assumes a roadway 270 feet in length and the new access road assumes a new roadway 8,953 feet in length. The standard width of the road would be 14 feet, but some areas of cut and fill would be required, so an average width of 25 feet is used for purposes of overall calculations. This includes five 25-foot by 100-foot passing lanes at intervals along the roadway.
3 Staging area would be 80 feet by 100 feet and would be in a previously disturbed area adjacent to the I-15/Nipton Road interchange.

The staging area would be adjacent to the I-15/Nipton Road interchange and is currently used for vehicle parking and vehicle turnaround purposes; therefore, this area is considered already disturbed and is generally devoid of vegetation. The existing access road segment is also already disturbed. Use of these areas would not be a part of the new disturbance area because the areas are already disturbed and would not require additional improvement or expansion. The previously disturbed area total is 0.27 acre.

3.2 PROJECT OBJECTIVES

The Applicant seeks to provide improved cellular communication capability within the I-15 corridor and surrounding lands in the Ivanpah Valley and Mountain Pass areas. I-15 is a heavily traveled roadway that carries regional traffic between southern California and Las Vegas, with an average daily traffic count along this segment typically surpassing 40,000 vehicles per day (Caltrans 2012). This segment of I-15 and adjacent lands has been identified as having inadequate cellular transmission coverage, largely due to signal shadowing caused by topographic features. Of particular concern are the areas where I-15 passes through the Clark Mountain Range before entering the Ivanpah Valley. Wireless telecommunication providers (i.e., Verizon, AT&T, etc.) have determined a need for an additional communication site based on any or all of the following criteria:

- need to provide signal coverage to an area or zone;
- need to strengthen/densify coverage to an area or zone;
- customer demand for coverage;
- emergency response agency demand for coverage;
- law enforcement agency demand for coverage; and
- federal/homeland security demand for coverage.

The proposed communication site would remedy the existing coverage deficiencies in the area and would meet one or more of the objectives outlined above. The facility would be made available for collocated use by existing wireless telecommunication providers and other telecommunication service providers.

3.3 PROJECT DESCRIPTION

The Project would comprise several permanent components: (1) road access; (2) communication tower; and (3) equipment cabinets, backup generators, solar arrays, and supporting elements. Additional information about each of these components is provided below. The following subsections also describe the construction and operation and maintenance (O&M) activities associated with the Project, and potential decommissioning and restoration of the Project.

3.3.1 PROJECT COMPONENTS

Road Access: Access to the site would begin at the Nipton Road and I-15 interchange and would travel northwesterly along an existing graded dirt road for approximately 270 feet. From this point, a new dirt roadway would be graded in a southwesterly direction approximately 8,953 feet to the proposed communication site. The existing 270 feet of roadway at the beginning of the alignment is of adequate width and condition that it would not require improvement to construct the communication site. The new 1.74-mile roadway segment to the communication site, however, would be all-new construction and would include a number of switchbacks near the top of the alignment to maintain a suitable grade up the slope. Up to 50 feet of upslope and downslope fall-off disturbance could occur on either side of the roadway along the steeper stretches. For purposes of acreage calculations, it is assumed that the average width of disturbance along the entire all-new access road would be 25 feet. The access route is shown in Figures 2 and 3.

The initial portion of the all-new access road would travel for approximately 450 feet adjacent to an ephemeral desert wash before circling around a low hill and passing through a low saddle. The roadway would then cross another ephemeral wash and then begin to climb up the ridge to the site.

The all-new access road would cross the second aforementioned ephemeral desert wash approximately 3,650 feet from the beginning of the alignment. At the location of this proposed crossing, the wash is approximately 16 feet in width. While substantial surface flows within this waterway are infrequent, improvements at the crossing would need to be made to ensure serviceability of the roadway following major stormwater runoff events. This may be accomplished by the placement of ribbed galvanized steel pipes placed directly on the streambed. The pipes would then be overlain with rock riprap and gravel. Alternatively, the road may be graded to drop into and out of this wash area with a slope not to exceed 20% into and out of this wash. Inflow and outflow areas may also be hardened with riprap to prevent scouring both upstream and downstream from the crossing. The quantity and size of the pipes at the crossing would be designed to accommodate projected peak flows along the watercourse, but preliminary indications based upon experience with similar projects in similar locations indicate that two pipes would be required.The roadway surface at the crossing would be 14 feet in width, consistent with the rest of the roadway. The *Environment Assessment: Nipton Communication Site* (hereafter Project EA) (AECOM 2018) provides additional details on the Project. Five vehicle pull-off/passing areas measuring 25 feet by 100 feet would be located at appropriate intervals along the new roadway (shown as part of the access road in Figure 3).

A gate would be constructed across the roadway just before the first passing lane along the alignment. The gate would be positioned in a suitable location to deter vehicles from driving around it.

Communication Tower: The communication tower would be installed within the 0.39-acre lease area and would be a self-supporting, three-legged, lattice-type galvanized steel structure measuring approximately 196 feet in height. The tower would serve as the structure upon which the communication equipment would be mounted. The tower would be placed upon a 32-foot by 32-foot concrete slab foundation, and would consist of either cast-in-place caissons or shallow foundations designed to carry axial loads and moments of force applied by wind and other factors on the tower. The tower, foundations, and all other structures on the site would be built to professional standards and applicable building codes. Soil tests and other investigations would be performed within the location of the proposed site to determine the specific foundation requirements.

The structural members and bracing units of the tower would be constructed of industry-standard galvanized steel with a silver-gray color tone. The types of communication equipment installed on the tower would depend upon the specific carriers housed at the site and the equipment requirements for their specific systems, but would likely include a rectangular antenna array, omni antennas, and microwave dishes.

Equipment Cabinets, Backup Generators, Solar Arrays, and Supporting Components: Equipment cabinets would be installed within the lease area and adjacent to the communication tower to house interior communication equipment. The equipment cabinets would be brought to the site by truck and installed on-site. The cabinets would include an environmental control system for heating, ventilation, and air conditioning (HVAC) to keep the interior within the temperature range required for the operation of the electronic communication equipment inside.

A series of solar arrays would be installed within the lease area to provide electrical power to the communication tower. No overhead utility line would be constructed and all necessary electrical power would be generated within the lease area. Solar power would consist of three 21-foot by 80-foot panels approximately 8 feet in height that would be mounted on concrete pads.

The compound would also include standby generators located within the compound and mounted on concrete pads. The generators would provide electric power in the event of failure of the site's commercial power source. The generators would be powered by propane-fed steel tanks located within the compound and would include mufflers on the power units to minimize noise. The propane tanks would also be mounted on concrete pads.

The communication tower, cabinets, solar arrays, and propane tanks would be enclosed within a chain-link fence measuring 8 feet in height, with three strands of barbed wire on the top, totaling 9 feet in height. Galvanized hardware mesh of 1-inch by 2-inch dimensions would be attached to the lower 18 inches of the chain-link fencing and buried to a 12-inch depth, in accordance with standard specifications for fencing in desert tortoise habitat. A gate would provide access into the compound for persons and vehicles, and permanent desert tortoise exclusion fencing would be installed along the bottom portion of the fence. A downward-shielded security light would be mounted to the outside of the cabinets and would be activated by a motion sensor.

Construction and O&M of the Project are described in the following subsections. Potential decommissioning and restoration are also discussed as the communication site may be removed at some point in the future.

3.3.2 Construction

Construction of the Project would occur within 90 to 120 days of right-of-way (ROW) issuance, preferably within the fall and winter seasons. It is expected that the site would take 60 to 120 days to construct. This time period could vary depending on the difficulty of construction, availability of work crews, and other factors. The number of workers (excluding biological monitors) at the site on any given day during construction would typically vary from four to six. Following completion of the construction process, all debris and waste materials would be removed from the site and disposed of at an approved facility in accordance with applicable regulations.

3.3.2.1 Access Road

The 270 feet of existing dirt roadway that would be utilized to approach the site is of sufficient width and condition that it would not require improvement to construct the site. The new segment, however, would be an all-new roadway and would be graded to a width of 14 feet. This would be accomplished with a bulldozer or grader, with associated spoils pushed to the sides of the roadway. Any earthen berms thus created would be rounded off to not inhibit travel by desert tortoise. A number of switchbacks would be installed along the last half-mile of the roadway near the top of the ridge to maintain a suitable grade up the slope. Up to 50 feet of upslope and downslope fall-off disturbance could occur on either side of the roadway along the steeper stretches, particularly at switchback locations. No paving or similar hardening of the road surface is anticipated. Construction of the new access road would occur in a biologically inactive season (e.g., winter or summer) and take up to 30 days.

3.3.2.2 Communication Site

Prior to construction of the communication site, the soils and substrate at the site would be sampled and tested to assist in tower foundation design. Typically, a mobile boring machine would be utilized to bore a single 6- to 8-inch-diameter hole using a hollow boring auger. These tests would only be conducted within the area of the proposed tower footprint. Soils density tests would be performed at specified levels, and samples would be collected for laboratory analysis. This information would be used to determine the tower foundation designs and methods of construction. In accordance with occupational safety and desert tortoise habitat regulations, the holes would be backfilled immediately following the drilling and analysis processes.

Construction at the communication site would proceed with site preparation and grading occurring first, followed by excavation for tower footings. The site is generally level, but some grading would need to occur to adequately prepare the site. Depending on tower foundation design, auguring could be required for the placement of caissons. Spoils or excess soil materials resulting from excavations or borings would be distributed evenly across the site. It is anticipated that the site would be practically accessible by concrete trucks so that premixed concrete could be delivered directly to the site. Should this prove infeasible, a batch concrete mixing station would be located on-site with water provided by a water truck.

Concrete mixing and other staging operations would take place within a temporary staging area adjacent to the I-15/Nipton Road interchange. This area would also provide space for other temporary disturbance activities such as vehicle turn-around and parking, staging, and material laydown.

Construction equipment to be used on-site would vary based upon the type of work currently underway. Vehicle speeds would be limited to 15 miles per hour on the access road to reduce fugitive dust generation, but the road would not be wetted during construction.

Rebar for the tower foundation footings would be installed and the anchor bolts for the tower mounts would be placed. The concrete foundation would be poured in a single day for both the tower and building/pad. Following placement of necessary foundations, the equipment cabinets, solar arrays, tower, and supporting components would be erected. Upon completion of the cabinets, internal and external equipment would be installed. Propane tanks and generators would be mounted on concrete-bermed foundations to contain spills or leaks that could occur during operation, fuel replenishment, and maintenance.

The surrounding chain-link fence and gate would also be installed. Galvanized hardware mesh of 1-inch by 2-inch dimensions would be attached to the lower 18 inches of the chain-link fencing and buried to a 12-inch depth, in accordance with standard specifications for desert tortoise exclusion fencing (see USFWS 2009).

3.3.3 Operations and Maintenance

Following construction, the facility would operate 24 hours a day, 7 days a week for the duration of the lease period. The lease period would be 30 years with a renewal option up to 50 years. The electronic equipment housed in the equipment cabinets would be temperature controlled by wall-mounted HVAC units. During warmer periods of the year, the cooling units could periodically be in operation 24 hours a day. Security lighting would be installed within the chain-link enclosure and would be controlled by means of a motion sensor.

Maintenance activities at the site would consist of monthly visits by technicians associated with each of the carriers with equipment at the site. While the number of site visits would vary depending upon specific maintenance requirements and other activities, the number of separate visits would likely be six to 10 visits per month, though this number could be greater and more frequent during the initial installation of carrier equipment. Workers would typically arrive in crews of one to three persons in standard service trucks. A typical monthly visit could be concluded in as little as an hour, but could extend to a full day or multiple days depending upon the task undertaken.

The on-site generators would typically switch on automatically once per week, and run for a period of approximately 30 minutes to ensure the maintenance of adequate lubrication within the units and to test them for proper operation. The units would be equipped with sensors to report their operational status, and in the event of a fault, a technician would be dispatched to conduct repairs.

Refills of the propane fuel for the generators would require periodic visits by a fuel delivery truck. Fuel levels would be monitored by a remote system and refills would occur as needed, probably once quarterly, depending on supplemental electric power demand. In the event of a prolonged power outage, more frequent visits would be necessary.

The solar panels would require occasional washing with water to maintain their efficiency. The frequency of washing would unlikely exceed more than twice per year. Water would be brought to the site by truck for this purpose.

The access road could require occasional maintenance following heavy rainfall events. Should maintenance be required, BLM would be contacted for approval prior to initiating work. Maintenance activities would likely be limited to minor smoothing using a front-end loader or grader during dry conditions. No road widening would be required during facility operations.

3.3.4 Decommissioning and Restoration

Upon termination of the ROW grant, the Applicant would restore, under the direction of BLM, the premises and access road as close to original condition as possible. This would entail the following procedure:

- All structures, tower, fencing and buildings would be deconstructed and removed from the Project site;
- The cement foundations would be covered over with local dirt from within the compound;
- The access gates for the Project site would be removed; and
- Revegetation would be allowed to occur naturally to blend with the surrounding area.

4. SITE DESCRIPTION

4.1 VEGETATION COMMUNITIES AND LAND COVER TYPES

Vegetation communities were mapped within the Project area in spring and fall 2013 and 2014, and spring 2015 in accordance with the classification system presented in Holland (1986) (AECOM 2015a). The Project area includes the proposed communication site, proposed access road, staging area, and a surrounding 656-foot buffer. Four vegetation communities and land cover types are present within the Project area (Figure 4). There were additional areas (alternative access road and utility easement) that had vegetation mapping conducted but have since been removed from the Project. The areas that had vegetation mapping conducted are still shown in Figure 4 for context.

The dominant upland floristic association within the Project area corresponds to Mojave creosote bush scrub (Holland Code 34100). Although shrub cover is sparse, common shrubs documented within this community included creosote bush (*Larrea tridentata*), white bursage (*Ambrosia dumosa*), cheesebush (*Ambrosia salsola*), white ratany (*Krameria bicolor*), leafy California buckwheat (*Eriogonum fasciculatum* var. *foliolosum*), Mojave yucca (*Yucca shidigera*), and Joshua tree (*Yucca brevifolia*). The dominant wash-dependent floristic association within the Project area corresponds to Mojave desert wash scrub (Holland Code 34250). Common shrubs within this habitat include catclaw (*Senegalia gregii*), bladder sage (*Scutellaria mexicana*), woolly bluestar (*Amsonia tomentosa*), and big galleta (*Hilaria rigida*). Unvegetated wash, a land cover type devoid of vegetation, was also delineated in the Project area, primarily near the northern portion of the area west of where the temporary staging area would be located. One land cover type, developed/maintained land cover, was also mapped in the Project area near the off-ramp to Nipton Road where the temporary staging area would be located. The acreage of the four vegetation communities and land cover types is provided in Table 2, below, based on the three project components.

Table 2. Acreage of Vegetation Communities and Land Cover Types

Vegetation Community and Land Cover Type	Communication Site ROW Area	Access Road (Existing and New)	Staging Area	Total
Mojave Creosote Bush Scrub	0.39	5.38	0.01	5.78
Mojave Desert Wash Scrub		0.08		0.08
Developed/Maintained		0.10	0.17	0.27
Total	**0.39**	**5.56**	**0.18**	**6.13**

A jurisdictional delineation of potentially regulated waters (including wetlands) of the U.S. was conducted in June 2013 for the Project area. No wetlands or waters of the U.S. were identified within the Project area (AECOM 2013). The U.S. Army Corps of Engineers has previously determined that the Project area's receiving waters at Ivanpah Dry Lake are not jurisdictional.

An updated jurisdictional delineation of arid streams was conducted in January 2019 to delineate areas of California Department of Fish and Wildlife (CDFW) jurisdiction (AECOM 2019). For this updated jurisdictional delineation, a 25-foot buffer around Project components was utilized as the study area. Within the study area, the jurisdictional delineation resulted in 0.10 acre of non-wetland waters of the State and 0.48 acre of CDFW streambeds for a total of 585 linear feet. Complete details of the jurisdictional delineation are provided in *Jurisdictional Delineation of Arid Streams for the Proposed Nipton Communication Site, San Bernardino County, CA* (AECOM 2019).

The Project area is within the USGS Mineral Hill quadrangle located in the Mojave Desert on the east slope of the Clark Mountain Range adjacent to the Ivanpah Valley. These mountains are part of the Basin and Range physiographic province, which in the vicinity of the site consists of north-south–trending mountain ranges and valleys. The mountains are often associated with normal and strike slip faults that also trend northwest-southeast although no mapped faults occur within the Project area. All rainfall at the site drains into Ivanpah Lake, the lowest point in the Ivanpah Valley. The valley has no natural outlet to the ocean. Soil types within the Project area are shown in Table 3 below and were classified during jurisdictional delineations in spring 2019. None of the mapped soils were hydric soils.

Table 3. Soils Data within Project Area

Soil Type Code	Soil Description[1]
3000	**Copperworld association**, 30 to 60 percent slopes – Hydrologic Soil Group D (Slow Infiltration Rate; High Runoff Potential) – Flooding Frequency Class: None[2] – Landform = Mountains and Hills
3520	**Arizo loamy sand**, 2 to 8 percent slopes – Hydrologic Soil Group A (High Infiltration Rate; Low Runoff Potential) – Flooding Frequency Class: Very Rare[2] – Landform = Fan Aprons, Fan Remnants, Drainageways

[1] Web Soil Survey (USDA NRCS 2019)
[2] Flooding Frequency Class = "None" means that flooding is not probable. The chance of flooding is nearly 0 percent in any year. Flooding occurs less than once in 500 years. "Very rare" means that flooding is very unlikely but possible under extremely unusual weather conditions. The chance of flooding is less than 1 percent in any year.

4.2 HABITAT PRESERVATION AND MANAGEMENT

The Project is within the boundary of the Desert Renewable Energy Conservation Plan (DRECP) Land Use Plan Amendment (LUPA) to the California Desert Conservation Act (CDCA) of 1980, as amended. Within the DRECP, the Project site is located within the Ivanpah Valley Extensive Recreation Management Area (ERMA) and the Ivanpah Area of Critical Environmental Concern (ACEC). The Project site is also within the CDCA-designated Utility Corridor "BB". The disturbance caps within the ACEC are 0.1% and 1.0% depending on the location. At this time, BLM has determined the baseline ground disturbance for the ACEC is 2.6% and exceeds the ground disturbance cap. The standard mitigation ratio within the ACEC is 3:1. Therefore, to mitigate for impacts to the ground disturbance cap by the development of the communication lease area and access road, ground disturbance will be mitigated at a ratio of 3:1, for a total of approximately 17.58 acres (i.e., impacts in undisturbed areas [5.86 acres] multiplied by 3) through habitat enhancement and restoration.

The Applicant has identified potential mitigation areas based on data provided by BLM (Figure 5). BLM identified areas of unauthorized disturbance within the ACEC when quantifying baseline ground disturbance for the DRECP. Unauthorized disturbance in the form of undesignated off-highway vehicle (OHV) routes occurs in the vicinity of the Project and these routes will be targeted as potential mitigation areas by the Applicant. The Applicant proposes to mitigate through passive restoration of these undesignated OHV routes (i.e., unauthorized disturbance areas). Restoration would be conducted through vertical mulching, soil decompaction, mechanical ripping, soil/vertical pitting, soil imprinting, raking, rocks, planting vegetation, seeding, or removing manufactured materials and structures. A detailed discussion of each of these techniques along with potential impacts associated with restoration is provided in the Project EA (AECOM 2018) and included in Appendix B.

Additionally, the Applicant proposes to mitigate for the 5.86 acres of ground disturbance by purchasing 5.86 acres of compensation lands suitable for the desert tortoise (i.e., a 1:1 ratio). It is anticipated that the 5.86 acres of compensation lands would be in the form of a purchase of habitat credits from a mitigation bank approved by CDFW. The acquisition of the compensation acreage, along with implementation of the general and desert tortoise-specific impact avoidance and minimization measures, outlined herein, would fully mitigate for any Project impacts to the species.

5. COVERED SPECIES

14 CCR § 783.2(a)(2): The common and scientific names of the species to be covered by the permit and the species' status under the California Endangered Species Act (CESA), including whether the species is the subject of rules and guidelines pursuant to Section 2112 and Section 2114 of the Fish and Game Code.

Coverage is requested for the incidental take of the State threatened desert tortoise (*Gopherus agassizii*) within the Mojave population.

5.1 DESERT TORTOISE

5.1.1 STATUS

The desert tortoise was listed as threatened under the California Endangered Species Act (CESA) on June 22, 1989 (CFGC 1989). Desert tortoise is also federally listed as threatened under the federal Endangered Species Act, with Critical Habitat designated by the U.S. Fish and Wildlife Service (USFWS 1994a). The listing was initially made on August 4, 1989, by emergency rule (USFWS 1989) and by final rule on April 2, 1990 (USFWS 1990). This listing status applies to the entire population of desert tortoise, except in Arizona south and east of the Colorado River, and in Mexico. An approved recovery plan was published by USFWS (1994b) and revised in 2011 (USFWS 2011).

The Mojave Desert population of desert tortoise has fluctuated range-wide, with population levels varying within regions. The population densities within each of the recovery units are highly variable, but, overall, the desert tortoise population has steadily decreased since monitoring efforts began.

The Project is not located within federally designated critical habitat. The nearest critical habitat (Ivanpah Unit of desert tortoise critical habitat) is designated approximately 600 feet east of the Project's access road; the communication site lease area is approximately 1.17 miles from the designated critical habitat. No impacts to designated desert tortoise critical habitat are anticipated; therefore, desert tortoise critical habitat is not discussed further.

5.1.2 CURRENT HABITAT CONDITIONS

As detailed previously under Section 4.1, Vegetation Communities and Land Cover Types, current habitat conditions and desert tortoise surveys indicate the habitat is primarily Mojave creosote bush scrub that is occupied by desert tortoise. At the time of the most recent desert tortoise surveys in spring 2015 (detailed below), there were no recent signs of disturbance along the new portion of the proposed access road or communication site and the habitat appeared relatively undisturbed. There were no OHV tracks, piles of trash, or other anthropogenic sources of disturbance along the majority of the access road, apart from the area immediately around the freeway off-ramp for Nipton Road.

5.1.3 POTENTIAL FOR OCCURRENCE

Desert tortoise pre-Project surveys were performed in accordance with USFWS (2010) survey protocol in April 2013, 2014, and 2015 (AECOM 2015b). In accordance with the USFWS survey protocol, 100% coverage presence-or-absence surveys were conducted within the lease area, along the proposed access road, and along a previously proposed aboveground electric power alignment (which has since been removed from the Project) using transects spaced approximately 30 feet apart. In addition, surveys were conducted along three belt transects surrounding the lease area, proposed access road, and the aboveground electric power alignment at approximately 217-foot intervals (217, 433, and 656 feet). These belt transects also covered the temporary staging area. In accordance with BLM direction (LaPre 2014), belt transects did not traverse or extend to the east side of I-15. As a heavily traveled transportation corridor, I-15 likely creates a barrier to desert tortoise movement and tortoises occupying areas east of the highway would not likely be impacted by the Project. Desert tortoise sign (burrows/pallets and carcasses) were classified according to USFWS methods (USFWS 1992).

During 2013 desert tortoise pre-project surveys, one Class 4 burrow (deteriorated condition, possibly desert tortoise) was observed. No individual desert tortoise or other definitive desert tortoise sign was observed in 2013. During desert tortoise pre-project surveys on April 23 and 24, 2014, four adult tortoises; one Class 1 burrow (currently active, with desert tortoise or recent desert tortoise sign); two Class 2 burrows (one a pallet) (good condition, definitely desert tortoise; no evidence or recent use); one Class 4 burrow (likely same burrow as observed in 2013) (deteriorated condition, possibly desert tortoise); one Class 5 burrow (good condition; possibly desert tortoise); and four desert tortoise scat (one Class 1 [wet (not from rain or dew) or freshly dried; obvious odor], one Class 2 [dried with glaze; some odor; dark brown], and two Class 4 [dried; light brown to pale yellow; loose material; scaly]) were observed (Figure 6). None of these observations of desert tortoise individuals and sign were observed within the lease area that would support the communication tower. However, all four desert tortoise adults and four burrows (one definitely desert tortoise, three possible desert tortoise) were observed along the proposed access road. An adult desert tortoise was also incidentally observed near a pallet (later classified as a Class 2 pallet [good condition, definitely tortoise; no evidence or recent use]) during rare plant surveys in April 2014 (Figure 6). No desert tortoise were detected in the western portion of the Project area around the communication lease area potentially because the terrain is steep with large rocks and little suitable foraging or burrowing habitat. No desert tortoise or desert tortoise sign was observed during surveys in spring 2015, which occurred exclusively around the aboveground electric power alignment, which has since been removed from the Project.

6. PROJECT EFFECTS AND POTENTIAL FOR TAKE

14 CCR § 783.2(a)(5): An analysis of whether and to what extent the project or activity for which the permit is sought could result in the taking of species to be covered by the permit.

6.1 POTENTIAL FOR SPECIES TAKE

6.1.1 DESERT TORTOISE

Project activities in areas of suitable habitat could result in disturbance to and/or loss of individual desert tortoises. The Project would result in permanent loss of desert tortoise habitat. Due to the length of time for recovery and restoration of impacts to desert tortoise habitat, all impacts to desert tortoise habitat from the Project are considered permanent.

Direct Impacts to Desert Tortoise

Potential direct impacts to desert tortoise associated with the Project include injury or mortality of individuals, burrows, and removal and disturbance to occupied habitat.

Injury and mortality: Injury or mortality of desert tortoise may result during all phases of the Project. Several adult desert tortoise were found within and adjacent to the proposed limits of the new access road with several burrows nearby; therefore, potential exists for the species to transit the access road during construction and O&M. Collisions with equipment (e.g., bulldozers, graders, and Project vehicles) as well as crushing from debris during access road construction may occur. Grading and blading of the access road may cause rocks to roll downhill, potentially impacting desert tortoise farther downhill. Individuals could also be crushed or entombed in their burrows during these activities. Vehicles travelling within the Project area during construction and operation could also kill or injure desert tortoise individuals. Desert tortoise may take shelter under parked vehicles and heavy equipment and could be crushed when vehicles or heavy equipment are moved. Smaller desert tortoise that are difficult to find are more at risk due to their size and similarity in size and shape to many rocks in the area. Lastly, noise or vibrations created during operation of heavy equipment could result in disruption of desert tortoise behaviors.

Loss of burrows: Disturbance to occupied desert tortoise habitat during construction may also include the destruction of suitable but unoccupied burrows. One definite and three potential desert tortoise burrows were documented along the proposed access road alignment during pre-Project desert tortoise surveys. Loss of suitable burrows in the Project area could result in exposure of individuals to temperature extremes or predation. O&M of the Project would not result in any additional disturbance to suitable desert tortoise habitat; the communication site and access road would be maintained relatively devoid of vegetation, and soil compaction and exclusion fencing (around the communication site only) would preclude burrow construction in these areas.

Habitat loss and modification: Approximately 5.86 acres of occupied desert tortoise habitat would be permanently disturbed during construction of the Project (Table 4). All habitat disturbance is considered permanent given the sensitivity of desert ecosystems to ground-disturbing activities. Disturbance to occupied habitat would primarily include compaction of soils and removal of vegetation that may provide forage and cover for the species.

Following construction, desert tortoise would be excluded from the communication site by permanent desert tortoise exclusion fencing designed per USFWS (2009) guidelines. However, while soils would be compacted and vegetation would be removed, desert tortoise would likely continue to occasionally occupy the access road alignment. Construction and O&M of the communication site and the access road would not appreciably reduce connectivity or movement within the Project. The communication is on a mountain ridge in the Clark Mountains and no desert tortoise individual or sign was found immediately around the communication site, likely due to the nature of the steep topography, lack of vegetation, and large boulders on the slopes leading up to the communication site. There is low potential for desert tortoise to be in this portion of the Project area. If by chance desert tortoise were to traverse this area, given the small size of the fenced communication site, desert tortoise are expected to move around the fenced barrier with minimal impact to energy expenditure.

Table 4. Direct Impacts to Occupied Desert Tortoise Habitat

Project Component[1]	Direct Impacts (Acres)
Communication Site Lease ROW Area	0.39
All-New Access Road	5.46
Staging Area	0.01
TOTAL	5.86

[1] The existing access road and temporary staging area are already disturbed and, therefore, the Project would not result in any new direct effects to desert tortoise habitat in these areas.

Project measures described in Section 9, Conservation Measures and Mitigation, especially pre-construction desert tortoise surveys, and the presence of qualified and authorized biologists would minimize potential direct impacts to desert tortoise as a result of Project activities. While it is anticipated that few desert tortoise would be present at the Project work sites, any desert tortoise found during pre-construction surveys or subsequent biological monitoring would remain in the population by being moved a short distance out of harm's way. Additionally, burrows along the access road would be avoided to the extent feasible through micro-siting. Implementation of the conservation measures and mitigation are anticipated to reduce and fully mitigate the Project's direct impacts to desert tortoise.

Indirect Impacts to Desert Tortoise

Indirect impacts to desert tortoise may occur from increased common raven presence, unauthorized trespass, introduction of invasive nonnative plant species, wildfires, and increased runoff and sedimentation during heavy rain events and flooding. Each of these indirect impacts is addressed in turn below.

Increased Common Raven Presence: The common raven (*Corvus corax*) is known to prey on young desert tortoises. Construction, use, and maintenance of the Project could attract common ravens to the Project area, potentially resulting in increased predation pressure on young desert tortoise. Specifically, potential litter left by workers and roadkill along the all-new access road could provide new foraging opportunities, thereby increasing raven presence in the Project area. Additionally, the communication tower would provide a substrate upon which ravens may nest and perch (especially since there are no nearby alternative nesting structures). Common ravens typically forage within approximately 1,870 feet of nest sites (Boarman and Heinrich 1999). Therefore, nesting ravens on the communication tower could increase predation on young desert tortoises within approximately 1,870 feet or more of the Project. While some ravens may be attracted to the site due to increased food subsidies, this is unlikely due to the low volume of maintenance personnel anticipated to regularly visit the site. Additionally, the Project is not expected to significantly increase the number of ravens in the area since only one communication tower is being constructed and regular maintenance is likely to prevent common ravens from building a nest on the communication tower. If a nest was constructed on the communication tower, it would likely need to be removed to prevent damage and interference with communication devices on the tower. Therefore, the increase in potential predation pressure on young tortoises would likely be negligible compared to existing conditions in the Project.

Unauthorized Trespass: Construction of an all-new access road could attract unauthorized recreational use of the area. Recreational users of the proposed access road alignment may inadvertently kill or injure individuals, collect individuals found along the alignment, or further affect desert tortoise habitat by driving off-road. To prevent unauthorized use of the new access road, the road would be gated in such a way to prevent unauthorized trespass.

Introduction of Invasive Nonnative Plant Species: Seeds of invasive nonnative plant species may be introduced to the Project via workers or equipment during construction, use, and maintenance of the Project. Ground disturbance could further facilitate the establishment of such species in the Project area. If introduced, these species may outcompete native plants, thereby potentially reducing habitat quality, diminishing valuable forage, and impeding movement of desert tortoise.

Wildfires: Wildfires caused by construction, use, and maintenance of access roads are rare (particularly in desert environments where fuel loads are low) but could occur. Wildfire triggered by the Project could result in desert tortoise injury or mortality and could reduce habitat quality in the Project area and vicinity. Wildfire could also facilitate the introduction and spread of invasive nonnative plant species, which could diminish habitat quality for the desert tortoise.

Increased Erosion, Runoff, and Sedimentation: Access roads change natural stormwater drainage patterns by increasing flow, speed, and volume of runoff in an area. Thus, the Project could increase erosion, runoff, and sedimentation in the Project, particularly during heavy rain events and flooding. Increased erosion, runoff, and sedimentation within the Project could destroy burrows and reduce overall habitat quality.

Implementation of the conservation measures and mitigation outlined in Section 9 would reduce and fully mitigate the Project's indirect impacts to desert tortoise.

6.2 EFFECT ON POPULATION VIABILITY OF COVERED SPECIES

It is anticipated that the Project will have no adverse impact on the overall or local population viability of desert tortoise. The Project is located close to I-15 on a ridge that overlooks the freeway and is connected to high-quality desert tortoise habitat. The Project would impact a small percentage of the overall available desert tortoise habitat in the area and, once constructed, the access road would only be used infrequently by a low number of maintenance personnel. The access road would be constructed in a way to allow desert tortoise to cross the road without impeding their movements. Therefore, the access road is not anticipated to create a barrier to movement or disrupt gene flow within the local desert tortoise population. Additionally, the access road would be gated at the lower portion of the road close to the freeway to prevent unauthorized access to this previously undisturbed area. Therefore, while there would be disturbance to desert tortoise during construction, once the access road has been established and the gate is in place, long-term disturbance would be relatively low. All Project personnel would have Worker Environmental Awareness Program (WEAP) training, which would highlight measures in place to reduce impacts to desert tortoise. Therefore, the Project is anticipated to have a low to negligible impact on the population viability of desert tortoise in the region.

7. IMPACTS OF PROPOSED TAKE

14 CCR § 783.2(a)(6): An analysis of the impacts of the proposed taking on the species.

The Project would not result in any impacts to desert tortoise critical habitat through the direct removal of approximately 5.86 acres of occupied habitat. However, there is the potential for take of individuals during construction of the new access road, O&M, and decommissioning due to vehicle strikes, or inadvertent killing or trapping from use of equipment. There are no temporary impact areas that are considered suitable or potential desert tortoise habitat. The temporary staging area at the Nipton Road exit is considered currently disturbed and is not suitable desert tortoise habitat. Potential adverse impacts could also result from construction-related impacts associated with transient increases in noise, fugitive dust, or the attraction of predators; however, measures described in Section 9 would minimize the potential for take.

7.1 DESERT TORTOISE

During historical surveys in spring 2015, four adult desert tortoise were found directly within or adjacent to the proposed access road route along with several nearby burrows (Figure 6). An additional desert tortoise was found near the 656-foot buffer transect. Therefore, the area is occupied by desert tortoise and there are likely more desert tortoise in the immediate area that were not detected due to their smaller size.

Any desert tortoise found on the site during Project construction would remain in the population by being moved a short distance (within their home range) out of harm’s way by an authorized biologist. During O&M, any desert tortoise observed on the access road by maintenance personnel would be permitted to move out of harm’s way on their own accord or moved out of harm’s way by an authorized biologist if they do not move on their own. Implementation of measures described in Section 9 would avoid and minimize potential for direct take of desert tortoise during implementation of the Project (including potential for vehicle strikes). Thus, the potential level of take is anticipated to be small. Although the Project will impact desert tortoise habitat, the potential level of direct take resulting from this impact is anticipated to be small and unlikely to have an overall, long-term adverse impact on desert tortoise within the Project vicinity or on the species as a whole.

8. POTENTIAL TO JEOPARDIZE CONTINUED EXISTENCE

14 CCR § 783.2(a)(7): An analysis of whether issuance of the incidental take permit would jeopardize the continued existence of a species. This analysis shall include consideration of the species' capability to survive and reproduce, and any adverse impacts of the taking on those abilities in light of (A) known population trends; (B) known threats to the species; and (C) reasonably foreseeable impacts on the species from other related projects and activities.

As discussed above, measures would reduce potential for take of desert tortoise. Therefore, very few individuals, if any, are likely to be taken, and take of these individuals would not have an overall impact on the species as a whole. Minimal amount of take could result from direct vehicle strikes and permanent impacts to approximately 5.86 acres of desert tortoise habitat. Implementation of Project conservation measures and mitigation of the permanent loss of desert tortoise habitat strongly supports the conclusion that the authorization of take for the Project would neither jeopardize the continued existence of the desert tortoise nor cause significant impacts to the local population. Thus, the level of potential take associated with issuance of an incidental take permit for the Project would not jeopardize the continued existence of desert tortoise. Measures for direct effects to suitable desert tortoise habitat and individual desert tortoises would also serve to avoid and minimize the cumulative effects to the species.

9. CONSERVATION MEASURES AND MITIGATION

14 CCR § 783.2(a)(8): Proposed measures to minimize and fully mitigate the impacts of the proposed taking.

The general measures and species-specific measures described below would be implemented to avoid, minimize, and fully mitigate impacts that could result from implementation of the Project.

9.1 AVOIDANCE AND MINIMIZATION MEASURES

This subsection describes the measures that will be implemented to avoid, minimize, and mitigate the potential impacts on desert tortoise. Measures provided in this section are categorized by general and desert tortoise-specific measures. General measures outlined herein are considered beneficial to all biological resources, including desert tortoise. Desert tortoise-specific measures identified below are consistent with and build upon the measures identified by USFWS in the "Biological Opinion for Activities in the California Desert Conservation Area" (USFWS 2017) issued to BLM on September 1, 2017, as a programmatic consultation, which has been applied to satisfy Endangered Species Act Section 7 consultation requirements for this Project.

Measures provided below may be applicable to all phases of the Project, but most specifically to the construction and O&M phases. A full list of all measures that will be implemented above and beyond general and desert tortoise-specific measures is provided in the Project EA (AECOM 2018).

9.1.1 GENERAL MEASURES

1. Areas of allowed surface disturbance during construction and O&M shall be delineated and marked with centerline brush pins every 100 to 300 feet. All surface disturbances during construction and O&M shall be limited to the minimum area possible and any disturbance outside of that area shall be restricted. This restriction shall apply to the communication site and road alignment, as well as temporary staging and parking areas.
2. Vehicle speeds will be limited to 15 miles per hour on access roads during construction and O&M. Small signs posting this speed limit will be placed at intervals along the access road.
3. A number of invasive plant species are known to occur in the region, and control measures will be implemented during construction and O&M to limit the further spread of these species. Specific requirements will be further detailed in BLM's final conditions of approval, but will likely include the following best management practices (BMPs):
    a. A monitoring and treatment plan will be developed for specific species, as appropriate.
    b. Weed-free gravel, base materials, and other imported earthen products will be procured and washed prior to transport to the Project area.
    c. A vehicle and equipment wash station will be located at an off-site area to minimize the inadvertent transport of noxious weed seeds into undisturbed areas. Mud and other material on

equipment that could contain noxious weed seeds will be removed at a location where the act of washing the equipment will not introduce noxious weeds into unaffected areas.

  d. Soil disturbance will be minimized to include only those areas specifically required for construction and O&M of the Project.

4. Water quality control measures will be implemented to minimize sediment transport from the Project and to minimize risks associated with contaminants and other impacts to water quality and soils. Specific requirements will be further detailed in BLM's final conditions of approval, but will likely include the following BMPs:

   a. Where erosion and sediment could occur, within disturbed areas, soil loss will be controlled through BMPs such as erosion-control blankets/mats, gravel bags, silt fencing, stabilized construction entrances, and scheduling management. Construction equipment staging and access, and disposal or temporary placement of excess fill within drainages will be prohibited.

   b. Slopes where erosion may occur will be protected with straw wattles or blankets. All straw wattles, straw bales, or hay bales will be certified weed-free.

   c. Whenever possible, grading will be phased to limit soil exposure. Vegetation removed will be used as vertical mulch on adjacent bladed areas.

   d. BMPs will be regularly inspected and repaired. Damaged or worn silt fences, straw wattles, gravel bags, and other BMPs will be replaced prior to rain events.

   e. Equipment will be inspected daily to ensure proper functioning condition and to minimize the potential for fluid leaks. Fluids will be stored in appropriate containers on pallets, inside rubber berms, indoors, or under a cover, as will other materials that could impact stormwater runoff. Equipment maintenance activities will be prohibited within the Project area.

   f. A hazardous fluid spill prevention plan will be implemented during construction and O&M, and will require that equipment operators and other personnel be informed of specific measures to be implemented in the event of a detected fluid leak, including the use of spill containment material, which will be carried with the equipment or vehicle.

   g. Approved portable toilets will be utilized during construction activity and will be regularly maintained in a sanitary condition.

5. Workers will be prohibited from bringing firearms and pets (e.g., dogs) to the Project area.

6. All drill holes and other voids in the earth that could entrap wildlife shall be backfilled as soon as practicable or covered if left overnight. During drilling for geotechnical analysis, all drill holes shall be filled immediately following the drilling and analysis processes, and prior to moving to the next boring location.

7. Any earthen berms created during road building or other activities shall be rounded off to avoid inhibiting travel by desert tortoise and other wildlife.

9.1.2 Desert Tortoise Measures

The following measures will be implemented specific to the desert tortoise.

1. The Applicant shall make a contribution to the regional raven management program at a rate of $105 per acre of new disturbance for the life of the 30-year project (i.e., term of the ROW grant).

2. The Applicant shall designate a Field Contact Representative (FCR) who shall be responsible for overseeing compliance with protective stipulations for the desert tortoise and for coordination on compliance with BLM. The FCR shall be on-site during all ground-disturbing construction and O&M activities and shall have the authority to halt all activities that are in violation of protective measures. The FCR shall have a copy of all measures when ground-disturbing construction or O&M activities are being conducted in the Project area. The FCR may be a crew chief or field supervisor, a project manager, any other employee of the Applicant, or a contracted biologist.

3. The Applicant shall designate "qualified biologists" and "authorized biologists" to oversee and implement desert tortoise-specific measures. A "qualified biologist" is defined as a trained wildlife biologist who is knowledgeable about the biology of desert tortoise, their habitat requirements, identification of their sign, and mitigation techniques and survey procedures for the species. An "authorized biologist" is defined as a wildlife biologist who has been authorized by USFWS to handle desert tortoise. The authorized biologist shall be responsible for ensuring that qualified biologists are sufficiently trained to successfully perform any task that he or she is assigned. The Applicant shall submit the name(s) of all proposed authorized biologist and qualified biologist(s) to BLM, CDFW, and USFWS (proposed authorized biologists only) for review and approval at least 30 days prior to the onset of ground-disturbing construction activities.

4. All construction and O&M personnel shall participate in WEAP training prior to working on-site. The Applicant shall be responsible for ensuring that the education program is developed and presented to the appropriate personnel. More than one training session may be required to ensure new employees receive formal training. The WEAP shall be received, reviewed, and approved by BLM at least 15 days prior to the presentation of the program. The WEAP shall consist of a class presented by a qualified biologist or a videotaped presentation. The WEAP shall:

    a. Place special emphasis on the natural history of the desert tortoise, including information on physical characteristics, photographs, distribution, behavior, ecology, and sensitivity to human activities;
    b. Describe construction activities that may affect the desert tortoise, the required protective measures for the Project, legal protections and penalties, and reporting requirements;
    c. Be developed by or in consultation with the authorized biologist(s) and consist of a presentation in which supporting written material and electronic media, including photographs of protected species, are made available to all participants;
    d. Provide an explanation of the purpose and function of the desert tortoise avoidance and minimization measures and the possible penalties for not adhering to them;

e. Inform workers that the authorized biologist(s) has the authority to halt work in any area where an unauthorized adverse impact to biological resources may occur if the activities continued;
f. Discuss general safety protocols such as hazardous substance spill prevention and containment measures and fire prevention and protection measures;
g. Provide an explanation of the sensitivity and locations of the vegetation, biological resources, and habitat within and adjacent to work areas, and proper identification of these resources;
h. Provide contact information for the authorized biologists to handle late comments and questions about the material discussed in the program, as well as notification of any dead or injured wildlife species encountered during Project-related activities;
i. Direct all workers to report all observations of listed species and their sign to an authorized biologist for inclusion in the yearly compliance report;
j. Include a training acknowledgment form to be signed by each worker indicating that they received training and shall abide by the guidelines; and
k. Provide information regarding the effects of predation on the desert tortoise by common ravens and other predators (such as coyotes [*Canis latrans*]) and describe preventative measures that reduce the likelihood that predators will be attracted to the Project area.

5. Prior to construction of the all-new access road, qualified and/or authorized biologist(s) will participate in micro-siting of the access route and will flag the proposed route to avoid desert tortoise burrows and to minimize disturbance of vegetation. The Applicant will prohibit Project personnel from driving off-road or performing ground-disturbing activities outside of designated areas unless specifically approved to do so by an authorized biologist.

6. Prior to construction of the communication tower, the entire lease area and the temporary staging area will be fenced with desert tortoise-proof fencing with effective desert tortoise-proof gates. The fence will be constructed under the direction of an authorized or qualified biologist. To the extent possible, the fence will be placed so that any desert tortoise burrows are on the outside of the fenced area. Fence construction will follow current fence specifications established by USFWS (2009). Where burial of the fence is not possible, the lower 12 inches will be folded outward against the ground and fastened to the ground to prevent desert tortoise from entering the lease area and temporary staging area. Gate(s) will be desert tortoise-proof and will remain closed except for the immediate passage of vehicles. Shade structures at regular intervals along fencing will be provided for desert tortoise if fence-pacing behavior is observed. The fence will be checked periodically during construction, and repairs will be made when necessary to ensure its integrity. Following construction, the fencing surrounding the temporary staging area will be removed and permanent desert tortoise fencing will remain in place adjacent to the chain-link fence around the lease area. Permanent desert tortoise fencing on the chain-link fence will be checked periodically during O&M, and repairs will be made when necessary to ensure its integrity.

7. After the fence installation around the lease area and the temporary staging area and prior to the start of construction, the authorized biologist(s) shall conduct a thorough survey for desert tortoise within the fenced areas and shall relocate any desert tortoise that are found in accordance with *Desert Tortoise Field Manual* (USFWS 2009). Relocation shall occur at the discretion of the authorized biologist, but tortoise shall not be moved outside their home range (i.e., more than 1,000 feet).

8. Desert tortoise exclusionary fencing shall not be installed along access road segments. Prior to initial grubbing and grading of the all-new access road, a pre-construction clearance survey shall be conducted to locate and remove desert tortoise found in harm's way. The survey shall be conducted by qualified and authorized biologists within 24 hours of the onset of initial grubbing and grading. Pre-construction clearance surveys shall be conducted in accordance with USFWS (2009) guidelines. Burrows that cannot be avoided shall be excavated during the clearance survey. Relocation shall occur at the discretion of the authorized biologist(s), but tortoises shall not be moved outside their home range (i.e., more than 1,000 feet). The authorized biologist or a qualified biologist shall be on-site to monitor all construction activities along the all-new access road.

9. An appropriate number of authorized biologists or qualified biologists shall be on-site to monitor all ground-disturbing construction and O&M activities. Biological monitoring activities will be conducted by either qualified or approved biologists. If a desert tortoise is observed, and may be adversely affected by activities, ground-disturbing activities shall be stopped until the biologist has verified that the individual has moved from harm's way under its own power. The determination of which activities may adversely affect the desert tortoise shall be made in the field by the authorized biologist. The authorized biologist or qualified biologist shall monitor the desert tortoise until it is confirmed to be out of harm's way. If the authorized biologist determines that the desert tortoise will not passively relocate (i.e., move from harm's way under its own power within a reasonable period of time), the authorized biologist may actively relocate the individual out of harm's way.

   Potential handling of desert tortoise for active relocation shall not occur until an authorized biologist is approved by BLM, CDFW, and USFWS. Active relocation of desert tortoise from harm's way shall be conducted in accordance with *Desert Tortoise Field Manual* (USFWS 2009). The authorized biologist shall be allowed some judgment and discretion to ensure that the survival of the desert tortoise is likely.

   Desert tortoise individuals actively moved from harm's way shall be marked for future identification in the event that a dead desert tortoise is found later within the Project area. An identification number using the acrylic paint/epoxy covering technique shall be placed on the fourth left costal scute. In handling desert tortoise, the authorized biologist shall follow the techniques for handling desert tortoise in *Guidelines for Handling Desert Tortoises during Construction Projects* (Desert Tortoise Council 1994, revised 1999). If a tortoise voids its bladder during handling, the authorized biologist shall rehydrate the individual by soaking it in tepid water in accordance with *Desert Tortoise Field Manual* (USFWS 2009).

   The authorized biologist shall maintain a record of all desert tortoise handled. This information shall include the following for each desert tortoise:

   a. the locations (narrative and maps) and dates of observations;
   b. general condition and health, including injuries and state of healing and whether the animals voided their bladders;
   c. the location from which the animal was collected and the location in which it was released;
   d. diagnostic markings (i.e., identification numbers or marked lateral scutes); and

   e. photographs of each handled desert tortoise as described above.

10. Prior to, and during all construction and O&M activities, all equipment storage and parking shall be confined to the maximum extent possible to previously disturbed areas that have been fenced and cleared of desert tortoise.

    No heavy equipment shall be moved into the fenced area until the area is clear of desert tortoise. A qualified or authorized biologist shall walk in front of equipment during the initial site entry to ensure that no desert tortoise or their burrows are harmed.

    Workers shall inspect for desert tortoise under all vehicles and equipment prior to movement. If personnel encounter a desert tortoise, they shall contact an authorized biologist. The desert tortoise shall be allowed to move a safe distance away prior to moving the vehicle/equipment, or the authorized biologist may move the desert tortoise to a safe location to allow for movement of the vehicle/equipment. If the tortoise must be moved, the authorized biologist shall ensure that the desert tortoise is relocated in accordance with *Desert Tortoise Field Manual* (USFWS 2009). All observations of desert tortoise and their sign shall be reported to the authorized biologist as soon as possible.

11. The Applicant shall contain in secure, self-closing receptacles all trash associated with the Project that could provide subsidies to predators. The Applicant shall also remove and dispose of all road-killed animals on the Project to prevent the introduction of subsidized food resources for common ravens and coyotes.

12. For site water needs, the Applicant shall use closed tanks for water storage to eliminate open water sources and shall apply any water used for dust suppression in a manner that does not result in puddling.

13. No later than 90 days after completion of construction or termination of construction activities, the FCR and authorized biologist shall prepare a report for BLM, CDFW, and USFWS documenting the effectiveness and practicality of the avoidance and minimization measures, the number of desert tortoise excavated from burrows, the number of desert tortoise moved, the number of desert tortoise killed or injured, and the specific information for each desert tortoise as described previously. The report shall address compliance with all avoidance and minimization measures. The report may make recommendations for modifying the measures to enhance protection of the desert tortoise or to make it more workable during O&M activities. The report shall provide an estimate of the actual acreage disturbed by construction.

14. Upon locating a dead or injured desert tortoise during construction or O&M, the Applicant shall immediately notify CDFW and BLM. BLM shall then notify USFWS's Palm Springs Fish and Wildlife Office by telephone within 3 days of the finding. Written notification shall be made within 5 days of the finding, to the CDFW Inland Deserts Region (Region 6) office, Palm Springs Fish and Wildlife Office, and USFWS's Division of Law Enforcement in Torrance. The information provided shall include the date and time of the finding or incident (if known), location of the carcass or injured animal, a photograph, cause of death (if known), and other pertinent information.

An injured animal shall be transported to a qualified veterinarian for treatment at the expense of the Applicant. If an injured animal recovers, the Palm Springs Fish and Wildlife Office shall be contacted for final disposition of the animal.

BLM shall endeavor to place the remains of intact desert tortoise carcasses with educational or research institutions holding the appropriate state and federal permits according to their instructions. If such institutions are not available or the animal's remains are in poor condition, the information noted above shall be obtained and the carcass left in place. If left in place and sufficient pieces are available, the carcass shall be marked to ensure that it is not reported again. Arrangements for disposition to a museum shall be made prior to removing the carcass from the field.

15. As agreed upon by BLM, the Applicant shall mitigate for disturbance to desert tortoise habitat resulting from construction of the Project through passive restoration at a 3:1 rate (i.e., 3 acres of passive restoration for each acre disturbed). Final mitigation acreage shall be based on the impact totals of as-built conditions. A land disturbance survey shall be conducted within 90 days following construction completion. To compensate for desert tortoise habitat loss, the Applicant proposes to mitigate through restoration of these undesignated OHV routes (i.e., unauthorized disturbance areas). The Applicant shall work closely with BLM in selecting lands most beneficial to the conservation and recovery efforts. Potential mitigation areas are shown in Figure 5 and restoration techniques can be found in Appendix B.

16. The Applicant proposes to mitigate for the 5.86 acres of ground disturbance by purchasing 5.86 acres of compensation lands suitable for the desert tortoise (i.e., a 1:1 ratio). The 5.86 acres of compensation lands is expected to be in the form of a purchase of habitat credits from a mitigation bank approved by CDFW. The acquisition of the compensation acreage, along with implementation of the general and desert tortoise-specific impact avoidance and minimization measures outlined herein, would fully mitigate for any Project impacts to the species. The Applicant is in discussions with the Black Mountain Conservation Bank to determine availability of compensation acreage, and determine associated costs of acquisition and management.

10. MONITORING AND MANAGEMENT

14 CCR § 783.2(a)(9): A proposed plan to monitor compliance with the minimization and mitigation measures and the effectiveness of the measures.

Several plans are proposed as detailed in the Project EA (AECOM 2018). These include:

1. A monitoring and treatment plan to be developed for specific invasive plant species, as appropriate.
2. A hazardous fluid spill prevention plan to be implemented during construction. This plan will require that equipment operators and other personnel be informed of specific measures to be implemented in the event of a detected fluid leak, including the use of spill containment material, which will be carried with the equipment or vehicle.
3. A decommissioning plan will be prepared and provide detail for the following procedures:
    - All structures, tower, fencing, buildings, solar arrays, and other structures will be deconstructed and removed from the communication site;
    - Any cement foundations will be covered over with local soils from within the compound;
    - Any access gates for the Project will be removed; and
    - Revegetation will be allowed to occur naturally to blend with the surrounding area.

Additionally, no later than 90 days after completion of construction or termination of construction activities, the FCR and authorized biologist shall prepare a report for BLM, CDFW, and USFWS documenting the effectiveness and practicality of the avoidance and minimization measures, the number of desert tortoise excavated from burrows, the number of desert tortoise moved, the number of desert tortoise killed or injured, and the specific information for each desert tortoise as described previously. The report shall address compliance with all avoidance and minimization measures. The report may make recommendations for modifying the measures to enhance protection of the desert tortoise or to make it more workable during O&M activities. The report shall provide an estimate of the actual acreage disturbed by construction.

Finally, the FCR shall be responsible to submit annual compliance reports to BLM, CDFW, and USFWS. These annual compliance reports shall include all observations of listed species and their sign that are detected by personnel in the field and the authorized and qualified biologist(s) and well as any additional permit stipulations.

11. FUNDING

14 CCR § 783.2(a)(10): A description of the funding source and the level of funding available for implementation of the minimization and mitigation measures.

11.1 LONG-TERM FUNDING

The Applicant will provide financial assurances to guarantee that an adequate level of funding is available to implement all conservation measures and mitigation identified in the CESA Section 2081 permit. These funds will be used solely for implementation of the measures associated with the Project. It is the intent of the Applicant to purchase Compensation Lands at a CDFW-approved mitigation bank as compensation for all associated biological impacts from the Project. The Compensation Lands, in conjunction with the implementation of the Project's impact avoidance and minimization measures described herein, would serve to fully mitigate incidental take of covered species. The Applicant also intends that the Compensation Lands would be managed in perpetuity by a third party. The Compensation Lands would be purchased by the Applicant prior to any ground-disturbing Project activities, unless financial assurance is provided to CDFW in the form of an irrevocable letter of credit, a pledged savings account, or another form of security ("Security") approved by the Department Office of the General Counsel to ensure funding in the amount of $76,180.00.

The amount of the Security is calculated as follows:

1. Costs of establishing an endowment for long-term management of Compensation Lands is calculated at $13,000 per 1 acre (based on preliminary discussion with Wildlands for acquisition of habitat credits at the Black Mountain Conservation Bank) for 5.86 acres: $76,180.

If Security is provided, InterConnect Towers, LLC, CDFW, or a third-party entity approved by CDFW shall complete the proposed Compensation Lands acquisition within 18 months after the start of Project ground-disturbing activities. A minimum of 1 month prior to Project ground-disturbing activities, InterConnect Towers, LLC or a third-party entity approved by CDFW will submit to CDFW for approval a formal proposal identifying the specific properties comprising the acres that will be conserved. CDFW will approve all of the mitigation bank parcels comprising the Compensation Lands. Compensation Lands are expected to promote conservation of desert tortoise and will be subject to the conditions listed in the section below. In the event that the Compensation Lands within the proposed mitigation bank are not approved for mitigation, InterConnect Towers, LLC will identify and propose an alternative mitigation site for approval by CDFW.

11.2 ADDITIONAL FUNDING AND AGREEMENTS

In conjunction with the funding obligations related to the Compensation Lands actions and following CDFW's field review and approval of the proposed Compensation Lands, InterConnect Towers, LLC, CDFW, or a third-party entity approved by CDFW will comply with the following conditions:

a. <u>Preliminary Report:</u> Provide a recent preliminary title report, initial hazardous materials survey report, biological analysis, and other necessary documents for the proposed Compensation Lands (and/or conservation easement). All documents conveying or conserving Compensation Lands and all conditions of title/easement are subject to the approval of CDFW, the California Department of General Services, and, if applicable, the Fish and Game Commission.

b. Title/Conveyance: Transfer fee title of the Compensation Lands to CDFW or an organization approved by CDFW under terms approved by CDFW for in-perpetuity management of the lands. Convey a conservation easement on the 5.86 acres of Compensation Lands to CDFW or an organization approved by CDFW under terms approved by CDFW and InterConnect Towers, LLC.

c. Enhancement Fund (as necessary): Fund the initial protection and enhancement of the Compensation Lands by providing to CDFW, or a third-party entity approved by CDFW, an appropriate amount as determined by CDFW and InterConnect Towers, LLC for field review of the land, as discussed above.

d. Endowment Fund: Prior to ground-disturbing Project activities, provide to CDFW or a third-party entity approved by CDFW a permanent capital endowment in the amount determined through the Property Analysis Record (PAR) or PAR-like analysis that will be conducted for the Compensation Lands. Interest from this amount will be available for reinvestment into the principal and for the long-term operation, management, and protection of the Compensation Lands, including reasonable administrative overhead, biological monitoring, improvements to carrying capacity, law enforcement measures, and any other action designed to protect or improve the habitat values of the Compensation Lands. The endowment principal will not be drawn upon unless such withdrawal is deemed necessary by CDFW or a third-party entity approved by CDFW to ensure the continued viability of the species on the Compensation Lands. Monies received by CDFW pursuant to this provision will be deposited in a special deposit account established pursuant to Government Code §16370. CDFW may pool the endowment with other endowments for the operation, management, and protection of the Compensation Lands for local populations of the covered species.

e. Security Deposit: InterConnect Towers, LLC may proceed with ground-disturbing Project activities before fully performing its duties and obligations as set forth above only if InterConnect Towers, LLC secures its performance by providing to CDFW funding or, if CDFW approves, administrative proof of funding, necessary to cover easement costs, fencing/cleanup costs, and, as necessary, initial protection and enhancement of the Compensation Lands. If the Security is provided to allow the commencement of Project disturbance prior to completion of compensation actions, InterConnect Towers, LLC, CDFW, or a third-party entity approved by CDFW must complete the required actions no later than 18 months after the start of the ground-disturbing activities. The Security will provide that CDFW or a third-party entity approved by CDFW may draw on the principal sum if it is determined that InterConnect Towers, LLC has failed to comply with the Conditions of Approval of the CESA Section 2081 permit. The Security will be returned to InterConnect Towers, LLC upon completion of the legal transfer of the Compensation Lands to CDFW or approved third-party entity, or upon completion of an implementation agreement with a third-party mitigation banking entity acceptable to CDFW, to acquire and/or manage the Compensation Lands.

f. Reimbursement Fund: Provide reimbursement to CDFW for reasonable expenses incurred during title, easement, and documentation review; expenses incurred from other state agency reviews; and overhead related to providing Compensation Lands to CDFW.

If all actions for Compensation Lands described above are not completed within 18 months of initial ground-disturbing activity, InterConnect Towers, LLC shall consult with CDFW to develop alternate compensation land proposals subject to the above requirements.

InterConnect Towers, LLC is responsible for all Compensation Lands acquisition/easement costs, including title and document review costs and expenses incurred from other state agency reviews and overhead related to providing Compensation Lands to CDFW, escrow fees or costs, toxic waste clearance, and other site cleanup measures.

12. CERTIFICATION

14 CCR § 783.2(a)(11): Certification

I certify that the information submitted in this application is complete and accurate to the best of my knowledge and belief. I understand that any false statement herein may subject me to suspension or revocation of this permit and to civil and criminal penalties under the laws of the State of California.

Tom Gammon

Tom Gammon, CEO

REFERENCES

AECOM. 2013. InterConnect Nipton Communications Site Jurisdictional Delineation Letter Report.

AECOM. 2015a. Nipton Communication Site – 2013 - 2015 Pre-Project Botanical Survey Results Report, San Bernardino County, California. September.

AECOM. 2015b. Nipton Communication Site – 2013-2015 Desert Tortoise Pre-Project Survey Report, San Bernardino County, California. September.

AECOM. 2018. Environmental Assessment: Nipton Communication Site. BLM Case File Number CACA-53817. July.

AECOM. 2019. Jurisdictional Delineation of Arid Streams for the Proposed Nipton Communication Site, San Bernardino County, CA. March.

Boarman, W. I., and B. Heinrich. 1999. Common raven. In A. Poole and F. Gill, editors. The Birds of North America, Number 476.

California Department of Transportation (Caltrans). 2012. Traffic Volumes on California State Highways. Available at 35TUhttp://traffic-counts.dot.ca.gov/docs/2012_aadt_volumes.pdfU35T. Accessed August 6, 2014.

California Fish and Game Commission (CFGC). 1989. Animals of California Declared to Be Endangered or Threatened. 14 CCR § 670.5, Barclays Official California Code of Regulations Title 14. Natural Resources, Division 1, Fish and Game Commission-Department of Fish and Game, Subdivision 3. General Regulations, Chapter 3, Miscellaneous.

Holland, R. 1986. Preliminary Descriptions of the Terrestrial Natural Communities of California. Nongame Heritage Program, State of California Department of Fish and Game.

LaPre, Larry. 2014. Bureau of Land Management, California Desert District. Email communication. March 4, 2014.

National Oceanic and Atmospheric Administration (NOAA). 2013. National Weather Service Climate Office for Barstow, California. Available at http://forecast.weather.gov/MapClick.php?CityName=Barstow&stateCA&site=VEF&textField1=34.8986&textField2=-117.022. Accessed May.

The Desert Tortoise Council. 1994. Guidelines for Handling Desert Tortoises during Construction Projects. Prepared for U.S. Fish and Wildlife Service, U.S. Bureau of Land Management, California Department of Fish and Game, Nevada Department of Wildlife, Arizona Game and Fish Department, and Utah Division of Wildlife Resources. Revised July 1999.

U.S Department of Agriculture, Natural Resources Conservation Service (USDA-NRCS). 2019. Web Soil Survey. Available at http://websoilsurvey.nrcs.usda.gov/; http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm.

U.S. Fish and Wildlife Service (USFWS). 1989. Endangered and Threatened Wildlife and Plants; Emergency Determination of Endangered Status for the Mojave Population of the Desert Tortoise. Federal Register 54(149):32326-32331.

U.S. Fish and Wildlife Service (USFWS). 1990. Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for the Mojave Population of the Desert Tortoise. Federal Register 55(63):12178-12191.

U.S. Fish and Wildlife Service (USFWS). 1992. Field Survey Protocol for Any Non-Federal Action That May Occur within the Range of the Desert Tortoise.

U.S. Fish and Wildlife Service (USFWS). 1994a. Endangered and Threatened Wildlife and Plants; Determination of Critical Habitat for the Mojave Population of the Desert Tortoise. Federal Register 59(26):5820-5866.

U.S. Fish and Wildlife Service (USFWS). 1994b. The Desert Tortoise (Mojave Population) Recovery Plan. U.S. Fish and Wildlife Service, Region 1 – Lead Region, Portland, Oregon. 73 pp. + appendices.

U.S. Fish and Wildlife Service. 2009. Desert Tortoise Field Manual. Available at http://www.fws.gov/ventura/speciesinfo/protocols_guidelines/.

U.S. Fish and Wildlife Service (USFWS). 2010. Preparing for Any Action That May Occur within the Range of the Mojave Desert Tortoise (Gopherus agassizii). 2010 Field Season**.**

U.S. Fish and Wildlife Service (USFWS). 2011. Revised Recovery Plan for the Mojave Population of the Desert Tortoise (Gopherus agassizii). U.S. Fish and Wildlife Service, Sacramento, California. 227 pp.

U.S. Geological Survey (USGS). 2013. Climate History of the Mojave Desert Region. Available at http://mojave.usgs.gov/climate-history/. Accessed May.

U.S. Fish and Wildlife Service (USFWS). 2017. Biological Opinion for Activities in the California Desert Conservation Area. Carlsbad Fish and Wildlife Office, Carlsbad, California.

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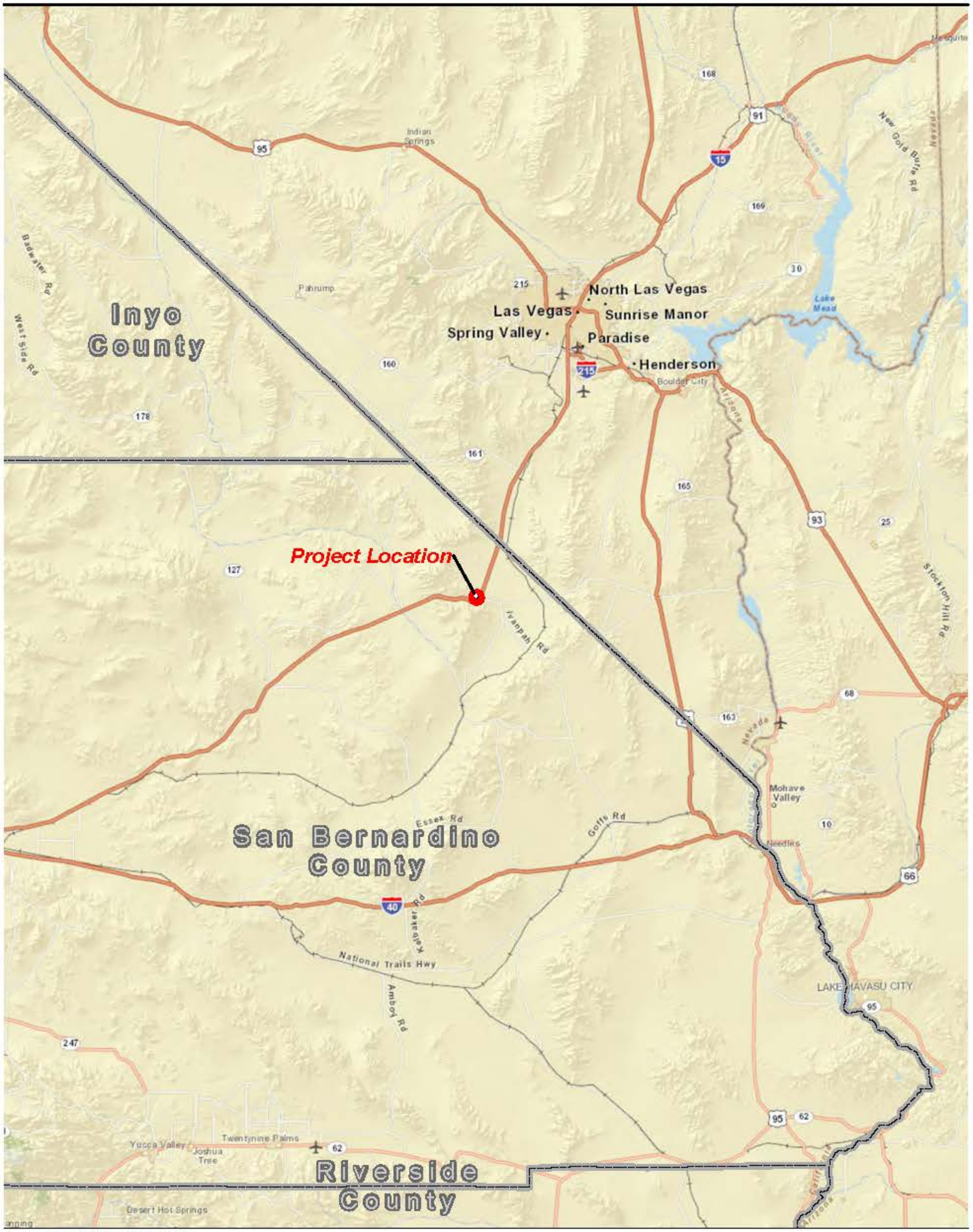
APPENDIX A

FIGURES

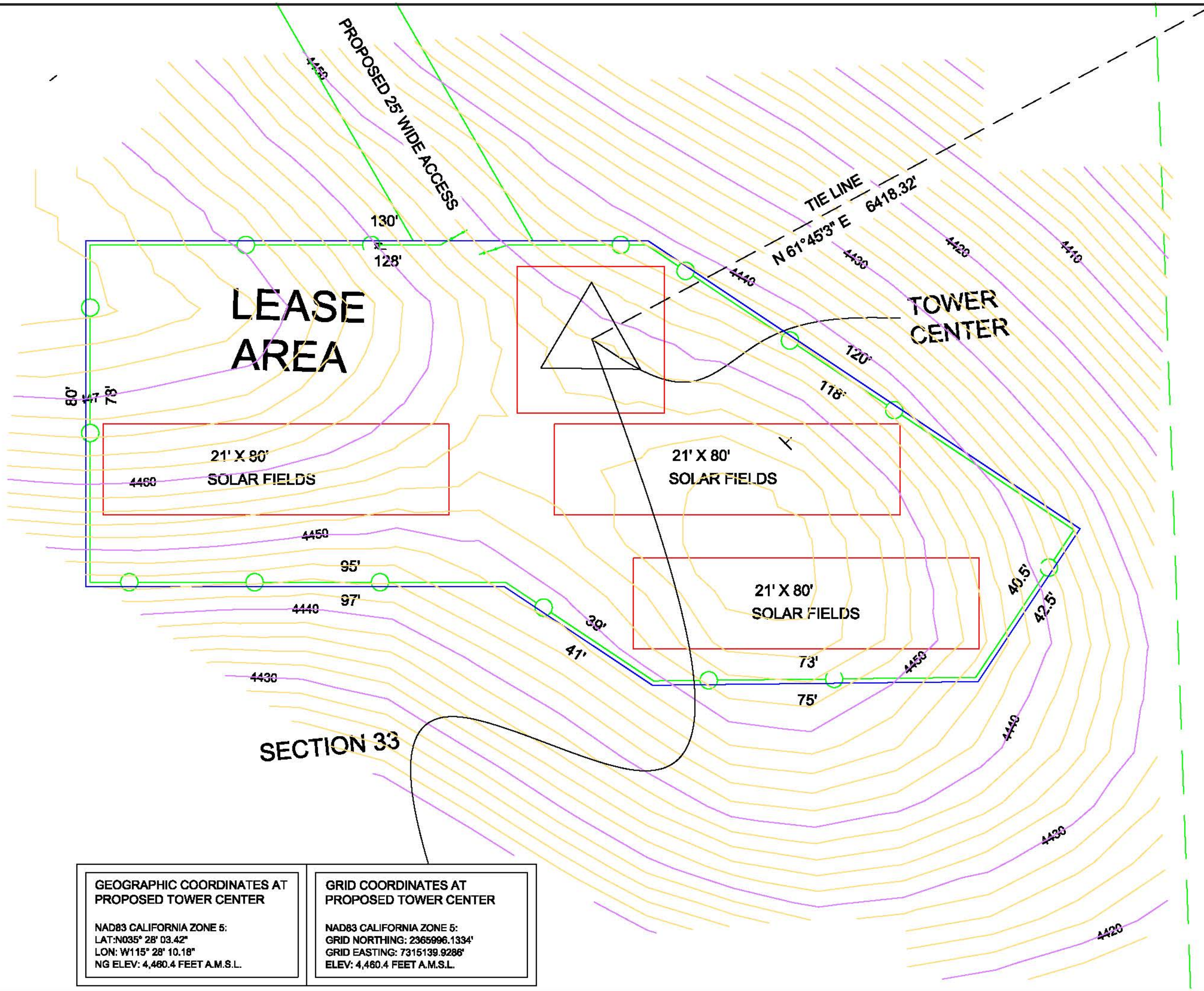


Source: ESRI 2012; SANGIS 2012

25 12.5 0 25 Miles

Scale: 1:1,584,000; 1 inch = 25 miles

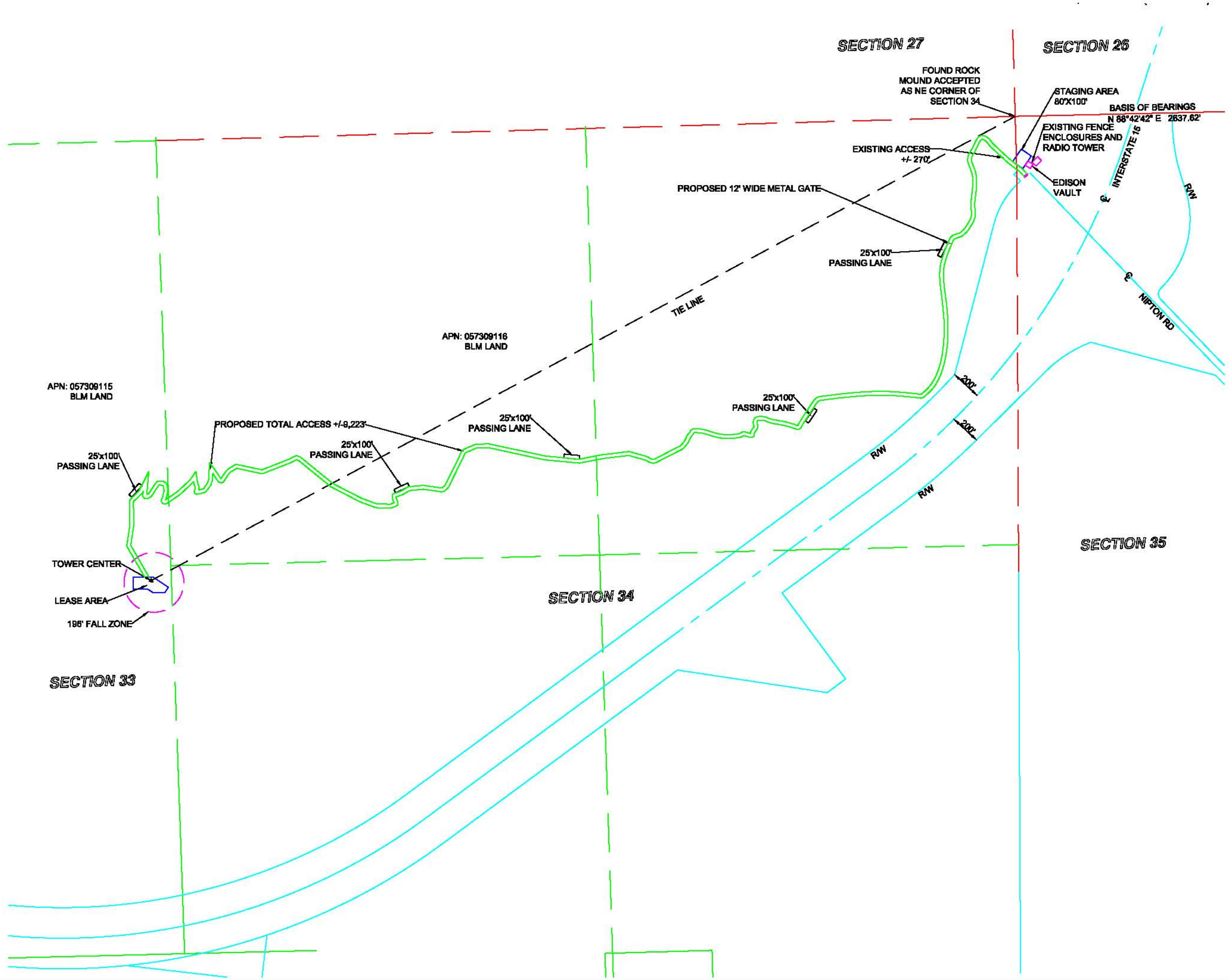
Figure 1
Regional Map



Source: LEJA Surveying Corps

Figure 2

Communication Site Plan



Source: LEJA Surveying Corps

Not to Scale

Figure 2-4

Access Road Alignment

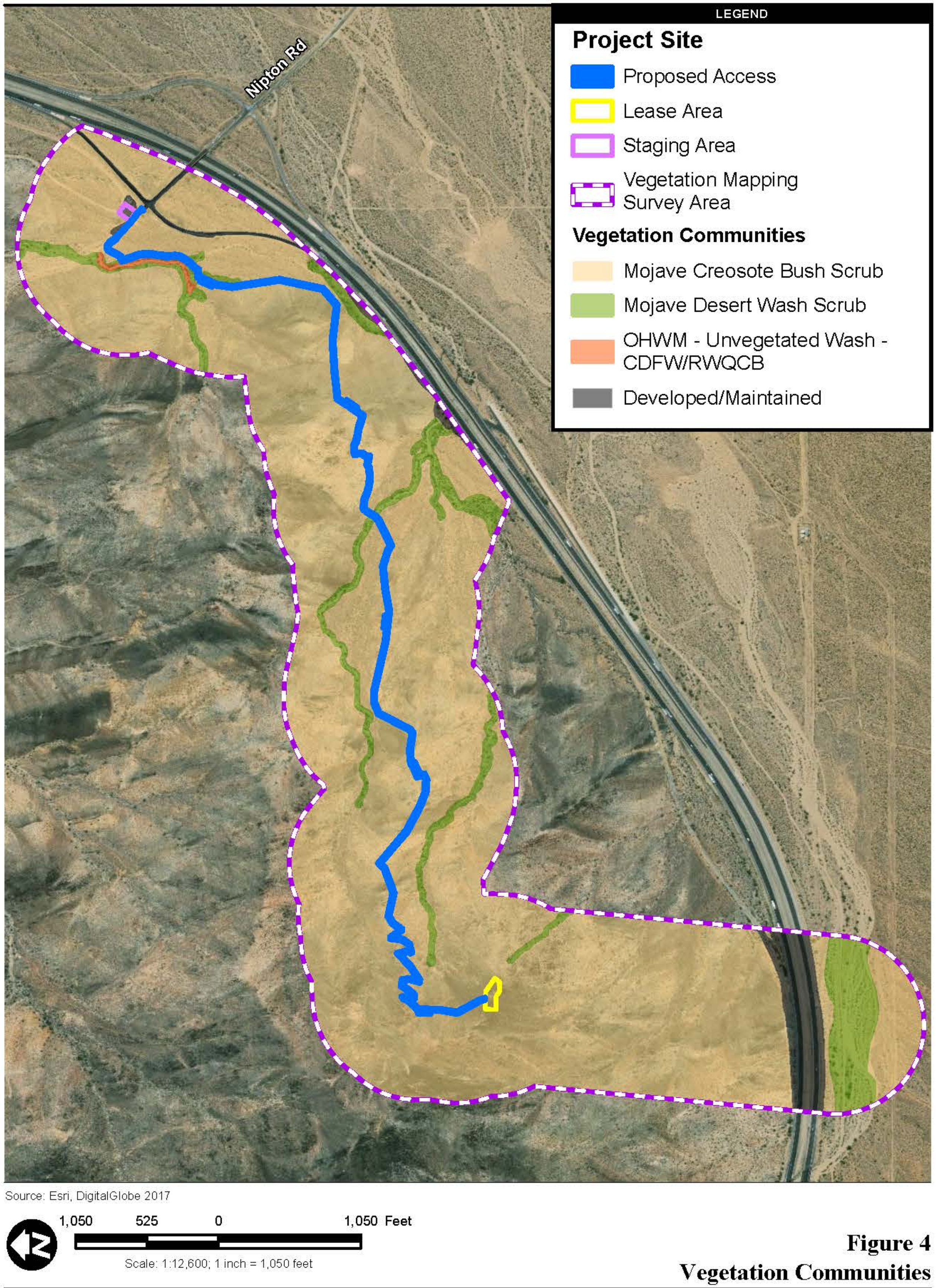


Figure 4
Vegetation Communities

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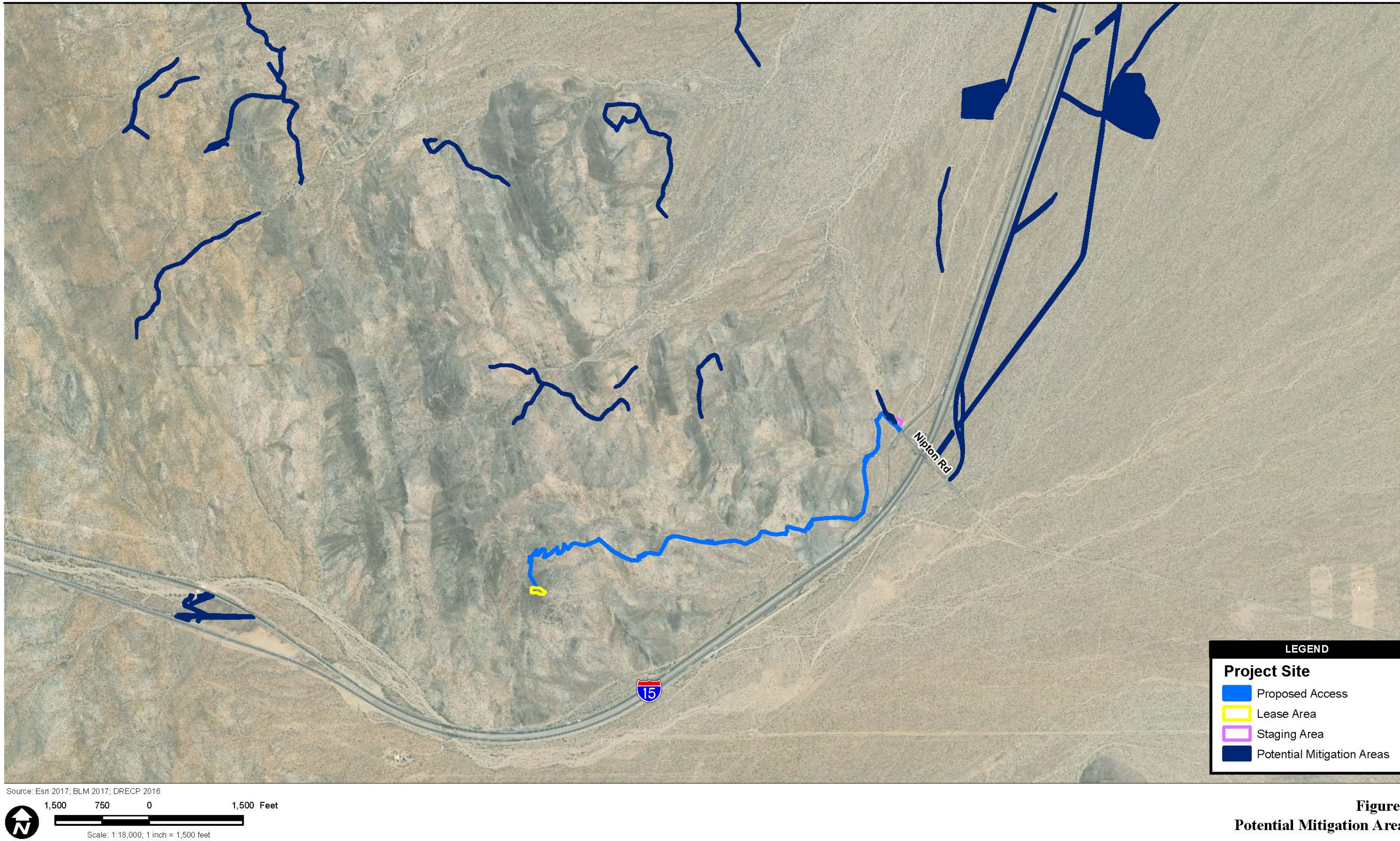

Figure 5
Potential Mitigation Areas

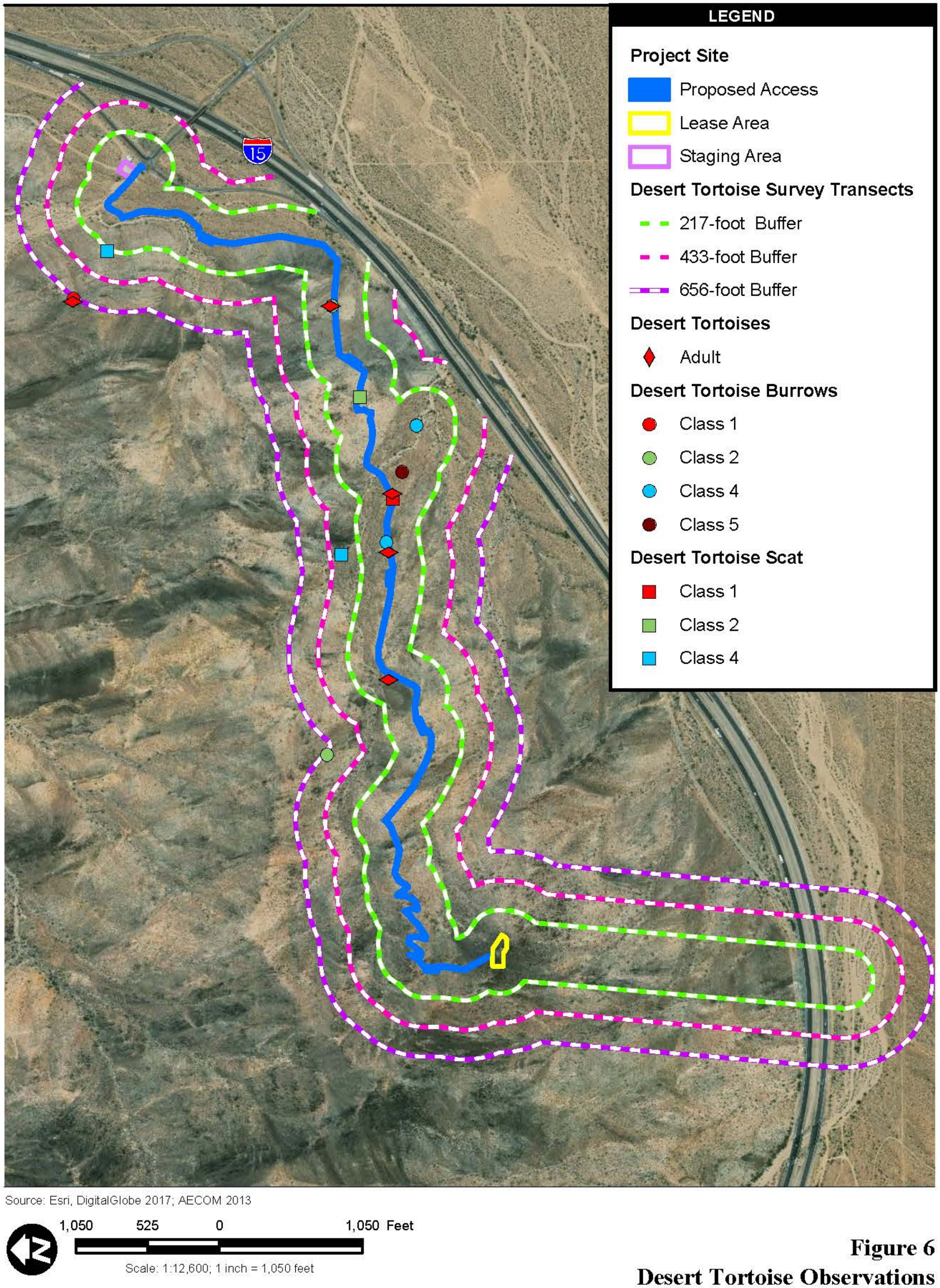

Figure 6
Desert Tortoise Observations

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APPENDIX B

RESTORATION TECHNIQUES

Appendix B
Nipton Communication Site
Restoration Techniques

Restoration would be conducted through one or more of the following techniques. These techniques are intended to help reduce the occurrences of inappropriate route use by restoring and camouflaging undesignated routes.

- **Vertical Mulching**: Dead plant material would be placed at the beginning of illegal routes in the line-of-sight off of BLM-designated routes to disguise the routes and deter additional illicit OHV traffic. Large dead pieces of plants (e.g., nearby trees, including Joshua trees, shrubs, and materials cleared from the communication site and access road) and rocks placed on the soil surface can act as barricades. Similarly, shrubs or branches planted upright in the soil make the trail blend in with surrounding vegetation. Mulch would be placed in a naturally appearing random pattern, with some scattered on the surface of the soil, and some vertically planted back into the soil. Vertical mulch also benefits restoration by trapping wind-blown seeds and lessening wind erosion just above the ground surface. This work would be primarily accomplished with hand tools. Little soil disturbance would occur, except where mulch is "planted" and thus requires a small hole to anchor the material.

- **Soil Decompaction**: Undesignated routes with repeated OHV traffic may require soil decompaction to increase water infiltration and facilitate seed germination. Improving water infiltration also allows burrowing wildlife, such as desert tortoise, to inhabit the soil again. Workers would preferably use hand tools such as soil spades, spading forks, and shovels to loosen the top 2 to 6 inches of soil.

- **Mechanical Ripping:** Routes too compacted or wide for use of hand tools may require mechanical ripping to a depth of 6 to 10 inches. A trail bulldozer or grader would pull an attachment to mechanically rip the soil. After ripping, hand tools would be used to camouflage bulldozer tracks. Ripping may provide conditions for germinating nonnative invasive plant species. Therefore, weed control measures would be implemented to limit the spread of these species.

- **Soil/Vertical Pitting**: Soil/vertical pitting of the soil surface would be applied in key areas to create depressions for windblown seeds, provide for local water collection and increased infiltration, reduce surface erosion, discourage vehicular traffic, and create a visual texture to the surface that blends with surrounding undisturbed areas. Soil/vertical pitting contours the soil to direct water flow and draw windblown seeds to focal spots on the ground. Pits would be approximately 1 to 2 feet wide, 6 inches deep, and spaced 1 to 2 feet apart in order to provide the estimated amount of water that may be needed for a plant to naturally germinate and grow in an arid environment. Pitting would create suitable microsites to increase seed germination rates and to promote higher survival and growth rates of small plants. This work would be done by shovel, spade, or power auger. Vertical mulch would be added as needed to some of the vertical pits.

- **Soil Imprinting**: Soil imprinting would entail raking small trenches to roughen the texture on surface soil and to collect windblown seed. Hand tools such as shovels and rakes would be used in sites with fragile soils or steep slopes.
- **Raking**: On undesignated routes formed from a single trespass (one person on one vehicle at one time) or on routes with scarce vegetation, work crews would rake or sweep, usually with a broom, the top 1 inch of soil to hide evidence of tracks. Soil surfaces may also be contoured to match surrounding land. Hand tools would be the primary method used for this work.
- **Rocks**: A row of large rocks and boulders would be used as barriers to deter use in especially fragile areas. Placement of small rocks would require no equipment and little or no soil disturbance. Large rocks may also be used through the use of dump trucks, trailers, and loaders. Large rocks and boulders removed to the side of the disturbance shall be placed back with the darkened/naturally varnished side facing up in a natural appearing pattern. To help ensure that rock placement appears natural, several rocks would be partially buried into the soil surface (similar to original conditions), rather than being set only on top of the surface.
- **Planting Vegetation**: Revegetating would involve directly planting native species in the line-of-sight from a BLM-designated OHV trail to accelerate improvements to soil stability, vegetation cover and diversity, and wildlife habitat. Eventually revegetation would disguise routes. Planting would make use of hand tools (shovels) and some mechanized equipment (augers) to dig holes up to 2 feet deep and 1 foot wide, for the largest transplants. In extraordinary cases, transplantation of larger plants would require somewhat larger holes potentially up to 3 feet deep and 3 feet wide. After planting, work can contour soil to direct the flow of rainwater or irrigation water to plant roots.
- **Seeding:** Seeding would require rakes to collect seed from seed banks in the soil or from dried seedpods still attached on plants. Hand sowing would be used to spread seeds across the soil surface. Raking would disturb, at most, the top 1 inch of soil. Hand seeding also may be concurrent with soil pitting (see above) to improve seed germination rates. Several methods described herein provide a seedbed for seed already onsite.
- **Removing Manufactured Materials and Structures:** A restoration team would remove litter and other unsightly or potentially dangerous manufactured materials or structures less than 50 years old. If the restoration team discovered materials more than 50 years old, they would consult with the BLM archaeologist. The archaeologist would assess

whether removing any materials older than 50 years is appropriate and what archeological documentation is required. Removal would include large structures and materials of nonhistorical value such as abandoned automobiles, fences, and buildings, including those built in trespass.

Impacts of route restoration are expected to be less than the communication site due to the limited ground disturbance of restoration techniques and the brief and temporary use of personnel and equipment. The same Applicant proposed measures/design features as described for the communication facility would be followed, except for installation of desert tortoise fencing.

Limited pollutant emissions would occur during route restoration, principally from the use of equipment where rehabilitation is taking place, additional vehicle travel by rehabilitation crews, and the surface disturbance caused by the rehabilitation process. Typically, only one or two pieces of equipment would be in use at any one time, and the duration of use would be temporary and brief. Overall, there would be a long-term positive effect to air quality from the reduction of undesignated routes and revegetation of the surface. These actions would reduce particulates introduced to the air through vehicle travel and wind.

Wildlife would benefit from the decrease in vehicle traffic through their habitat. Routes would grow over and reseed, creating new forage and undisturbed habitat. Native vegetation in the restored areas would be allowed to proliferate undisturbed.

Route restoration could result in a perceived limitation on opportunities for motorized vehicle use and related recreational activities. There would be a negligible effect on OHV riding in the restoration areas because the routes that would be restored are undesignated and not legally available for riding on now. The proposed route restoration does not affect the existing legal riding opportunities. There would be positive benefits to travel in the area because the route restoration would clarify the open route network. Open routes provide a sufficient network to access the restoration areas for recreation purposes. The restoration effort would cause the undesignated routes to be less noticeable.

Restoring the surface contour and vegetation cover in the bed and side banks of undesignated routes to a natural contour can improve soil conservation. Steep terrain is particularly vulnerable to losing soil crusts and mineral soils after OHV impact. Decompaction would increase water infiltration and facilitate seed germination. Improving water infiltration also allows burrowing animals, such as ants and rodents, to inhabit the soil again. Decompaction may promote seed germination of nonnative invasive species.

Appendix B

Air Quality and Greenhouse Gas Emissions Estimates

Nipton Comunication Site
Construction Emission Summary

Daily Emissions Summary	Emissions (lbs/day)					
Construction Phase/Emissions Source	ROG	CO	NOx	PM_{10}	$PM_{2.5}$	SOx
Boulder Removal						
Construction Equipment	0.90	5.82	9.24	0.44	0.41	0.11
On-Road Vehicles	0.02	0.71	0.30	0.04	0.02	0.00
Fugitive Dust, Paved & Unpaved Road Dust	0.00	0.00	0.00	15.50	4.61	0.00
Total Construction Emissions	0.92	6.53	9.54	15.98	5.04	0.11
Site Preparation and Grading						
Construction Equipment	1.49	10.17	15.49	0.74	0.68	0.02
On-Road Vehicles	0.03	0.84	0.69	0.06	0.02	0.00
Fugitive Dust, Paved & Unpaved Road Dust	0.00	0.00	0.00	25.42	8.77	0.00
Total Construction Emissions	1.52	11.02	16.18	26.22	9.47	0.02
Tower Foundation and Tower Stack + Fence						
Construction Equipment	0.68	5.53	6.79	0.33	0.31	0.01
On-Road Vehicles	0.10	1.18	3.68	0.22	0.11	0.02
Paved Road Dust & Unpaved Road Dust & Fugitive Dust	0.00	0.00	0.00	30.48	4.06	0.00
Total Construction Emissions	0.78	6.70	10.47	31.03	4.48	0.03
Max Daily (lbs/day)	1.52	11.02	16.18	31.03	9.47	0.11
MDAQMD Daily Emission Threshold	137	548	137	82	65	137
Exceed Threshold?	No	No	No	No	No	No

Annual Emissions Summary - 2020	Emissions (tons/year)						Tons
Construction Phase/Emissions Source	ROG	CO	NOx	PM_{10}	$PM_{2.5}$	SOx	CO_2e
Boulder Removal							
Construction Equipment	0.01	0.03	0.06	0.00	0.00	0.00	7.34
On-Road Vehicles	0.00	0.00	0.00	0.00	0.00	0.00	1.63
Fugitive Dust, Paved & Unpaved Road Dust	0.00	0.00	0.00	0.06	0.02	0.00	0
Total Construction Emissions	0.01	0.04	0.06	0.07	0.03	0.00	8.97
Site Preparation and Grading							
Construction Equipment	0.04	0.25	0.39	0.02	0.02	0.00	56.97
On-Road Vehicles	0.00	0.02	0.02	0.00	0.00	0.00	4.85
Fugitive Dust, Paved & Unpaved Road Dust	0.00	0.00	0.00	0.43	0.20	0.00	0
Total Construction Emissions	0.04	0.28	0.40	0.45	0.21	0.00	61.82
Tower Foundation and Tower Stack + Fence							
Construction Equipment	0.01	0.12	0.15	0.01	0.01	0.00	27.94
On-Road Vehicles	0.00	0.03	0.08	0.00	0.00	0.00	4.87
Paved Road Dust & Unpaved Road Dust & Fugitive Dust	0.00	0.00	0.00	0.12	0.01	0.00	0
Total Construction Emissions	0.02	0.15	0.23	0.13	0.02	0.00	32.81
Total Annual Emissions	0.04	0.28	0.40	0.45	0.21	0.00	103.61
MDAQMD Annual Emission Threshold (tons)	25	100	25	15	12	25	100,000
Exceed Threshold?	No	No	No	No	No	No	No

Notes:
Fugitive dust emissions in Tower Foundation and Tower Stack + Fence include PM emissions associated with use of a concrete batch plant.

Phase	Length (days)
Boulder Removal	12
Site Preparation and Grading	50
Tower Foundation and Tower Stack + Fence	44

Constants	
ton	lbs
1	2000

Daily Operational Emissions Summary	Emissions (lbs/day)					
Emissions Source	ROG	CO	NOx	PM_{10}	$PM_{2.5}$	SOx
On-Road Vehicles	0.01	0.51	0.04	19.08	1.74	0.00
Emergency Generators	0.55	0.85	0.92	0.03	0.03	0.00
Total	0.56	1.36	0.96	19.11	1.78	0.00

Annual Operational Emissions Summary	Emissions (tons/year)						
Emissions Source	ROG	CO	NOx	PM_{10}	$PM_{2.5}$	SOx	CO_2e
On-Road Vehicles	0.00	0.00	0.00	0.11	0.01	0.00	1.05
Emergency Generators	0.01	0.02	0.02	0.00	0.00	0.00	2.19
Total	0.01	0.03	0.02	0.12	0.01	0.00	3.24

GHG Emissions Summary	
Source	GHG Emissions (tons CO_2e)
Construction Activities	103.70
Decommissioning Activities	103.70
Total Construction and Decommissioning	207.40
Amortized Construction and Decommissioning	6.91
Operational GHG Emissions	3.24
Total GHG Emissions	10.15

Construction GHG Emissions include indirect GHG emissions associated with electricity required to treat and supply water required during concrete-batching activities.
Activities associated with decommissioning after the lease period (30 years) are anticipated to be similar to construction activities. As such, due to advancements in engine technology and turnover in equipment fleet, emissions related to decommissioning are anticipated to be similar or less than those determined for the construction phase of the project. The table above conservatively assumes decommissioning activities would also generate 100 tons of CO2e.

Energy Consumption - Construction and Operation

Construction		
Description	Quantity	Total Energy Consumption (MMBtu)
Off-Road Equipment (Diesel) (gal)	8,135	1,123.39
On-Road Equipment (Gasoline-Fueled) (gal)	1,032	129.04
On-Road Equipment (Diesel-Fueled) (gal)	94	13.00
Indirect Electricity (Water Use) (kWh)	474	1.62
Total Construction-Related Energy Consumption		1,267.04

Operations		
Description	Total Gallons	Total Energy Consumption (MMBtu)
On-Road Equipment (Gasoline-Fueled)	101	12.66
On-Road Equipment (Propane-Fueled)	343	31.34
Total Operational Consumption		44.01

Conversion Factors	
Factors	MT/gallon
Diesel	0.0102
Gasoline	0.0088

Category	Amount	Units
Diesel (heat content)	5.8	MMBtu/barrel
Motor Gasoline	5.25	MMBtu/gallon
Gallons per Barrel	42	gallons/barrel
Propane	0.0913	MMBtu/gallon
kWh per Btu	3,412	Btu/kWh

Sources:

The Climate Registry (April 2020): 2020 Default Emission Factors: https://www.theclimateregistry.org/wp-content/uploads/2020/04/The-Climate-Registry-2020-Default-Emission-Factor-Document.pdf

U.S. Energy Information Administration (EIA). 2016. https://www.eia.gov/environment/emissions/co2_vol_mass.php

Off-Road Construction Emissions

Construction Year

2020									Emissions Factors (g/bhp-hr)						
Project Component/Construction Equipment		Number	Usage Factor (hrs/day)	Total Hours/Day (Number * Usage Factor)	Total Days	Horsepower	Total Runtime Hours	Load Factor	ROG	CO	NOx	PM_{10}	$PM_{2.5}$	SOx	CO_2
Boulder Removal															
Generator	Generator Sets	1	9	9	12	84	108	0.74	0.08	1.15	0.75	0.06	0.05	0.00	154.58
Bulldozer	Rubber Tired Dozers	1	9	9	12	247	108	0.40	0.27	1.40	2.84	0.14	0.13	0.00	208.55
Water truck	Off-Highway Trucks	1	9	9	12	402	108	0.38	0.09	0.55	0.90	0.03	0.03	0.03	201.40
Site Preparation and Grading															
Generator	Generator Sets	1	9	9	50	84	450	0.74	0.08	1.15	0.75	0.06	0.05	0.00	154.58
Water truck	Off-Highway Trucks	1	9	9	50	402	450	0.38	0.09	0.55	0.90	0.03	0.03	0.00	201.40
Drill Rig/Boring Machine	Bore/Drill Rigs	1	9	9	50	221	450	0.50	0.07	0.54	0.92	0.03	0.02	0.00	263.42
Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	1	9	9	50	97	450	0.37	0.12	1.31	1.19	0.07	0.07	0.00	194.99
Bulldozer	Rubber Tired Dozers	1	9	9	50	247	450	0.40	0.27	1.40	2.84	0.14	0.13	0.00	208.55
Grader	Graders	1	9	9	50	187	450	0.41	0.23	1.46	2.22	0.12	0.11	0.00	216.06
Tower Foundation and Tower Stack + Fence															
Cement and Mortar Mixer	Cement and Mortar Mixers	2	9	18	44	9	792	0.56	0.31	1.83	2.36	0.09	0.09	0.00	318.98
Generator	Generator Sets	2	9	18	44	84	792	0.74	0.08	1.15	0.75	0.06	0.05	0.00	154.58
Water truck	Off-Highway Trucks	1	9	9	44	402	396	0.38	0.09	0.55	0.90	0.03	0.03	0.00	201.40
Crane	Cranes	1	9	9	44	231	396	0.29	0.11	0.51	1.30	0.05	0.05	0.00	152.03

	Emission Factor (g/gal)				Emissions (lbs/day)						tons/day				Tons Per Phase
Project Component/Construction Equipment	CH_4	N_2O	gal/hp-hr	Daily Gallons	ROG	CO	NO_x	PM_{10}	$PM_{2.5}$	SOx	CO_2	CH_4	N_2O	CO_2e	CO_2e
Boulder Removal					*0.90*	*5.82*	*9.24*	*0.44*	*0.41*	*0.11*	*0.61*	*0.00*	*0.00*	*0.61*	*7.34*
Generator	0.57	0.26	0.02	8.47	0.09	1.42	0.93	0.07	0.07	0.00	0.10	0.00001	0.00000	0.09612	1.15
Bulldozer	0.57	0.26	0.02	18.17	0.52	2.74	5.56	0.27	0.25	0.00	0.20	0.00001	0.00001	0.20611	2.47
Water truck	0.57	0.26	0.02	27.27	0.29	1.66	2.75	0.10	0.09	0.10	0.31	0.00002	0.00001	0.30931	3.71
Site Preparation and Grading					*1.49*	*10.17*	*15.49*	*0.74*	*0.68*	*0.02*	*1.13*	*0.00006*	*0.00003*	*1.13936*	*56.97*
Generator	0.57	0.26	0.02	8.47	0.09	1.42	0.93	0.07	0.07	0.00	0.10	0.00001	0.00000	0.09612	4.81
Water truck	0.57	0.26	0.02	27.27	0.29	1.66	2.75	0.10	0.09	0.01	0.31	0.00002	0.00001	0.30931	15.47
Drill Rig/Boring Machine	0.57	0.26	0.03	25.80	0.16	1.19	2.04	0.06	0.05	0.01	0.29	0.00002	0.00001	0.29263	14.63
Tractors/Loaders/Backhoes	0.57	0.26	0.02	6.17	0.08	0.94	0.84	0.05	0.05	0.00	0.07	0.00000	0.00000	0.07000	3.50
Bulldozer	0.57	0.26	0.02	18.17	0.52	2.74	5.56	0.27	0.25	0.00	0.20	0.00001	0.00001	0.20611	10.31
Grader	0.57	0.26	0.02	14.56	0.34	2.22	3.36	0.19	0.17	0.00	0.16	0.00001	0.00000	0.16518	8.26
Tower Foundation and Tower Stack + Fence					*0.68*	*5.53*	*6.79*	*0.33*	*0.31*	*0.01*	*0.63*	*0.00004*	*0.00002*	*0.63493*	*27.94*
Cement and Mortar Mixer	0.57	0.26	0.03	2.91	0.06	0.37	0.47	0.02	0.02	0.00	0.03	0.00000	0.00000	0.03217	1.42
Generator	0.57	0.26	0.02	16.95	0.19	2.83	1.86	0.14	0.13	0.00	0.19	0.00001	0.00000	0.19224	8.46
Water truck	0.57	0.26	0.02	27.27	0.29	1.66	2.75	0.10	0.09	0.01	0.31	0.00002	0.00001	0.30931	13.61
Crane	0.57	0.26	0.01	8.92	0.14	0.67	1.71	0.07	0.06	0.00	0.10	0.00001	0.00000	0.10121	4.45

On-Road Construction Emissions

					Emissions Factors (g/mi)									Emissions (lb/day)									tons/day	tons/phase
Project Component/On-Road Vehicles	Days	One-Way Trips/Day	Trip Distance (one-way)	Daily VMT	ROG	CO	NOx	PM_{10}	$PM_{2.5}$	SOx	CO_2	CH_4	N_2O	ROG	CO	NOx	PM_{10}	$PM_{2.5}$	SOx	CO_2	CH_4	N_2O	CO_2e	CO_2e
Boulder Removal														*0.02*	*0.71*	*0.30*	*0.04*	*0.02*	*0.00*	*269.03*	*0.00*	*0.01*	*0.14*	*1.63*
Construction Workers	12	12	12.0	144	0.02	0.93	0.07	0.05	0.02	0.00	299.43	0.00	0.01	0.01	0.30	0.02	0.01	0.01	0.00	95.06	0.00	0.00	0.05	0.57
Flat Bed Large Pick-Up (Construction Equipment Mobilization)	1	4	13.7	55	0.07	0.67	1.99	0.12	0.06	0.01	664.05	0.00	0.06	0.01	0.08	0.24	0.01	0.01	0.00	80.51	0.00	0.01	0.04	0.50
Pick-Ups and Other Light/Medium Duty Road Vehicles	12	8	13.7	110	0.03	1.39	0.14	0.05	0.02	0.00	385.40	0.01	0.01	0.01	0.34	0.03	0.01	0.00	0.00	93.46	0.00	0.00	0.05	0.57
Site Preparation and Grading														*0.03*	*0.84*	*0.69*	*0.06*	*0.02*	*0.00*	*399.32*	*0.00*	*0.02*	*0.20*	*4.85*
Construction Workers	50	12	12.0	144	0.02	0.93	0.07	0.05	0.02	0.00	299.43	0.00	0.01	0.01	0.30	0.02	0.01	0.01	0.00	95.06	0.00	0.00	0.05	2.39
Flat Bed Large Pick-Up (Construction Equipment Mobilization)	1	6	13.7	82	0.07	0.67	1.99	0.12	0.06	0.01	664.05	0.00	0.06	0.01	0.21	0.63	0.04	0.01	0.00	210.81	0.00	0.02	0.11	0.11
Pick-Ups and Other Light/Medium Duty Road Vehicles	50	8	13.7	110	0.03	1.39	0.14	0.05	0.02	0.00	385.40	0.01	0.01	0.01	0.34	0.03	0.01	0.00	0.00	93.45	0.00	0.00	0.05	2.35
Tower Foundation and Tower Stack + Fence														*0.10*	*1.18*	*3.68*	*0.22*	*0.11*	*0.02*	*1773.85*	*0.01*	*0.24*	*0.78*	*4.87*
Construction Workers	44	12	12.0	144	0.02	0.93	0.07	0.05	0.02	0.00	299.43	0.00	0.01	0.01	0.30	0.02	0.01	0.01	0.00	95.06	0.00	0.00	0.05	2.10
Tower Foundation and Stack/Fence Delivery	1	2	110	220	0.05	0.27	2.86	0.15	0.08	0.01	1,343.08	0.00	0.21	0.03	0.13	1.39	0.07	0.04	0.01	651.42	0.00	0.10	0.34	0.34
Solar Panels, and Carrier Equipment Delivery	1	2	110	220	0.05	0.27	2.86	0.15	0.08	0.01	1,343.08	0.00	0.21	0.03	0.13	1.39	0.07	0.04	0.01	651.42	0.00	0.10	0.34	0.34
Pick-Ups and Other Light/Medium Duty Road Vehicles	44	8	13.7	110	0.03	1.39	0.14	0.05	0.02	0.00	385.40	0.01	0.01	0.01	0.34	0.03	0.01	0.00	0.00	93.46	0.00	0.00	0.05	2.07
Flat Bed Large Pick-Up (Tower, Fence, Solar Panels Delivery to Site)	1	16	1.75	28	0.07	0.67	1.99	0.12	0.06	0.01	664.05	0.00	0.06	0.00	0.04	0.12	0.01	0.00	0.00	40.96	0.00	0.00	0.00	0.00
Flat Bed Large Pick-Up (Construction Equipment Demobilization)	2	12	13.7	165	0.07	0.67	1.99	0.12	0.06	0.01	664.05	0.00	0.06	0.03	0.24	0.72	0.04	0.02	0.00	241.54	0.00	0.02	0.01	0.02

Constants	
lb	grams
1	453.59237
ton	lbs
1	2000
ton	grams
1	907185
GWP CO2e	CH4
28	1
GWP CO2e	N2O
265	1
ton	lbs
1	2000
MT	lbs
1	2204.62

On-Road Vehicles Fuel Consumption

Fuel Consumption and Assumptions	Fuel Type	MT CO_2
Boulder Removal		
Construction Workers	Gasoline	0.52
Flat Bed Large Pick-Up (Construction Equipment Mobilization)	Diesel	0.04
Pick-Ups and Other Light/Medium Duty Road Vehicles	Gasoline	0.51
Site Preparation and Grading		
Construction Workers	Gasoline	2.16
Flat Bed Large Pick-Up (Construction Equipment Mobilization)	Diesel	0.10
Pick-Ups and Other Light/Medium Duty Road Vehicles	Gasoline	2.12
Tower Foundation and Tower Stack + Fence		
Construction Workers	Gasoline	1.90
Tower Foundation and Stack/Fence Delivery	Diesel	0.30
Solar Panels, and Carrier Equipment Delivery	Diesel	0.30
Pick-Ups and Other Light/Medium Duty Road Vehicles	Gasoline	1.87
Flat Bed Large Pick-Up (Tower, Fence, Solar Panels Delivery to Site)	Diesel	0.02
Flat Bed Large Pick-Up (Construction Equipment Demobilization)	Diesel	0.22

Notes: For energy consumption calculations, the fuel type of each on-road vehicle is based on highest fleet mix percentage by category (diesel vs. gas) for the San Bernardino Region (see EMFAC2017 sheet).

	Total GHG Emissions (MT CO_2)	Gallons
Gasoline	9.06	1032.32
Diesel	0.96	94.10

Factors	MT CO2/gallon
Diesel	0.0102
Gasoline	0.0088

CalEEMod
Equipment HP and Load Factors

OFFROAD Equipment Type	Horsepower	Load Factor
Aerial Lifts	63	0.31
Air Compressors	78	0.48
Bore/Drill Rigs	221	0.50
Cement and Mortar Mixers	9	0.56
Concrete/Industrial Saws	81	0.73
Cranes	231	0.29
Crawler Tractors	212	0.43
Crushing/Proc. Equipment	85	0.78
Dumpers/Tenders	16	0.38
Excavators	158	0.38
Forklifts	89	0.201
Generator Sets	84	0.74
Graders	187	0.41
Off-Highway Tractors	124	0.44
Off-Highway Trucks	402	0.38
Other Construction Equipment	171	0.42
Other General Industrial Equipmen	88	0.34
Other Material Handling Equipmen	168	0.40
Pavers	130	0.42
Paving Equipment	132	0.36
Plate Compactors	8	0.43
Pressure Washers	13	0.3
Pumps	84	0.74
Rollers	80	0.38
Rough Terrain Forklifts	100	0.40
Rubber Tired Dozers	247	0.4
Rubber Tired Loaders	203	0.36
Scrapers	367	0.48
Signal Boards	6	0.82
Skid Steer Loaders	65	0.37
Surfacing Equipment	263	0.30
Sweepers/Scrubbers	64	0.46
Tractors/Loaders/Backhoes	97	0.37
Trenchers	78	0.50
Welders	46	0.45

OFFROAD Grams Per Horsepower-Hour Derivation

Constants	
lb	grams
1	453.5924
ton	lbs
1	2000

Region	CalYr	VehClass	MdlYr	HP_Bin	Fuel	ROG g_hp-hr	CO g_hp-hr	Nox g_hp-hr	CO2 g_hp-hr	PM10 g_hp-hr	PM2_5 g_hp-hr	PM g_hp-hr	Sox g_hp-hr	NH3 g_hp-hr	gal/hp-hr
San Bernardino	2020	ConstMin - Bore/Drill Rigs	Aggregated	300	Diesel	0.072924544	0.542299609	0.924189938	263.4208338	0.026856065	0.02470758	0.026856065	0.002433648	0.002150005	0.025810389
San Bernardino	2020	ConstMin - Cranes	Aggregated	300	Diesel	0.108085402	0.507388808	1.297237989	152.0271844	0.053038427	0.048795353	0.053038427	0.001402887	0.001240825	0.014895864
San Bernardino	2020	ConstMin - Graders	Aggregated	175	Diesel	0.227317402	1.464043338	2.218866303	216.0611387	0.12386176	0.113952819	0.12386176	0.001991956	0.001763462	0.021170012
San Bernardino	2020	ConstMin - Off-Highway Trucks	Aggregated	600	Diesel	0.094146169	0.545356054	0.903155193	201.4048305	0.032974003	0.030336083	0.032974003	0.001859753	0.001643839	0.019733963
San Bernardino	2020	ConstMin - Rubber Tired Dozers	Aggregated	300	Diesel	0.266279098	1.399470426	2.836341407	208.5483874	0.138133177	0.127082523	0.138133177	0.001921531	0.001702144	0.0204339
San Bernardino	2020	ConstMin - Tractors/Loaders/Backhoes	Aggregated	100	Diesel	0.116701124	1.314701558	1.18569024	194.9877027	0.074186756	0.068251815	0.074186756	0.001799865	0.001591463	0.019105203
San Bernardino	2020	Portable Equipment - Non-Rental Generator	Aggregated	100	Diesel	0.076250321	1.147632362	0.752863045	154.5845927	0.058700348	0.05400432	0.058700348	0.001427321	0.001261699	0.015146443
San Bernardino	2020	OFF - ConstMin - Cement and Mortar Mixers	Aggregated	25	Diesel	0.312583805	1.827252845	2.35899981	318.9817464	0.093745559	0.086245915	0.093745559	0.004780333	0.002671129	0.032066372

CH4 Emissions Factor (g/gallon diesel):	0.57
N2O Emissions Factor (g/gallon diesel):	0.26

*Source: EPA 2018. Emission Factors for Greenhouse Gas Inventories: https://www.epa.gov/sites/production/files/2018-03/documents/emission-factors_mar_2018_0.pdf

OFFROAD Tons Per Year and Gallons Per Horsepower-Hour Calculation

Constants	
year	days
1	365

Region	CalYr	VehClass	MdlYr	HP_Bin	Fuel	HC_tpy	ROG_tpy	TOG_tpy	CO_tpy	NOx_tpy	CO2_tpy	PM10_tpy	PM2_5_tpy	PM_tpy	SOx_tpy	NH3_tpy	gal/hp-hr
San Bernardino	2020	ConstMin - Bore/Drill Rigs	Aggregated	50	Diesel	0.04747846	0.057449	0.068369	0.361991	0.372824	48.05764	0.023605	0.021717	0.023605	0.000442892	0.00039224	0.029448
San Bernardino	2020	ConstMin - Bore/Drill Rigs	Aggregated	75	Diesel	0.037293122	0.045125	0.053702	0.551973	0.662401	83.71956	0.034823	0.032037	0.034823	0.00077291	0.000683308	0.025678
San Bernardino	2020	ConstMin - Bore/Drill Rigs	Aggregated	100	Diesel	0.078913496	0.095485	0.113635	1.362601	1.095519	215.1499	0.055778	0.051316	0.055778	0.0019868	0.001756024	0.02558
San Bernardino	2020	ConstMin - Bore/Drill Rigs	Aggregated	175	Diesel	0.094804966	0.114714	0.136519	1.932414	1.227999	347.4489	0.054412	0.050059	0.054412	0.003209493	0.002835831	0.026064
San Bernardino	2020	ConstMin - Bore/Drill Rigs	Aggregated	300	Diesel	0.112255445	0.135829	0.161648	1.010086	1.721394	490.647	0.050022	0.04602	0.050022	0.004532908	0.004004595	0.02581
San Bernardino	2020	ConstMin - Bore/Drill Rigs	Aggregated	600	Diesel	0.171248297	0.20721	0.246598	1.771249	2.368136	938.7361	0.074592	0.068625	0.074592	0.008673944	0.007661838	0.025735
San Bernardino	2020	ConstMin - Bore/Drill Rigs	Aggregated	750	Diesel	0.061335168	0.074216	0.088323	0.654412	0.817938	354.3057	0.028645	0.026353	0.028645	0.003273892	0.002891795	0.026245
San Bernardino	2020	ConstMin - Bore/Drill Rigs	Aggregated	9999	Diesel	0.073578999	0.089031	0.105954	0.490869	1.979511	259.822	0.048051	0.044206	0.048051	0.002399976	0.002120632	0.025944
San Bernardino	2020	ConstMin - Cranes	Aggregated	25	Diesel	0.001426756	0.001726	0.002055	0.008088	0.007397	0.919041	0.000555	0.000511	0.000555	8.45419E-06	7.50109E-06	0.016559
San Bernardino	2020	ConstMin - Cranes	Aggregated	50	Diesel	0.045566292	0.055135	0.065615	0.193218	0.155932	14.89163	0.016467	0.01515	0.016467	0.000136313	0.000121543	0.016725
San Bernardino	2020	ConstMin - Cranes	Aggregated	75	Diesel	0.013764696	0.016655	0.019821	0.057482	0.125821	6.695025	0.011679	0.010745	0.011679	6.14859E-05	5.46439E-05	0.015003
San Bernardino	2020	ConstMin - Cranes	Aggregated	100	Diesel	0.399838359	0.483804	0.575767	2.756325	4.241435	345.6103	0.299111	0.275182	0.299111	0.003183344	0.002820825	0.014849
San Bernardino	2020	ConstMin - Cranes	Aggregated	175	Diesel	0.852661731	1.031721	1.227833	6.860703	10.65776	1020.454	0.57282	0.526995	0.57282	0.009409023	0.008328808	0.014919
San Bernardino	2020	ConstMin - Cranes	Aggregated	300	Diesel	1.07990929	1.30669	1.555069	6.134038	15.68286	1837.921	0.641204	0.589908	0.641204	0.016960095	0.015000865	0.014896
San Bernardino	2020	ConstMin - Cranes	Aggregated	600	Diesel	1.42930113	1.729454	2.058194	13.9138	21.03417	3051.533	0.828967	0.76265	0.828967	0.028170052	0.024906198	0.01487
San Bernardino	2020	ConstMin - Cranes	Aggregated	750	Diesel	0.048978723	0.059264	0.070529	0.482343	0.631581	48.88634	0.032565	0.02996	0.032565	0.000450509	0.000399004	0.014955
San Bernardino	2020	ConstMin - Cranes	Aggregated	9999	Diesel	0.204868278	0.247891	0.29501	2.116065	2.835583	171.1248	0.135305	0.124481	0.135305	0.001575988	0.001396698	0.01489
San Bernardino	2020	ConstMin - Crawler Tractors	Aggregated	50	Diesel	0.14171372	0.171474	0.204068	0.609767	0.471338	48.18159	0.04938	0.04543	0.04938	0.000441211	0.000393252	0.024504
San Bernardino	2020	ConstMin - Crawler Tractors	Aggregated	75	Diesel	0.048558011	0.058755	0.069924	0.19047	0.465308	15.90334	0.034116	0.031386	0.034116	0.000145578	0.000129801	0.02237
San Bernardino	2020	ConstMin - Crawler Tractors	Aggregated	100	Diesel	2.306625853	2.791017	3.321541	15.96076	23.49751	2113.853	1.962577	1.805571	1.962577	0.019474421	0.017252984	0.022227
San Bernardino	2020	ConstMin - Crawler Tractors	Aggregated	175	Diesel	1.741917813	2.107721	2.508362	14.74144	21.54299	2322.559	1.20517	1.108756	1.20517	0.021420948	0.018956411	0.022177
San Bernardino	2020	ConstMin - Crawler Tractors	Aggregated	300	Diesel	1.619486635	1.959579	2.332061	10.30004	24.31672	2482.803	0.975765	0.897704	0.975765	0.022906164	0.020264308	0.022166
San Bernardino	2020	ConstMin - Crawler Tractors	Aggregated	600	Diesel	3.511001744	4.248312	5.055843	26.63008	51.42251	8403.87	1.932838	1.778211	1.932838	0.077592615	0.068591256	0.022191
San Bernardino	2020	ConstMin - Crawler Tractors	Aggregated	750	Diesel	0.106489692	0.128853	0.153345	0.664596	2.043555	180.5613	0.059876	0.055086	0.059876	0.001666184	0.001473717	0.022132
San Bernardino	2020	ConstMin - Crawler Tractors	Aggregated	9999	Diesel	0.325945887	0.394395	0.469362	1.663215	6.389664	495.003	0.18117	0.166676	0.18117	0.00456677	0.004040148	0.022222
San Bernardino	2020	ConstMin - Excavators	Aggregated	25	Diesel	0.001332792	0.001613	0.001919	0.004529	0.003076	0.238293	0.000429	0.000394	0.000429	2.16316E-06	1.94492E-06	0.021926
San Bernardino	2020	ConstMin - Excavators	Aggregated	50	Diesel	1.607591841	1.945186	2.314932	14.76475	13.22698	1928.351	0.728684	0.670389	0.728684	0.017780333	0.015738941	0.021973
San Bernardino	2020	ConstMin - Excavators	Aggregated	75	Diesel	0.034408132	0.041634	0.049548	0.434761	0.615191	60.89652	0.035588	0.032741	0.035588	0.000561986	0.000497029	0.019782
San Bernardino	2020	ConstMin - Excavators	Aggregated	100	Diesel	1.135595828	1.374071	1.635258	16.31144	14.05013	2444.628	0.839656	0.772484	0.839656	0.022567731	0.019952726	0.019664
San Bernardino	2020	ConstMin - Excavators	Aggregated	175	Diesel	1.926089814	2.330569	2.773569	30.89454	22.91499	5283.396	1.113736	1.024638	1.113736	0.048789832	0.043122367	0.019764
San Bernardino	2020	ConstMin - Excavators	Aggregated	300	Diesel	1.885604146	2.281581	2.71527	14.43714	26.06887	6719.404	0.794949	0.731353	0.794949	0.062067656	0.054842874	0.019766
San Bernardino	2020	ConstMin - Excavators	Aggregated	600	Diesel	2.84169947	3.438456	4.092047	24.7165	35.06891	11913.44	1.154376	1.062026	1.154376	0.110060421	0.097235906	0.019712
San Bernardino	2020	ConstMin - Excavators	Aggregated	750	Diesel	0.086649906	0.104846	0.124776	0.556655	1.332708	211.3134	0.043687	0.040192	0.043687	0.001951098	0.001724712	0.019714
San Bernardino	2020	ConstMin - Excavators	Aggregated	9999	Diesel	0.081770784	0.098943	0.11775	0.736238	2.065078	332.9941	0.038719	0.035622	0.038719	0.003076243	0.002717853	0.019774

OFFROAD Tons Per Year and Gallons Per Horsepower-Hour Calculation

Constants	
year	days
1	365

Region	CalYr	VehClass	MdlYr	HP_Bin	Fuel	HC_tpy	ROG_tpy	TOG_tpy	CO_tpy	NOx_tpy	CO2_tpy	PM10_tpy	PM2_5_tp	PM_tpy	SOx_tpy	NH3_tpy	gal/hp-hr
San Bernardino	2020	ConstMin - Graders	Aggregated	50	Diesel	0.045831953	0.055457	0.065998	0.178308	0.127867	11.9923	0.015712	0.014455	0.015712	0.0001095	9.78795E-05	0.023497
San Bernardino	2020	ConstMin - Graders	Aggregated	75	Diesel	0.020008499	0.02421	0.028812	0.151888	0.185836	19.76404	0.013145	0.012093	0.013145	0.000182128	0.000161311	0.021138
San Bernardino	2020	ConstMin - Graders	Aggregated	100	Diesel	0.47928494	0.579935	0.69017	2.433404	4.506795	266.2565	0.372518	0.342717	0.372518	0.002447294	0.002173149	0.020944
San Bernardino	2020	ConstMin - Graders	Aggregated	175	Diesel	2.80536751	3.394495	4.039729	21.86233	33.13398	3226.407	1.849608	1.701639	1.849608	0.029745569	0.026333498	0.02117
San Bernardino	2020	ConstMin - Graders	Aggregated	300	Diesel	3.66183414	4.430819	5.273041	17.83205	55.40274	6812.096	1.837447	1.690451	1.837447	0.06287135	0.055599411	0.021152
San Bernardino	2020	ConstMin - Graders	Aggregated	600	Diesel	0.158976937	0.192362	0.228927	0.688807	2.544611	297.0983	0.078743	0.072443	0.078743	0.002742051	0.002424876	0.021245
San Bernardino	2020	ConstMin - Graders	Aggregated	9999	Diesel	0.179853497	0.217623	0.258989	0.919312	3.011826	230.9393	0.094445	0.086889	0.094445	0.002129752	0.001884895	0.021143
San Bernardino	2020	ConstMin - Off-Highway Tractors	Aggregated	50	Diesel	1.140663374	1.380203	1.642555	7.530124	6.364042	799.7202	0.47403	0.436107	0.47403	0.00735959	0.006527209	0.025
San Bernardino	2020	ConstMin - Off-Highway Tractors	Aggregated	75	Diesel	0.28851299	0.349101	0.415459	3.751422	3.347144	549.3065	0.201706	0.18557	0.201706	0.005069956	0.004483366	0.022528
San Bernardino	2020	ConstMin - Off-Highway Tractors	Aggregated	100	Diesel	0.420557271	0.508874	0.605602	3.504179	4.665409	466.568	0.386354	0.355446	0.386354	0.004301036	0.003808065	0.022607
San Bernardino	2020	ConstMin - Off-Highway Tractors	Aggregated	175	Diesel	0.36778952	0.445025	0.529617	5.279814	4.746447	868.6969	0.230276	0.211854	0.230276	0.0080205	0.007090187	0.022517
San Bernardino	2020	ConstMin - Off-Highway Tractors	Aggregated	300	Diesel	0.294650859	0.356528	0.424297	1.896397	4.271876	777.0618	0.144698	0.133122	0.144698	0.007175482	0.006342274	0.022478
San Bernardino	2020	ConstMin - Off-Highway Tractors	Aggregated	600	Diesel	0.597349468	0.722793	0.860183	4.804408	7.088328	2377.07	0.239841	0.220653	0.239841	0.021959272	0.019401327	0.02246
San Bernardino	2020	ConstMin - Off-Highway Tractors	Aggregated	750	Diesel	0.051521396	0.062341	0.074191	0.279439	0.6213	138.4056	0.025217	0.023199	0.025217	0.001278082	0.001129648	0.022243
San Bernardino	2020	ConstMin - Off-Highway Tractors	Aggregated	9999	Diesel	0.050266342	0.060822	0.072384	0.324313	0.916474	135.1082	0.02412	0.022191	0.02412	0.001247635	0.001102735	0.022513
San Bernardino	2020	ConstMin - Off-Highway Trucks	Aggregated	25	Diesel	0.010423123	0.012612	0.015009	0.047215	0.03102	3.392225	0.003206	0.00295	0.003206	3.10501E-05	2.76869E-05	0.021951
San Bernardino	2020	ConstMin - Off-Highway Trucks	Aggregated	50	Diesel	0.084293926	0.101996	0.121383	0.705482	0.592387	73.50303	0.041216	0.037919	0.041216	0.000677043	0.000599922	0.021827
San Bernardino	2020	ConstMin - Off-Highway Trucks	Aggregated	75	Diesel	0.010967077	0.01327	0.015793	0.171729	0.100768	23.15268	0.004062	0.003737	0.004062	0.000213729	0.000188969	0.019728
San Bernardino	2020	ConstMin - Off-Highway Trucks	Aggregated	100	Diesel	0.03962175	0.047942	0.057055	0.404765	0.407411	53.60623	0.032881	0.03025	0.032881	0.000494428	0.000437527	0.019732
San Bernardino	2020	ConstMin - Off-Highway Trucks	Aggregated	175	Diesel	0.903845304	1.093653	1.301537	11.65444	9.264021	1829.663	0.485526	0.446684	0.485526	0.016889025	0.014933462	0.019717
San Bernardino	2020	ConstMin - Off-Highway Trucks	Aggregated	300	Diesel	1.609389367	1.947361	2.317521	9.858634	17.76932	3727.219	0.692326	0.63694	0.692326	0.034411708	0.030421062	0.019657
San Bernardino	2020	ConstMin - Off-Highway Trucks	Aggregated	600	Diesel	6.178297502	7.47574	8.896748	43.30436	71.71565	15992.69	2.618323	2.408857	2.618323	0.147674966	0.130530155	0.019734
San Bernardino	2020	ConstMin - Off-Highway Trucks	Aggregated	750	Diesel	2.603331025	3.150031	3.748797	20.22038	30.45544	5386.002	1.191292	1.095989	1.191292	0.049718156	0.043959821	0.019711
San Bernardino	2020	ConstMin - Off-Highway Trucks	Aggregated	9999	Diesel	4.224707916	5.111897	6.083579	25.22237	77.8534	9566.173	1.96778	1.810358	1.96778	0.08831727	0.078077816	0.019817
San Bernardino	2020	ConstMin - Other Construction Equipment	Aggregated	50	Diesel	0.647212906	0.783128	0.931987	3.94731	3.678387	431.3357	0.295957	0.272281	0.295957	0.003968496	0.003520504	0.023965
San Bernardino	2020	ConstMin - Other Construction Equipment	Aggregated	75	Diesel	0.083543489	0.101088	0.120303	0.444536	0.851815	48.36845	0.063427	0.058353	0.063427	0.000444684	0.000394777	0.021284
San Bernardino	2020	ConstMin - Other Construction Equipment	Aggregated	100	Diesel	1.014419748	1.227448	1.460764	9.117421	11.36258	1305.537	0.842116	0.774746	0.842116	0.012039907	0.010655619	0.021469
San Bernardino	2020	ConstMin - Other Construction Equipment	Aggregated	175	Diesel	0.451100465	0.545832	0.649585	4.540192	5.781149	737.0298	0.305496	0.281057	0.305496	0.006800673	0.006015538	0.021407
San Bernardino	2020	ConstMin - Other Construction Equipment	Aggregated	300	Diesel	0.476939464	0.577097	0.686793	3.070756	7.221465	984.9202	0.274835	0.252849	0.274835	0.009091768	0.008038787	0.021591
San Bernardino	2020	ConstMin - Other Construction Equipment	Aggregated	600	Diesel	1.270587414	1.537411	1.829646	10.77991	18.58776	3753.75	0.656703	0.604167	0.656703	0.034667165	0.030637605	0.021445
San Bernardino	2020	ConstMin - Other Construction Equipment	Aggregated	750	Diesel	0.194790849	0.235697	0.280499	1.461577	2.813121	686.5218	0.091937	0.084582	0.091937	0.006341391	0.005603299	0.021416
San Bernardino	2020	ConstMin - Other Construction Equipment	Aggregated	9999	Diesel	0.072861319	0.088162	0.10492	0.496044	1.698141	236.8974	0.039781	0.036598	0.039781	0.002188048	0.001933525	0.021467
San Bernardino	2020	ConstMin - Pavers	Aggregated	50	Diesel	0.097768903	0.1183	0.140787	0.495711	0.427554	52.82483	0.036092	0.033205	0.036092	0.000485459	0.000431149	0.023909
San Bernardino	2020	ConstMin - Pavers	Aggregated	75	Diesel	0.136591808	0.165276	0.196692	0.667907	1.241778	86.52082	0.118592	0.109105	0.118592	0.00079583	0.000706171	0.021393
San Bernardino	2020	ConstMin - Pavers	Aggregated	100	Diesel	0.232861329	0.281762	0.33532	2.807274	2.987216	421.5186	0.191056	0.175771	0.191056	0.003890163	0.003440378	0.0214
San Bernardino	2020	ConstMin - Pavers	Aggregated	175	Diesel	0.305533628	0.369696	0.439968	3.998686	3.926677	700.2656	0.193668	0.178174	0.193668	0.006465137	0.005715474	0.021525
San Bernardino	2020	ConstMin - Pavers	Aggregated	300	Diesel	0.151878295	0.183773	0.218705	1.059659	2.832596	546.2113	0.08145	0.074934	0.08145	0.005045438	0.004458103	0.021459
San Bernardino	2020	ConstMin - Pavers	Aggregated	600	Diesel	0.02277865	0.027562	0.032801	0.185332	0.349745	98.83866	0.011984	0.011026	0.011984	0.000913129	0.000806708	0.021535
San Bernardino	2020	ConstMin - Pavers	Aggregated	750	Diesel	0.003704411	0.004482	0.005334	0.037489	0.046017	20.45745	0.00202	0.001859	0.00202	0.000189028	0.000166971	0.021484

OFFROAD Tons Per Year and Gallons Per Horsepower-Hour Calculation

Constants	
year	days
1	365

Region	CalYr	VehClass	MdlYr	HP_Bin	Fuel	HC_tpy	ROG_tpy	TOG_tpy	CO_tpy	NOx_tpy	CO2_tpy	PM10_tpy	PM2_5_tpy	PM_tpy	SOx_tpy	NH3_tpy	gal/hp-hr
San Bernardino	2020	ConstMin - Paving Equipment	Aggregated	50	Diesel	0.0580709	0.070266	0.083622	0.477552	0.446872	65.78766	0.024527	0.022565	0.024527	0.000606497	0.00053695	0.020317
San Bernardino	2020	ConstMin - Paving Equipment	Aggregated	75	Diesel	0.010611492	0.01284	0.015281	0.067172	0.110337	8.02315	0.008489	0.00781	0.008489	7.38597E-05	6.54839E-05	0.018328
San Bernardino	2020	ConstMin - Paving Equipment	Aggregated	100	Diesel	0.155394764	0.188028	0.223768	1.83015	1.83648	274.9632	0.120495	0.110855	0.120495	0.002537509	0.002244213	0.018398
San Bernardino	2020	ConstMin - Paving Equipment	Aggregated	175	Diesel	0.128951909	0.156032	0.185691	1.74391	1.555755	297.8354	0.083847	0.077139	0.083847	0.002749768	0.002430893	0.018334
San Bernardino	2020	ConstMin - Paving Equipment	Aggregated	300	Diesel	0.076355908	0.092391	0.109953	0.473122	1.208067	211.2516	0.042819	0.039393	0.042819	0.001950835	0.001724207	0.018388
San Bernardino	2020	ConstMin - Paving Equipment	Aggregated	600	Diesel	0.07068648	0.085531	0.101789	0.467651	1.134463	217.6396	0.034836	0.032049	0.034836	0.002010065	0.001776345	0.018448
San Bernardino	2020	ConstMin - Paving Equipment	Aggregated	750	Diesel	0.008999197	0.010889	0.012959	0.050635	0.152642	25.95923	0.003893	0.003582	0.003893	0.000239736	0.000211876	0.018373
San Bernardino	2020	ConstMin - Paving Equipment	Aggregated	9999	Diesel	0.002709175	0.003278	0.003901	0.03551	0.084758	19.32677	0.001365	0.001256	0.001365	0.000178604	0.000157743	0.018374
San Bernardino	2020	ConstMin - Rollers	Aggregated	25	Diesel	0.000928302	0.001123	0.001337	0.003099	0.002198	0.16983	0.000295	0.000271	0.000295	1.54231E-06	1.38613E-06	0.021561
San Bernardino	2020	ConstMin - Rollers	Aggregated	50	Diesel	1.411625761	1.708067	2.032741	8.717659	8.366449	1085.495	0.606664	0.558131	0.606664	0.00999359	0.008859663	0.02158
San Bernardino	2020	ConstMin - Rollers	Aggregated	75	Diesel	0.028105611	0.034008	0.040472	0.112446	0.275791	9.77065	0.019375	0.017825	0.019375	8.94913E-05	7.97467E-05	0.019428
San Bernardino	2020	ConstMin - Rollers	Aggregated	100	Diesel	0.998649768	1.208366	1.438056	11.18875	12.14607	1686.497	0.772554	0.710749	0.772554	0.015562537	0.013764958	0.019412
San Bernardino	2020	ConstMin - Rollers	Aggregated	175	Diesel	0.590999129	0.715109	0.851039	9.746583	8.146478	1753.956	0.374212	0.344275	0.374212	0.016198466	0.014315556	0.019387
San Bernardino	2020	ConstMin - Rollers	Aggregated	300	Diesel	0.109876811	0.132951	0.158223	0.863203	1.699191	290.4215	0.05971	0.054933	0.05971	0.002681794	0.002370381	0.019413
San Bernardino	2020	ConstMin - Rollers	Aggregated	600	Diesel	0.044889874	0.054317	0.064641	0.499105	0.675976	170.3955	0.022865	0.021036	0.022865	0.001574044	0.001390745	0.019506
San Bernardino	2020	ConstMin - Rough Terrain Forklifts	Aggregated	25	Diesel	8.25703E-05	9.99E-05	0.000119	0.001806	0.002427	0.293343	7.95E-05	7.31E-05	7.95E-05	2.70962E-06	2.39422E-06	0.023133
San Bernardino	2020	ConstMin - Rough Terrain Forklifts	Aggregated	50	Diesel	0.06792035	0.082184	0.097805	0.390194	0.36842	49.30945	0.024748	0.022768	0.024748	0.000453853	0.000402457	0.023126
San Bernardino	2020	ConstMin - Rough Terrain Forklifts	Aggregated	75	Diesel	0.015314048	0.01853	0.022052	0.071903	0.108755	7.781095	0.008778	0.008076	0.008778	7.14807E-05	6.35083E-05	0.022442
San Bernardino	2020	ConstMin - Rough Terrain Forklifts	Aggregated	100	Diesel	1.00340853	1.214124	1.444908	25.98696	18.0123	4263.243	0.598584	0.550698	0.598584	0.03938569	0.034796013	0.020814
San Bernardino	2020	ConstMin - Rough Terrain Forklifts	Aggregated	175	Diesel	0.490128134	0.593055	0.705785	5.800283	5.465502	1005.302	0.3667	0.337364	0.3667	0.009279816	0.008205143	0.020796
San Bernardino	2020	ConstMin - Rough Terrain Forklifts	Aggregated	300	Diesel	0.011967504	0.014481	0.017233	0.128982	0.205852	69.73898	0.004698	0.004322	0.004698	0.000644412	0.0005692	0.02079
San Bernardino	2020	ConstMin - Rough Terrain Forklifts	Aggregated	600	Diesel	0.003746187	0.004533	0.005395	0.046785	0.069729	25.87838	0.001488	0.001369	0.001488	0.000239146	0.000211216	0.020663
San Bernardino	2020	ConstMin - Rough Terrain Forklifts	Aggregated	750	Diesel	0.000713096	0.000863	0.001027	0.00817	0.011255	4.461204	7.9E-05	7.26E-05	7.9E-05	4.12246E-05	3.64117E-05	0.020774
San Bernardino	2020	ConstMin - Rubber Tired Dozers	Aggregated	50	Diesel	0.083706063	0.101284	0.120537	0.491084	0.370349	48.17189	0.030628	0.028177	0.030628	0.000442862	0.000393172	0.02274
San Bernardino	2020	ConstMin - Rubber Tired Dozers	Aggregated	75	Diesel	0.077441592	0.093704	0.111516	0.365007	0.737177	37.53538	0.058814	0.054109	0.058814	0.00034471	0.000306359	0.020595
San Bernardino	2020	ConstMin - Rubber Tired Dozers	Aggregated	100	Diesel	0.244511056	0.295858	0.352096	1.492336	2.31937	183.4474	0.203603	0.187315	0.203603	0.001688727	0.001497273	0.020642
San Bernardino	2020	ConstMin - Rubber Tired Dozers	Aggregated	175	Diesel	0.225272756	0.27258	0.324393	1.463253	2.677995	197.3336	0.154272	0.14193	0.154272	0.001817689	0.001610611	0.02044
San Bernardino	2020	ConstMin - Rubber Tired Dozers	Aggregated	300	Diesel	0.232619248	0.281469	0.334972	1.479305	2.998144	220.4453	0.146013	0.134332	0.146013	0.002031147	0.001799245	0.020434
San Bernardino	2020	ConstMin - Rubber Tired Dozers	Aggregated	600	Diesel	1.996874581	2.416218	2.875499	19.2771	25.95655	2450.188	1.168053	1.074609	1.168053	0.022593296	0.019998104	0.020562
San Bernardino	2020	ConstMin - Rubber Tired Dozers	Aggregated	750	Diesel	0.026162253	0.031656	0.037674	0.141087	0.476296	69.60272	0.013329	0.012262	0.013329	0.000642727	0.000568088	0.020445
San Bernardino	2020	ConstMin - Rubber Tired Loaders	Aggregated	50	Diesel	0.31456869	0.380628	0.452979	1.74	1.350697	150.8907	0.121899	0.112147	0.121899	0.001385623	0.00123155	0.020847
San Bernardino	2020	ConstMin - Rubber Tired Loaders	Aggregated	100	Diesel	3.230328291	3.908697	4.651673	27.79014	32.97558	3666.531	2.58239	2.375799	2.58239	0.033801987	0.029925733	0.018524
San Bernardino	2020	ConstMin - Rubber Tired Loaders	Aggregated	175	Diesel	5.176461348	6.263518	7.454104	55.69237	58.17063	8714.919	3.201907	2.945754	3.201907	0.080418456	0.071129999	0.018676
San Bernardino	2020	ConstMin - Rubber Tired Loaders	Aggregated	300	Diesel	5.658333727	6.846584	8.148001	31.41161	79.60497	13028.42	2.642743	2.431323	2.642743	0.120284451	0.10633621	0.018669
San Bernardino	2020	ConstMin - Rubber Tired Loaders	Aggregated	600	Diesel	7.684469874	9.298209	11.06564	49.78137	97.02391	16186.52	3.649528	3.357566	3.649528	0.149421914	0.132112238	0.018608
San Bernardino	2020	ConstMin - Rubber Tired Loaders	Aggregated	750	Diesel	0.519910412	0.629092	0.748671	4.137234	6.741725	1198.76	0.239218	0.22008	0.239218	0.011067537	0.009784121	0.018653
San Bernardino	2020	ConstMin - Rubber Tired Loaders	Aggregated	9999	Diesel	0.503522774	0.609263	0.725073	2.486459	10.54506	1124.429	0.266611	0.245282	0.266611	0.010380797	0.009177438	0.018704
San Bernardino	2020	ConstMin - Scrapers	Aggregated	25	Diesel	0.002157155	0.00261	0.003106	0.00733	0.004979	0.385683	0.000694	0.000638	0.000694	3.50112E-06	3.1479E-06	0.027744
San Bernardino	2020	ConstMin - Scrapers	Aggregated	50	Diesel	0.014474142	0.017514	0.020843	0.049424	0.035505	3.069744	0.004896	0.004504	0.004896	2.79471E-05	2.50548E-05	0.02728
San Bernardino	2020	ConstMin - Scrapers	Aggregated	75	Diesel	0.047849547	0.057898	0.068903	0.226015	0.442753	26.1104	0.038692	0.035596	0.038692	0.000239968	0.00021311	0.024997

OFFROAD Tons Per Year and Gallons Per Horsepower-Hour Calculation

Constants	
year	days
1	365

Region	CalYr	VehClass	MdlYr	HP_Bin	Fuel	HC_tpy	ROG_tpy	TOG_tpy	CO_tpy	NOx_tpy	CO2_tpy	PM10_tpy	PM2_5_tpy	PM_tpy	SOx_tpy	NH3_tpy	gal/hp-hr
San Bernardino	2020	ConstMin - Scrapers	Aggregated	100	Diesel	0.120312004	0.145578	0.173249	0.976607	1.491571	128.2696	0.109736	0.100957	0.109736	0.001182307	0.001046919	0.025034
San Bernardino	2020	ConstMin - Scrapers	Aggregated	175	Diesel	1.227781942	1.485616	1.768006	10.90422	15.14549	1667.504	0.814578	0.749412	0.814578	0.015380064	0.01360994	0.02504
San Bernardino	2020	ConstMin - Scrapers	Aggregated	300	Diesel	1.345642434	1.628227	1.937725	7.534017	18.56965	1914.229	0.814524	0.749362	0.814524	0.017657625	0.015623678	0.024862
San Bernardino	2020	ConstMin - Scrapers	Aggregated	600	Diesel	11.09910029	13.42991	15.9827	96.37756	158.3454	24009.68	6.037712	5.554695	6.037712	0.221648445	0.195963798	0.024985
San Bernardino	2020	ConstMin - Scrapers	Aggregated	750	Diesel	0.415940524	0.503288	0.598954	4.742698	6.901643	387.5513	0.281051	0.258567	0.281051	0.003570626	0.003163141	0.025067
San Bernardino	2020	ConstMin - Scrapers	Aggregated	9999	Diesel	0.607470047	0.735039	0.874757	7.363414	9.303655	555.921	0.388766	0.357665	0.388766	0.005121541	0.004537353	0.02494
San Bernardino	2020	ConstMin - Skid Steer Loaders	Aggregated	50	Diesel	0.505293963	0.611406	0.727623	5.238915	5.137531	821.6573	0.201405	0.185293	0.201405	0.00758147	0.006706256	0.021267
San Bernardino	2020	ConstMin - Skid Steer Loaders	Aggregated	75	Diesel	1.257569613	1.521659	1.8109	26.47734	20.15591	4268.276	0.861285	0.792382	0.861285	0.039424603	0.034837096	0.019057
San Bernardino	2020	ConstMin - Skid Steer Loaders	Aggregated	100	Diesel	0.027626447	0.033428	0.039782	0.575932	0.520156	89.32523	0.03375	0.03105	0.03375	0.000825027	0.000729061	0.018846
San Bernardino	2020	ConstMin - Skid Steer Loaders	Aggregated	175	Diesel	0.007138369	0.008637	0.010279	0.158825	0.095534	29.45323	0.004018	0.003697	0.004018	0.000272096	0.000240393	0.019004
San Bernardino	2020	ConstMin - Skid Steer Loaders	Aggregated	300	Diesel	0.004157573	0.005031	0.005987	0.050265	0.063513	27.35686	0.001801	0.001657	0.001801	0.000252803	0.000223283	0.019054
San Bernardino	2020	ConstMin - Skid Steer Loaders	Aggregated	600	Diesel	0.001900419	0.0023	0.002737	0.014768	0.031	7.914069	0.001331	0.001225	0.001331	7.31125E-05	6.45936E-05	0.019083
San Bernardino	2020	ConstMin - Skid Steer Loaders	Aggregated	9999	Diesel	0.004855082	0.005875	0.006991	0.033618	0.089301	10.71278	0.00293	0.002696	0.00293	9.88994E-05	8.74363E-05	0.019029
San Bernardino	2020	ConstMin - Surfacing Equipment	Aggregated	50	Diesel	0.00561905	0.006799	0.008091	0.049934	0.053812	7.60417	0.002747	0.002527	0.002747	7.01358E-05	6.20642E-05	0.017533
San Bernardino	2020	ConstMin - Surfacing Equipment	Aggregated	75	Diesel	0.004761241	0.005761	0.006856	0.040632	0.067695	5.794173	0.004227	0.003889	0.004227	5.34272E-05	4.72913E-05	0.015639
San Bernardino	2020	ConstMin - Surfacing Equipment	Aggregated	100	Diesel	0.021165063	0.02561	0.030478	0.282748	0.278234	43.6617	0.015709	0.014452	0.015709	0.000403039	0.000356361	0.015601
San Bernardino	2020	ConstMin - Surfacing Equipment	Aggregated	175	Diesel	0.019592512	0.023707	0.028213	0.235032	0.275251	40.87058	0.01348	0.012402	0.01348	0.000377281	0.00033358	0.015572
San Bernardino	2020	ConstMin - Surfacing Equipment	Aggregated	300	Diesel	0.028684738	0.034709	0.041306	0.218477	0.524299	80.76761	0.016931	0.015576	0.016931	0.000745876	0.000659214	0.015598
San Bernardino	2020	ConstMin - Surfacing Equipment	Aggregated	600	Diesel	0.051397855	0.062191	0.074013	0.526338	0.777868	256.0682	0.027982	0.025743	0.027982	0.002365936	0.002089994	0.015584
San Bernardino	2020	ConstMin - Surfacing Equipment	Aggregated	750	Diesel	0.031163597	0.037708	0.044876	0.244574	0.573921	126.2666	0.020236	0.018617	0.020236	0.001166463	0.001030571	0.015591
San Bernardino	2020	ConstMin - Surfacing Equipment	Aggregated	9999	Diesel	0.016056756	0.019429	0.023122	0.09135	0.380478	41.91124	0.009084	0.008357	0.009084	0.000387008	0.000342074	0.015589
San Bernardino	2020	ConstMin - Sweepers/Scrubbers	Aggregated	25	Diesel	0.007534211	0.009116	0.010849	0.025051	0.01725	1.318155	0.002371	0.002182	0.002371	1.1961E-05	1.07586E-05	0.026205
San Bernardino	2020	ConstMin - Sweepers/Scrubbers	Aggregated	50	Diesel	0.938516719	1.135605	1.351464	5.218553	4.32316	499.2522	0.392	0.36064	0.392	0.004587678	0.004074829	0.026189
San Bernardino	2020	ConstMin - Sweepers/Scrubbers	Aggregated	75	Diesel	0.146554508	0.177331	0.211038	1.032076	1.460295	135.7688	0.117654	0.108242	0.117654	0.001250854	0.001108127	0.023651
San Bernardino	2020	ConstMin - Sweepers/Scrubbers	Aggregated	100	Diesel	0.480289032	0.58115	0.691616	4.551544	5.078224	637.8792	0.407619	0.375009	0.407619	0.005883101	0.005206284	0.023555
San Bernardino	2020	ConstMin - Sweepers/Scrubbers	Aggregated	175	Diesel	0.139095327	0.168305	0.200297	1.224889	1.680338	192.9787	0.086449	0.079533	0.086449	0.001780011	0.001575066	0.023572
San Bernardino	2020	ConstMin - Sweepers/Scrubbers	Aggregated	300	Diesel	0.040467222	0.048965	0.058273	0.249784	0.606841	115.8925	0.019486	0.017928	0.019486	0.00107027	0.000945899	0.023572
San Bernardino	2020	ConstMin - Sweepers/Scrubbers	Aggregated	600	Diesel	0.012597406	0.015243	0.01814	0.207389	0.174918	15.65115	0.00883	0.008124	0.00883	0.000144325	0.000127743	0.023572
San Bernardino	2020	ConstMin - Sweepers/Scrubbers	Aggregated	9999	Diesel	0.007688825	0.009303	0.011072	0.040039	0.161112	20.10935	0.004572	0.004206	0.004572	0.00018569	0.00016413	0.023572
San Bernardino	2020	ConstMin - Tractors/Loaders/Backhoes	Aggregated	50	Diesel	1.931507974	2.337125	2.781371	14.18473	12.38993	1625.676	0.810947	0.746071	0.810947	0.014972236	0.013268549	0.021049
San Bernardino	2020	ConstMin - Tractors/Loaders/Backhoes	Aggregated	75	Diesel	0.649870416	0.786343	0.935813	2.619006	6.174131	258.0973	0.49519	0.455575	0.49519	0.002366741	0.002106555	0.019058
San Bernardino	2020	ConstMin - Tractors/Loaders/Backhoes	Aggregated	100	Diesel	12.77779258	15.46113	18.40002	174.178	157.086	25832.91	9.82862	9.04233	9.82862	0.238454762	0.210844767	0.019105
San Bernardino	2020	ConstMin - Tractors/Loaders/Backhoes	Aggregated	175	Diesel	1.751892811	2.11979	2.522726	26.81146	20.84932	4515.321	1.050468	0.96643	1.050468	0.041693827	0.036853445	0.018951
San Bernardino	2020	ConstMin - Tractors/Loaders/Backhoes	Aggregated	300	Diesel	0.996918796	1.206272	1.435563	6.571073	14.59233	2792.662	0.487149	0.448177	0.487149	0.025789636	0.022793331	0.019024
San Bernardino	2020	ConstMin - Tractors/Loaders/Backhoes	Aggregated	600	Diesel	1.188126012	1.437632	1.710901	9.774707	15.67502	3715.043	0.553829	0.509523	0.553829	0.034311775	0.030321685	0.018883
San Bernardino	2020	ConstMin - Tractors/Loaders/Backhoes	Aggregated	750	Diesel	0.027030207	0.032707	0.038923	0.252589	0.301028	125.6512	0.008301	0.007637	0.008301	0.001160897	0.001025548	0.018828
San Bernardino	2020	ConstMin - Tractors/Loaders/Backhoes	Aggregated	9999	Diesel	0.349099072	0.42241	0.502703	2.490389	8.179717	1269.667	0.166019	0.152737	0.166019	0.011728224	0.010362848	0.019068
San Bernardino	2020	ConstMin - Trenchers	Aggregated	50	Diesel	0.729213527	0.882348	1.050067	4.712623	4.559932	574.8931	0.347195	0.319419	0.347195	0.005293296	0.0046922	0.028941
San Bernardino	2020	ConstMin - Trenchers	Aggregated	75	Diesel	0.056916029	0.068868	0.081959	0.32666	0.575838	38.36867	0.039518	0.036356	0.039518	0.00035303	0.00031316	0.026082
San Bernardino	2020	ConstMin - Trenchers	Aggregated	100	Diesel	0.338403225	0.409468	0.487301	2.677647	3.75068	378.2194	0.284405	0.261653	0.284405	0.003486674	0.003086976	0.026031
San Bernardino	2020	ConstMin - Trenchers	Aggregated	175	Diesel	0.056534304	0.068407	0.081409	0.541367	0.725212	85.06468	0.03708	0.034114	0.03708	0.000784769	0.000694286	0.025899
San Bernardino	2020	ConstMin - Trenchers	Aggregated	300	Diesel	0.112768164	0.136449	0.162386	0.643198	1.672285	206.5254	0.067378	0.061988	0.067378	0.001906047	0.001685632	0.026061
San Bernardino	2020	ConstMin - Trenchers	Aggregated	600	Diesel	0.095220632	0.115217	0.137118	0.971896	1.350889	277.2257	0.050782	0.046719	0.050782	0.002560233	0.002262679	0.026087
San Bernardino	2020	ConstMin - Trenchers	Aggregated	750	Diesel	0.010473075	0.012672	0.015081	0.163175	0.106699	90.4926	0.001557	0.001432	0.001557	0.000836335	0.000738588	0.02601
San Bernardino	2020	ConstMin - Trenchers	Aggregated	9999	Diesel	0.013604832	0.016462	0.019591	0.195397	0.188883	7.501084	0.008722	0.008024	0.008722	6.89431E-05	6.12228E-05	0.025998
San Bernardino	2020	OFF - Light Commercial - Air Compressors	Aggregated	50	Diesel	0.441655566	0.525607	0.635984	3.359938	2.85802	378.4209	0.157215	0.144638	0.157215	0.004892037	0.003193666	0.027645
San Bernardino	2020	OFF - Light Commercial - Generator Sets	Aggregated	25	Diesel	0.739860192	0.880495	1.065399	4.571092	7.020071	884.6469	0.320866	0.295196	0.320866	0.012347333	0.007410216	0.042282
San Bernardino	2020	OFF - Light Commercial - Generator Sets	Aggregated	50	Diesel	0.843753283	1.004136	1.215005	7.241115	7.347514	1047.379	0.337562	0.310557	0.337562	0.013539992	0.008796071	0.042398
San Bernardino	2020	Portable Equipment - Non-Rental Generator	Aggregated	100	Diesel	0.596575642	0.721857	0.859069	10.86456	7.127302	1463.442	0.555712	0.511255	0.555712	0.013512347	0.011944414	0.015146
San Bernardino	2020	OFF - ConstMin - Cement and Mortar Mixers	Aggregated	25	Diesel	0.036812035	0.043809	0.053009	0.256094	0.330619	44.70605	0.013139	0.012088	0.013139	0.000669975	0.000374365	0.032066

OFFROAD2017 (v1.0.1) Emissions Inventory
Region Type: County
Region: San Bernardino
Calendar Year: 2020
Scenario: All Adopted Rules - Exhaust
Vehicle Classification: OFFROAD2017 Equipment Types
Units: Emissions: tons/day, Fuel Consumption: gallons/year, Activity: hours/year, HP-Hours: HP-hours/year

Region	CalYr	VehClass	MdlYr	HP_Bin	Fuel	HC_tpd	ROG_tpd	TOG_tpd	CO_tpd	NOx_tpd	CO2_tpd	PM10_tpd	PM2_5_tpd	PM_tpd	SOx_tpd	NH3_tpd	Fuel_gpy	Total_Activity	Total_Popu	Horsepower_Hours_hhpy
San Bernardino	2020	ConstMin - Bore/Drill Rigs	Aggregated	50	Diesel	0.000130078	0.000157394	0.000187312	0.000991755	0.001021436	0.131665	6.46725E-05	5.94987E-05	6.46725E-05	1.2134E-06	1.07463E-06	4271.718582	3697.631	10.63749	145058.68
San Bernardino	2020	ConstMin - Bore/Drill Rigs	Aggregated	75	Diesel	0.000102173	0.000123629	0.000147129	0.001512255	0.001814798	0.229369	9.54059E-05	8.77734E-05	9.54059E-05	2.11756E-06	1.87208E-06	7441.613862	3947.179	8.957888	289804.2634
San Bernardino	2020	ConstMin - Bore/Drill Rigs	Aggregated	100	Diesel	0.000216201	0.000261604	0.00031133	0.003733155	0.003001423	0.589452	0.000152817	0.000140591	0.000152817	5.44329E-06	4.81103E-06	19124.11101	8725.435	23.51446	747616.0505
San Bernardino	2020	ConstMin - Bore/Drill Rigs	Aggregated	175	Diesel	0.00025974	0.000314285	0.000374025	0.005294286	0.003364381	0.951915	0.000149073	0.000137147	0.000149073	8.79313E-06	7.7694E-06	30883.82322	7926.082	25.64196	1184920.033
San Bernardino	2020	ConstMin - Bore/Drill Rigs	Aggregated	300	Diesel	0.000307549	0.000372134	0.000442871	0.002767359	0.004716148	1.344238	0.000137047	0.000126083	0.000137047	1.24189E-05	1.09715E-05	43612.33642	8173.382	25.64196	1689720.206
San Bernardino	2020	ConstMin - Bore/Drill Rigs	Aggregated	600	Diesel	0.000469173	0.0005677	0.00067561	0.004852738	0.006488043	2.57188	0.000204362	0.000188013	0.000204362	2.37642E-05	2.09913E-05	83441.80935	7740.982	22.17077	3242397.491
San Bernardino	2020	ConstMin - Bore/Drill Rigs	Aggregated	750	Diesel	0.000168042	0.00020333	0.00024198	0.001792908	0.002240927	0.9707	7.8479E-05	7.22007E-05	7.8479E-05	8.96957E-06	7.92273E-06	31493.30733	1857.496	4.254997	1199951.385
San Bernardino	2020	ConstMin - Bore/Drill Rigs	Aggregated	9999	Diesel	0.000201586	0.000243919	0.000290284	0.001344846	0.005423317	0.711841	0.000131645	0.000121114	0.000131645	6.57528E-06	5.80995E-06	23094.90107	478.4876	0.671842	890174.8457
San Bernardino	2020	ConstMin - Cranes	Aggregated	25	Diesel	3.90892E-06	4.72979E-06	5.62884E-06	2.21592E-05	2.02665E-05	0.002518	1.5208E-06	1.39914E-06	1.5208E-06	2.31622E-08	2.05509E-08	81.69118793	197.3332	0.421889	4933.330716
San Bernardino	2020	ConstMin - Cranes	Aggregated	50	Diesel	0.000124839	0.000151055	0.000179768	0.000529364	0.000427211	0.040799	4.51155E-05	4.15062E-05	4.51155E-05	3.73462E-07	3.32996E-07	1323.677766	1919.528	4.500147	79143.23645
San Bernardino	2020	ConstMin - Cranes	Aggregated	75	Diesel	3.77115E-05	4.56309E-05	5.43046E-05	0.000157484	0.000344716	0.018343	3.19975E-05	2.94377E-05	3.19975E-05	1.68454E-07	1.49709E-07	595.1033595	566.4311	1.546926	39666.01817
San Bernardino	2020	ConstMin - Cranes	Aggregated	100	Diesel	0.001095448	0.001325492	0.001577444	0.007551574	0.011620371	0.946878	0.000819483	0.000753925	0.000819483	8.72149E-06	7.72829E-06	30720.40184	23435.44	54.28302	2068849.742
San Bernardino	2020	ConstMin - Cranes	Aggregated	175	Diesel	0.00233606	0.002826632	0.003363926	0.018796447	0.029199333	2.795764	0.001569371	0.001443821	0.001569371	2.57781E-05	2.28187E-05	90705.49333	41389.78	92.53427	6079958.521
San Bernardino	2020	ConstMin - Cranes	Aggregated	300	Diesel	0.002958656	0.003579973	0.004260464	0.016805585	0.04296674	5.0354	0.001756723	0.001616186	0.001756723	4.6466E-05	4.10983E-05	163368.0145	49326.56	106.4566	10967340.89
San Bernardino	2020	ConstMin - Cranes	Aggregated	600	Diesel	0.003915894	0.004738231	0.005638887	0.038120003	0.057627873	8.360363	0.002271142	0.002089451	0.002271142	7.71782E-05	6.82362E-05	271242.7731	49280.13	102.3783	18241386.87
San Bernardino	2020	ConstMin - Cranes	Aggregated	750	Diesel	0.000134188	0.000162368	0.000193231	0.001321487	0.00173036	0.133935	8.92193E-05	8.20818E-05	8.92193E-05	1.23427E-06	1.09316E-06	4345.379158	453.9605	1.125037	290569.6498
San Bernardino	2020	ConstMin - Cranes	Aggregated	9999	Diesel	0.000561283	0.000679152	0.000808247	0.005797438	0.007768721	0.468835	0.000370699	0.000341043	0.000370699	4.31778E-06	3.82657E-06	15210.84144	1088.784	2.250074	1021548.791
San Bernardino	2020	ConstMin - Crawler Tractors	Aggregated	50	Diesel	0.000388257	0.000469791	0.00055909	0.001670594	0.001291338	0.132004	0.000135288	0.000124465	0.000135288	1.2088E-06	1.0774E-06	4282.735919	4158.776	12.48126	174778.3409
San Bernardino	2020	ConstMin - Crawler Tractors	Aggregated	75	Diesel	0.000133036	0.000160973	0.000191571	0.000521837	0.001274816	0.043571	9.34672E-05	8.59898E-05	9.34672E-05	3.98843E-07	3.55619E-07	1413.606804	875.1361	4.243628	63192.1419
San Bernardino	2020	ConstMin - Crawler Tractors	Aggregated	100	Diesel	0.006319523	0.007646623	0.009100113	0.043728097	0.064376749	5.791378	0.005376923	0.004946769	0.005376923	5.33546E-05	4.72685E-05	187894.8887	96582.53	209.8099	8453286.735
San Bernardino	2020	ConstMin - Crawler Tractors	Aggregated	175	Diesel	0.004772378	0.005774577	0.006872224	0.040387518	0.059021892	6.363174	0.003301834	0.003037688	0.003301834	5.86875E-05	5.19354E-05	206446.1774	62437.88	141.2878	9308861.684
San Bernardino	2020	ConstMin - Crawler Tractors	Aggregated	300	Diesel	0.00443695	0.005368709	0.006389208	0.028219281	0.066621153	6.802201	0.00267333	0.002459464	0.00267333	6.27566E-05	5.55187E-05	220689.9234	48137.91	112.4561	9956133.62
San Bernardino	2020	ConstMin - Crawler Tractors	Aggregated	600	Diesel	0.009619183	0.011639211	0.013851623	0.072959119	0.14088359	23.0243	0.005295448	0.004871812	0.005295448	0.000212583	0.000187921	746998.0905	87454.02	186.5948	33661800.87
San Bernardino	2020	ConstMin - Crawler Tractors	Aggregated	750	Diesel	0.000291753	0.000353021	0.000420124	0.00182081	0.00559878	0.494689	0.000164043	0.00015092	0.000164043	4.56489E-06	4.03758E-06	16049.62537	1168.472	2.621064	725185.8804
San Bernardino	2020	ConstMin - Crawler Tractors	Aggregated	9999	Diesel	0.000893002	0.001080533	0.001285923	0.004556752	0.017505928	1.356173	0.000496356	0.000456648	0.000496356	1.25117E-05	1.10689E-05	43999.52499	2023.978	3.744377	1979961.064
San Bernardino	2020	ConstMin - Excavators	Aggregated	25	Diesel	3.65148E-06	4.4183E-06	5.25814E-06	1.24074E-05	8.42764E-06	0.000653	1.17456E-06	1.0806E-06	1.17456E-06	5.92646E-09	5.32854E-09	21.18127792	38.64102	0.125062	966.0253987
San Bernardino	2020	ConstMin - Excavators	Aggregated	50	Diesel	0.004404361	0.005329277	0.00634228	0.040451362	0.036238292	5.283153	0.001996394	0.001836682	0.001996394	4.87132E-05	4.31204E-05	171406.0904	218103.8	305.4018	7800695.592
San Bernardino	2020	ConstMin - Excavators	Aggregated	75	Diesel	9.42689E-05	0.000114065	0.000135747	0.001191126	0.001685456	0.16684	9.75001E-05	8.97001E-05	9.75001E-05	1.53969E-06	1.36172E-06	5412.93286	3728.649	5.502735	273631.9761
San Bernardino	2020	ConstMin - Excavators	Aggregated	100	Diesel	0.003111221	0.003764578	0.004480159	0.044688874	0.03849351	6.697611	0.002300427	0.002116393	0.002300427	6.18294E-05	5.4665E-05	217296.6187	135360.3	214.4816	11050478.02
San Bernardino	2020	ConstMin - Excavators	Aggregated	175	Diesel	0.005276958	0.00638512	0.00759882	0.084642565	0.062780787	14.47506	0.003051333	0.002807226	0.003051333	0.000133671	0.000118143	469627.2905	162742.6	281.765	23761655.29
San Bernardino	2020	ConstMin - Excavators	Aggregated	300	Diesel	0.005166039	0.006250907	0.007439096	0.039553807	0.071421573	18.40933	0.002177941	0.002003706	0.002177941	0.000170048	0.000150254	597270.3305	138350.7	242.3705	30217674.28
San Bernardino	2020	ConstMin - Excavators	Aggregated	600	Diesel	0.007785478	0.009420428	0.011211088	0.06771645	0.096079197	32.63957	0.003162675	0.002909661	0.003162675	0.000301535	0.0002664	1058954.741	159086.5	254.2514	53721930.02
San Bernardino	2020	ConstMin - Excavators	Aggregated	750	Diesel	0.000237397	0.00028725	0.000341852	0.001525083	0.003651255	0.578941	0.000119691	0.000110116	0.000119691	5.34547E-06	4.72524E-06	18783.10092	1520.949	2.751367	952792.2411
San Bernardino	2020	ConstMin - Excavators	Aggregated	9999	Diesel	0.00022403	0.000271076	0.000322603	0.002017089	0.005657747	0.912313	0.00010608	9.75936E-05	0.00010608	8.42806E-06	7.44617E-06	29598.98053	1243.348	1.875932	1496829.223

OFFROAD2017 (v1.0.1) Emissions Inventory
Region Type: County
Region: San Bernardino
Calendar Year: 2020
Scenario: All Adopted Rules - Exhaust
Vehicle Classification: OFFROAD2017 Equipment Types
Units: Emissions: tons/day, Fuel Consumption: gallons/year, Activity: hours/year, HP-Hours: HP-hours/year

Region	CalYr	VehClass	MdlYr	HP_Bin	Fuel	HC_tpd	ROG_tpd	TOG_tpd	CO_tpd	NOx_tpd	CO2_tpd	PM10_tpd	PM2_5_tpd	PM_tpd	SOx_tpd	NH3_tpd	Fuel_gpy	Total_Activity	Total_Popu	Horsepower_Hours_hhpy
San Bernardino	2020	ConstMin - Graders	Aggregated	50	Diesel	0.000125567	0.000151936	0.000180816	0.000488515	0.000350322	0.032856	4.30466E-05	3.96029E-05	4.30466E-05	2.99999E-07	2.68163E-07	1065.964369	1253.089	3.644584	45366.83524
San Bernardino	2020	ConstMin - Graders	Aggregated	75	Diesel	5.48178E-05	6.63295E-05	7.89376E-05	0.00041613	0.000509139	0.054148	3.60124E-05	3.31314E-05	3.60124E-05	4.98981E-07	4.41949E-07	1756.774283	1156.643	3.141883	83109.53496
San Bernardino	2020	ConstMin - Graders	Aggregated	100	Diesel	0.001313109	0.001588862	0.001890878	0.00666686	0.012347385	0.72947	0.001020598	0.00093895	0.001020598	6.70492E-06	5.95383E-06	23666.84252	12579.53	34.93774	1129992.536
San Bernardino	2020	ConstMin - Graders	Aggregated	175	Diesel	0.007685938	0.009299985	0.011067751	0.059896786	0.090778023	8.83947	0.005067419	0.004662026	0.005067419	8.14947E-05	7.21466E-05	286786.8818	91147.86	197.6873	13546845.74
San Bernardino	2020	ConstMin - Graders	Aggregated	300	Diesel	0.010032422	0.012139231	0.014446688	0.048854928	0.151788317	18.66328	0.005034101	0.004631373	0.005034101	0.00017225	0.000152327	605509.4513	132075.3	177.9563	28626175.34
San Bernardino	2020	ConstMin - Graders	Aggregated	600	Diesel	0.000435553	0.000527019	0.000627197	0.001887142	0.006971537	0.813968	0.000215733	0.000198474	0.000215733	7.51247E-06	6.6435E-06	26408.29011	3543.385	4.901337	1243037.165
San Bernardino	2020	ConstMin - Graders	Aggregated	9999	Diesel	0.000492749	0.000596227	0.000709559	0.002518663	0.008251579	0.63271	0.000258753	0.000238053	0.000258753	5.83494E-06	5.1641E-06	20527.58958	536.6174	0.754052	970913.6272
San Bernardino	2020	ConstMin - Off-Highway Tractors	Aggregated	50	Diesel	0.003125105	0.003781377	0.004500151	0.020630476	0.017435732	2.191014	0.001298711	0.001194814	0.001298711	2.01633E-05	1.78828E-05	71085.04566	75361.91	117.1043	2843381.586
San Bernardino	2020	ConstMin - Off-Highway Tractors	Aggregated	75	Diesel	0.000790447	0.00095644	0.001138243	0.010277869	0.009170258	1.504949	0.00055262	0.000508411	0.00055262	1.38903E-05	1.22832E-05	48826.42304	30563.99	48.61865	2167375.681
San Bernardino	2020	ConstMin - Off-Highway Tractors	Aggregated	100	Diesel	0.001152212	0.001394176	0.001659185	0.00960049	0.012781943	1.278268	0.001058505	0.000973824	0.001058505	1.17837E-05	1.04331E-05	41472.01312	23016.14	36.52568	1834461.3
San Bernardino	2020	ConstMin - Off-Highway Tractors	Aggregated	175	Diesel	0.001007643	0.001219247	0.001451005	0.014465245	0.013003964	2.379991	0.000630893	0.000580421	0.000630893	2.1974E-05	1.94252E-05	77216.19953	21658.45	32.33017	3429211.965
San Bernardino	2020	ConstMin - Off-Highway Tractors	Aggregated	300	Diesel	0.000807263	0.000976788	0.001162458	0.005195608	0.011703771	2.128936	0.000396432	0.000364718	0.000396432	1.96589E-05	1.73761E-05	69070.99598	14161.11	22.58176	3072874.635
San Bernardino	2020	ConstMin - Off-Highway Tractors	Aggregated	600	Diesel	0.001636574	0.001980254	0.002356666	0.013162763	0.019420077	6.512521	0.000657098	0.00060453	0.000657098	6.01624E-05	5.31543E-05	211291.5717	26316.37	38.87024	9407257.501
San Bernardino	2020	ConstMin - Off-Highway Tractors	Aggregated	750	Diesel	0.000141155	0.000170797	0.000203262	0.000765586	0.001702192	0.379193	6.9087E-05	6.356E-05	6.9087E-05	3.5016E-06	3.09492E-06	12302.50903	867.4169	1.233976	553095.3067
San Bernardino	2020	ConstMin - Off-Highway Tractors	Aggregated	9999	Diesel	0.000137716	0.000166636	0.000198311	0.000888528	0.002510888	0.37016	6.60828E-05	6.07961E-05	6.60828E-05	3.41818E-06	3.02119E-06	12009.41801	326.3481	0.616988	533433.2044
San Bernardino	2020	ConstMin - Off-Highway Trucks	Aggregated	25	Diesel	2.85565E-05	3.45534E-05	4.11214E-05	0.000129356	8.49868E-05	0.009294	8.78431E-06	8.08157E-06	8.78431E-06	8.50688E-08	7.58545E-08	301.5260202	549.4617	0.366791	13736.54233
San Bernardino	2020	ConstMin - Off-Highway Trucks	Aggregated	50	Diesel	0.000230942	0.00027944	0.000332557	0.001932828	0.001622979	0.201378	0.00011292	0.000103887	0.00011292	1.85491E-06	1.64362E-06	6533.492924	10399.13	6.602236	299331.7051
San Bernardino	2020	ConstMin - Off-Highway Trucks	Aggregated	75	Diesel	3.00468E-05	3.63566E-05	4.32674E-05	0.00047049	0.000276076	0.063432	1.11281E-05	1.02378E-05	1.11281E-05	5.85559E-07	5.17723E-07	2057.981347	1466.459	0.978109	104315.9185
San Bernardino	2020	ConstMin - Off-Highway Trucks	Aggregated	100	Diesel	0.000108553	0.000131349	0.000156316	0.001108946	0.001116193	0.146866	9.00842E-05	8.28775E-05	9.00842E-05	1.3546E-06	1.1987E-06	4764.91798	2743.49	2.200745	241486.0276
San Bernardino	2020	ConstMin - Off-Highway Trucks	Aggregated	175	Diesel	0.002476289	0.002996309	0.003565855	0.031929979	0.02538088	5.012775	0.001330208	0.001223791	0.001330208	4.62713E-05	4.09136E-05	162633.9575	52283.96	38.14625	8248329.919
San Bernardino	2020	ConstMin - Off-Highway Trucks	Aggregated	300	Diesel	0.004409286	0.005335236	0.006349372	0.027009955	0.048683059	10.21156	0.001896785	0.001745042	0.001896785	9.42787E-05	8.33454E-05	331302.7975	79839.28	64.06614	16854073.34
San Bernardino	2020	ConstMin - Off-Highway Trucks	Aggregated	600	Diesel	0.016926842	0.020481479	0.024374653	0.118642095	0.196481223	43.81558	0.007173487	0.006599608	0.007173487	0.000404589	0.000357617	1421548.194	191375.1	144.0266	72035615.17
San Bernardino	2020	ConstMin - Off-Highway Trucks	Aggregated	750	Diesel	0.007132414	0.008630221	0.010270676	0.055398308	0.083439573	14.75617	0.003263815	0.003002709	0.003263815	0.000136214	0.000120438	478747.6446	36626.82	30.81044	24288000.22
San Bernardino	2020	ConstMin - Off-Highway Trucks	Aggregated	9999	Diesel	0.011574542	0.014005196	0.016667341	0.069102377	0.213296996	26.20869	0.005391179	0.004959884	0.005391179	0.000241965	0.000213912	850312.166	33946.75	24.57499	42907429.87
San Bernardino	2020	ConstMin - Other Construction Equipm	Aggregated	50	Diesel	0.001773186	0.002145555	0.002553388	0.010814549	0.010077772	1.181742	0.000810841	0.000745974	0.000810841	1.08726E-05	9.64522E-06	38340.30875	41986.69	90.40667	1599874.229
San Bernardino	2020	ConstMin - Other Construction Equipm	Aggregated	75	Diesel	0.000228886	0.000276952	0.000329596	0.001217906	0.002333739	0.132516	0.000173772	0.00015987	0.000173772	1.21831E-06	1.08158E-06	4299.345819	2765.498	9.004163	202002.1856
San Bernardino	2020	ConstMin - Other Construction Equipm	Aggregated	100	Diesel	0.002779232	0.003362871	0.004002094	0.024979237	0.031130366	3.576814	0.002307166	0.002122593	0.002307166	3.2986E-05	2.91935E-05	116045.802	65908.6	150.3939	5405217.859
San Bernardino	2020	ConstMin - Other Construction Equipm	Aggregated	175	Diesel	0.001235892	0.001495429	0.001779684	0.012438883	0.015838763	2.01926	0.000836976	0.000770018	0.000836976	1.8632E-05	1.64809E-05	65512.654	20092.48	49.76625	3060351.306
San Bernardino	2020	ConstMin - Other Construction Equipm	Aggregated	300	Diesel	0.001306683	0.001581087	0.001881624	0.008413031	0.019784836	2.698412	0.000752974	0.000692736	0.000752974	2.4909E-05	2.20241E-05	87546.99283	18477.51	46.84598	4054771.393
San Bernardino	2020	ConstMin - Other Construction Equipm	Aggregated	600	Diesel	0.003481061	0.004212084	0.005012728	0.029533992	0.050925377	10.28425	0.001799188	0.001655253	0.001799188	9.49785E-05	8.39386E-05	333661.0762	40608.96	93.20526	15559230.28
San Bernardino	2020	ConstMin - Other Construction Equipm	Aggregated	750	Diesel	0.000533674	0.000645745	0.00076849	0.00400432	0.00770718	1.880882	0.000251881	0.00023173	0.000251881	1.73737E-05	1.53515E-05	61023.13733	4602.514	8.882485	2849431.197
San Bernardino	2020	ConstMin - Other Construction Equipm	Aggregated	9999	Diesel	0.00019962	0.00024154	0.000287453	0.001359024	0.004652442	0.649034	0.000108988	0.000100269	0.000108988	5.99465E-06	5.29733E-06	21057.19259	1075.2	2.31188	980893.5662
San Bernardino	2020	ConstMin - Pavers	Aggregated	50	Diesel	0.00026786	0.000324111	0.000385718	0.001358113	0.00117138	0.144726	9.88823E-05	9.09717E-05	9.88823E-05	1.33002E-06	1.18123E-06	4695.461251	5073.985	14.64552	196386.2647
San Bernardino	2020	ConstMin - Pavers	Aggregated	75	Diesel	0.000374224	0.000452811	0.000538883	0.001829882	0.003402132	0.237043	0.00032491	0.000298917	0.00032491	2.18036E-06	1.93472E-06	7690.609772	4970.523	14.15734	359496.1422
San Bernardino	2020	ConstMin - Pavers	Aggregated	100	Diesel	0.000637976	0.000771951	0.000918686	0.007691162	0.008184155	1.154845	0.00052344	0.000481565	0.00052344	1.0658E-05	9.42569E-06	37467.68872	21613.45	56.38527	1750799.224
San Bernardino	2020	ConstMin - Pavers	Aggregated	175	Diesel	0.000837078	0.001012865	0.001205393	0.010955303	0.01075802	1.918536	0.000530596	0.000488149	0.000530596	1.77127E-05	1.56588E-05	62244.78773	18332.75	48.69637	2891722.2
San Bernardino	2020	ConstMin - Pavers	Aggregated	300	Diesel	0.000416105	0.000503487	0.000599191	0.002903174	0.007760536	1.496469	0.00022315	0.000205298	0.00022315	1.38231E-05	1.2214E-05	48551.2953	10217.53	23.31079	2262552.601
San Bernardino	2020	ConstMin - Pavers	Aggregated	600	Diesel	6.24073E-05	7.55128E-05	8.98665E-05	0.000507759	0.000958207	0.270791	3.28342E-05	3.02075E-05	3.28342E-05	2.50172E-06	2.21016E-06	8785.511031	1111.125	2.562967	407958.2418
San Bernardino	2020	ConstMin - Pavers	Aggregated	750	Diesel	1.01491E-05	1.22804E-05	1.46147E-05	0.000102711	0.000126075	0.056048	5.53465E-06	5.09188E-06	5.53465E-06	5.17885E-07	4.57455E-07	1818.409735	112.8551	0.244092	84641.29427

OFFROAD2017 (v1.0.1) Emissions Inventory
Region Type: County
Region: San Bernardino
Calendar Year: 2020
Scenario: All Adopted Rules - Exhaust
Vehicle Classification: OFFROAD2017 Equipment Types
Units: Emissions: tons/day, Fuel Consumption: gallons/year, Activity: hours/year, HP-Hours: HP-hours/year

Region	CalYr	VehClass	MdlYr	HP_Bin	Fuel	HC_tpd	ROG_tpd	TOG_tpd	CO_tpd	NOx_tpd	CO2_tpd	PM10_tpd	PM2_5_tpd	PM_tpd	SOx_tpd	NH3_tpd	Fuel_gpy	Total_Activ	Total_Popu	Horsepower_Hours_hhpy
San Bernardino	2020	ConstMin - Paving Equipment	Aggregated	50	Diesel	0.000159098	0.000192509	0.000229102	0.001308362	0.001224308	0.18024	6.71981E-05	6.18222E-05	6.71981E-05	1.66164E-06	1.4711E-06	5847.693641	8297.342	18.03376	287815.6684
San Bernardino	2020	ConstMin - Paving Equipment	Aggregated	75	Diesel	2.90726E-05	3.51778E-05	4.18645E-05	0.000184034	0.000302293	0.021981	2.32587E-05	2.1398E-05	2.32587E-05	2.02355E-07	1.79408E-07	713.1568697	579.6777	1.584047	38911.29883
San Bernardino	2020	ConstMin - Paving Equipment	Aggregated	100	Diesel	0.000425739	0.000515144	0.000613064	0.005014108	0.005031452	0.753324	0.000330122	0.000303712	0.000330122	6.95208E-06	6.14853E-06	24440.7619	14943.86	33.14313	1328439.955
San Bernardino	2020	ConstMin - Paving Equipment	Aggregated	175	Diesel	0.000353293	0.000427484	0.000508742	0.004777836	0.004262341	0.815988	0.000229717	0.00021134	0.000229717	7.53361E-06	6.65998E-06	26473.81618	9974.261	22.17666	1444006.756
San Bernardino	2020	ConstMin - Paving Equipment	Aggregated	300	Diesel	0.000209194	0.000253125	0.00030124	0.001296224	0.003309773	0.578772	0.000117312	0.000107927	0.000117312	5.34475E-06	4.72386E-06	18777.60559	4368.174	9.504281	1021174.467
San Bernardino	2020	ConstMin - Paving Equipment	Aggregated	600	Diesel	0.000193662	0.000234331	0.000278873	0.001281235	0.003108117	0.596273	9.54401E-05	8.78049E-05	9.54401E-05	5.50703E-06	4.8667E-06	19345.41464	2547.727	5.605089	1048625.058
San Bernardino	2020	ConstMin - Paving Equipment	Aggregated	750	Diesel	2.46553E-05	2.9833E-05	3.55037E-05	0.000138727	0.000418198	0.071121	1.06658E-05	9.81251E-06	1.06658E-05	6.56811E-07	5.80481E-07	2307.448226	183.7571	0.365549	125592.2953
San Bernardino	2020	ConstMin - Paving Equipment	Aggregated	9999	Diesel	7.4224E-06	8.9811E-06	1.06883E-05	9.72867E-05	0.000232213	0.05295	3.74001E-06	3.44081E-06	3.74001E-06	4.89327E-07	4.32171E-07	1717.906575	110.9067	0.2437	93495.95796
San Bernardino	2020	ConstMin - Rollers	Aggregated	25	Diesel	2.54329E-06	3.07739E-06	3.66234E-06	8.49047E-06	6.02184E-06	0.000465	8.07986E-07	7.43347E-07	8.07986E-07	4.22552E-09	3.79762E-09	15.09576002	28.00613	0.125539	700.1531567
San Bernardino	2020	ConstMin - Rollers	Aggregated	50	Diesel	0.003867468	0.004679636	0.005569154	0.023883997	0.022921779	2.973959	0.001662094	0.001529126	0.001662094	2.73797E-05	2.42731E-05	96486.81247	125166.1	370.2158	4471045.926
San Bernardino	2020	ConstMin - Rollers	Aggregated	75	Diesel	7.70017E-05	9.3172E-05	0.000110882	0.000308071	0.000755591	0.026769	5.30825E-05	4.88359E-05	5.30825E-05	2.45182E-07	2.18484E-07	868.4876058	645.1211	2.887407	44703.91087
San Bernardino	2020	ConstMin - Rollers	Aggregated	100	Diesel	0.002736027	0.003310592	0.003939879	0.030654119	0.0332769	4.620538	0.002116585	0.001947258	0.002116585	4.26371E-05	3.77122E-05	149908.2827	88520.08	273.2994	7722470.375
San Bernardino	2020	ConstMin - Rollers	Aggregated	175	Diesel	0.001619176	0.001959203	0.002331613	0.026702968	0.022319119	4.80536	0.001025239	0.00094322	0.001025239	4.43794E-05	3.92207E-05	155904.6047	55925.57	159.6862	8041833.328
San Bernardino	2020	ConstMin - Rollers	Aggregated	300	Diesel	0.000301032	0.000364249	0.000433487	0.002364939	0.004655317	0.795675	0.000163588	0.000150501	0.000163588	7.34738E-06	6.49419E-06	25814.80841	6152.806	20.46293	1329769.278
San Bernardino	2020	ConstMin - Rollers	Aggregated	600	Diesel	0.000122986	0.000148813	0.0001771	0.001367412	0.001851988	0.466837	6.26443E-05	5.76327E-05	6.26443E-05	4.31245E-06	3.81026E-06	15146.01461	2221.026	7.406827	776486.3134
San Bernardino	2020	ConstMin - Rough Terrain Forklifts	Aggregated	25	Diesel	2.2622E-07	2.73726E-07	3.25757E-07	4.94721E-06	6.65012E-06	0.000804	2.17793E-07	2.0037E-07	2.17793E-07	7.42362E-09	6.55951E-09	26.07445454	45.08599	0.144875	1127.149835
San Bernardino	2020	ConstMin - Rough Terrain Forklifts	Aggregated	50	Diesel	0.000186083	0.000225161	0.00026796	0.001069024	0.00100937	0.135094	6.78034E-05	6.23791E-05	6.78034E-05	1.24343E-06	1.10262E-06	4382.98879	4005.22	14.92216	189524.3791
San Bernardino	2020	ConstMin - Rough Terrain Forklifts	Aggregated	75	Diesel	4.19563E-05	5.07671E-05	6.04171E-05	0.000196995	0.000297958	0.021318	2.40492E-05	2.21253E-05	2.40492E-05	1.95837E-07	1.73995E-07	691.6412722	566.2413	2.318006	30819.42766
San Bernardino	2020	ConstMin - Rough Terrain Forklifts	Aggregated	100	Diesel	0.002749064	0.003326368	0.003958653	0.07119715	0.049348762	11.68012	0.001639957	0.00150876	0.001639957	0.000107906	9.53315E-05	378948.5229	189386.7	684.6811	18206376.57
San Bernardino	2020	ConstMin - Rough Terrain Forklifts	Aggregated	175	Diesel	0.001342817	0.001624808	0.001933656	0.015891186	0.014973977	2.754253	0.001004656	0.000924284	0.001004656	2.54242E-05	2.24798E-05	89358.71277	34664.83	131.1122	4296833.822
San Bernardino	2020	ConstMin - Rough Terrain Forklifts	Aggregated	300	Diesel	3.27877E-05	3.96731E-05	4.72143E-05	0.000353375	0.000563979	0.191066	1.28719E-05	1.18422E-05	1.28719E-05	1.76551E-06	1.55945E-06	6198.916392	1418.027	5.795015	298171.3694
San Bernardino	2020	ConstMin - Rough Terrain Forklifts	Aggregated	600	Diesel	1.02635E-05	1.24189E-05	1.47795E-05	0.000128178	0.000191038	0.0709	4.07616E-06	3.75007E-06	4.07616E-06	6.55195E-07	5.78674E-07	2300.261756	289.5846	1.159003	111325.236
San Bernardino	2020	ConstMin - Rough Terrain Forklifts	Aggregated	750	Diesel	1.95369E-06	2.36396E-06	2.81331E-06	2.2383E-05	3.08347E-05	0.012222	2.16303E-07	1.98998E-07	2.16303E-07	1.12944E-07	9.97582E-08	396.5447659	30.54212	0.144875	19088.82785
San Bernardino	2020	ConstMin - Rubber Tired Dozers	Aggregated	50	Diesel	0.000229332	0.000277491	0.000330238	0.001345435	0.001014655	0.131978	8.3911E-05	7.71981E-05	8.3911E-05	1.21332E-06	1.07718E-06	4281.873575	4540.472	4.896996	188299.6429
San Bernardino	2020	ConstMin - Rubber Tired Dozers	Aggregated	75	Diesel	0.000212169	0.000256724	0.000305523	0.00100002	0.002019662	0.102837	0.000161135	0.000148245	0.000161135	9.44411E-07	8.39339E-07	3336.421996	2306.007	3.463729	162002.6792
San Bernardino	2020	ConstMin - Rubber Tired Dozers	Aggregated	100	Diesel	0.000669893	0.000810571	0.000964646	0.004088591	0.006354438	0.502596	0.000557816	0.00051319	0.000557816	4.62665E-06	4.10212E-06	16306.16141	9400.554	10.7495	789939.8961
San Bernardino	2020	ConstMin - Rubber Tired Dozers	Aggregated	175	Diesel	0.000617186	0.000746795	0.000888747	0.004008913	0.007336972	0.54064	0.000422662	0.000388849	0.000422662	4.97997E-06	4.41263E-06	17540.47249	5799.99	7.882969	858163.8838
San Bernardino	2020	ConstMin - Rubber Tired Dozers	Aggregated	300	Diesel	0.000637313	0.000771149	0.000917731	0.00405289	0.008214092	0.60396	0.000400036	0.000368033	0.000400036	5.56479E-06	4.92944E-06	19594.80514	4388.728	6.569141	958936.119
San Bernardino	2020	ConstMin - Rubber Tired Dozers	Aggregated	600	Diesel	0.005470889	0.006619776	0.007878081	0.052813979	0.071113829	6.712843	0.003200146	0.002944135	0.003200146	6.18994E-05	5.47893E-05	217790.813	28665.55	40.25092	10592124.42
San Bernardino	2020	ConstMin - Rubber Tired Dozers	Aggregated	750	Diesel	7.16774E-05	8.67297E-05	0.000103215	0.000386539	0.00130492	0.190692	3.6517E-05	3.35956E-05	3.6517E-05	1.7609E-06	1.55641E-06	6186.804758	465.2249	0.477756	302606.6785
San Bernardino	2020	ConstMin - Rubber Tired Loaders	Aggregated	50	Diesel	0.000861832	0.001042817	0.001241038	0.004767124	0.003700539	0.413399	0.00033397	0.000307252	0.00033397	3.79623E-06	3.37411E-06	13412.28365	15461.42	18.42475	643371.1243
San Bernardino	2020	ConstMin - Rubber Tired Loaders	Aggregated	100	Diesel	0.008850214	0.01070876	0.012744309	0.076137368	0.090344057	10.04529	0.00707504	0.006509037	0.00707504	9.26082E-05	8.19883E-05	325908.3827	204889.4	228.9399	17593629.46
San Bernardino	2020	ConstMin - Rubber Tired Loaders	Aggregated	175	Diesel	0.014182086	0.017160324	0.020422204	0.152581847	0.159371595	23.87649	0.008772348	0.00807056	0.008772348	0.000220325	0.000194877	774646.4529	276410.9	300.2736	41478924.17
San Bernardino	2020	ConstMin - Rubber Tired Loaders	Aggregated	300	Diesel	0.015502284	0.018757764	0.022323289	0.086059203	0.218095798	35.6943	0.007240391	0.006661159	0.007240391	0.000329546	0.000291332	1158062.273	294674	280.106	62030654.86
San Bernardino	2020	ConstMin - Rubber Tired Loaders	Aggregated	600	Diesel	0.021053342	0.025474544	0.030316813	0.136387329	0.265818936	44.34664	0.009998708	0.009198812	0.009998708	0.000409375	0.000361951	1438777.99	232129.2	246.3688	77321565.41
San Bernardino	2020	ConstMin - Rubber Tired Loaders	Aggregated	750	Diesel	0.001424412	0.001723539	0.002051153	0.011334888	0.01847048	3.284275	0.000655391	0.000602959	0.000655391	3.0322E-05	2.68058E-05	106554.6891	8639.007	10.08381	5712591.414
San Bernardino	2020	ConstMin - Rubber Tired Loaders	Aggregated	9999	Diesel	0.001379514	0.001669212	0.001986501	0.006812216	0.028890575	3.080627	0.000730441	0.000672005	0.000730441	2.84405E-05	2.51437E-05	99947.55703	5590.991	4.85517	5343617.042

OFFROAD2017 (v1.0.1) Emissions Inventory
Region Type: County
Region: San Bernardino
Calendar Year: 2020
Scenario: All Adopted Rules - Exhaust
Vehicle Classification: OFFROAD2017 Equipment Types
Units: Emissions: tons/day, Fuel Consumption: gallons/year, Activity: hours/year, HP-Hours: HP-hours/year

Region	CalYr	VehClass	MdlYr	HP_Bin	Fuel	HC_tpd	ROG_tpd	TOG_tpd	CO_tpd	NOx_tpd	CO2_tpd	PM10_tpd	PM2_5_tpd	PM_tpd	SOx_tpd	NH3_tpd	Fuel_gpy	Total_Activity	Total_Popu	Horsepower_Hours_hhpy
San Bernardino	2020	ConstMin - Scrapers	Aggregated	25	Diesel	5.91001E-06	7.15112E-06	8.51042E-06	2.00817E-05	1.36403E-05	0.001057	1.90105E-06	1.74897E-06	1.90105E-06	9.59211E-09	8.62437E-09	34.28239389	49.42752	0.12309	1235.687921
San Bernardino	2020	ConstMin - Scrapers	Aggregated	50	Diesel	3.96552E-05	4.79828E-05	5.71035E-05	0.000135409	9.72729E-05	0.00841	1.34128E-05	1.23398E-05	1.34128E-05	7.65674E-08	6.86434E-08	272.8615623	258.2588	0.738541	10002.34452
San Bernardino	2020	ConstMin - Scrapers	Aggregated	75	Diesel	0.000131095	0.000158625	0.000188776	0.00061922	0.001213022	0.071535	0.000106004	9.75239E-05	0.000106004	6.57447E-07	5.83862E-07	2320.885345	1372.712	3.323435	92848.40043
San Bernardino	2020	ConstMin - Scrapers	Aggregated	100	Diesel	0.000329622	0.000398843	0.000474656	0.002675636	0.004086497	0.351424	0.000300647	0.000276595	0.000300647	3.2392E-06	2.86827E-06	11401.54947	5027.465	8.862494	455444.948
San Bernardino	2020	ConstMin - Scrapers	Aggregated	175	Diesel	0.003363786	0.004070181	0.004843852	0.029874576	0.041494495	4.568503	0.002231721	0.002053183	0.002231721	4.21372E-05	3.72875E-05	148220.0419	35296.46	80.13171	5919417.807
San Bernardino	2020	ConstMin - Scrapers	Aggregated	300	Diesel	0.003686692	0.004460897	0.005308836	0.020641143	0.050875752	5.244463	0.002231572	0.002053046	0.002231572	4.83771E-05	4.28046E-05	170150.8106	30515.31	77.54682	6843759.557
San Bernardino	2020	ConstMin - Scrapers	Aggregated	600	Diesel	0.030408494	0.036794278	0.043788231	0.264048098	0.433823105	65.77995	0.016541677	0.015218343	0.016541677	0.000607256	0.000536887	2134158.064	202484.6	432.1697	85418559.14
San Bernardino	2020	ConstMin - Scrapers	Aggregated	750	Diesel	0.001139563	0.001378871	0.001640971	0.012993694	0.018908612	1.061784	0.000770003	0.000708403	0.000770003	9.78254E-06	8.66614E-06	34448.4231	2208.586	5.785239	1374229.223
San Bernardino	2020	ConstMin - Scrapers	Aggregated	9999	Diesel	0.001664301	0.002013805	0.002396594	0.020173737	0.025489467	1.523071	0.001065112	0.000979903	0.001065112	1.40316E-05	1.24311E-05	49414.37125	1240.493	3.200345	1981329.472
San Bernardino	2020	ConstMin - Skid Steer Loaders	Aggregated	50	Diesel	0.001384367	0.001675084	0.001993489	0.014353191	0.014075427	2.251116	0.000551794	0.000507651	0.000551794	2.07712E-05	1.83733E-05	73034.9725	78806.07	256.3337	3434209.498
San Bernardino	2020	ConstMin - Skid Steer Loaders	Aggregated	75	Diesel	0.003445396	0.004168929	0.004961371	0.07254066	0.055221663	11.69391	0.002359685	0.00217091	0.002359685	0.000108013	9.54441E-05	379395.9422	282542.8	810.8126	19908662.31
San Bernardino	2020	ConstMin - Skid Steer Loaders	Aggregated	100	Diesel	7.56889E-05	9.15836E-05	0.000108992	0.001577896	0.001425084	0.244727	9.24657E-05	8.50685E-05	9.24657E-05	2.26035E-06	1.99743E-06	7939.886806	5519.569	16.39417	421302.655
San Bernardino	2020	ConstMin - Skid Steer Loaders	Aggregated	175	Diesel	1.95572E-05	2.36642E-05	2.81623E-05	0.000435137	0.000261737	0.080694	1.10088E-05	1.01281E-05	1.10088E-05	7.45467E-07	6.58612E-07	2618.021074	904.9729	3.431339	137759.6508
San Bernardino	2020	ConstMin - Skid Steer Loaders	Aggregated	300	Diesel	1.13906E-05	1.37826E-05	1.64025E-05	0.000137712	0.000174009	0.07495	4.93489E-06	4.5401E-06	4.93489E-06	6.92611E-07	6.11734E-07	2431.679573	622.5941	2.160473	127620.028
San Bernardino	2020	ConstMin - Skid Steer Loaders	Aggregated	600	Diesel	5.20663E-06	6.30002E-06	7.49755E-06	4.04604E-05	8.49313E-05	0.021682	3.64672E-06	3.35499E-06	3.64672E-06	2.00308E-07	1.76969E-07	703.4610025	77.96602	0.254173	36862.33469
San Bernardino	2020	ConstMin - Skid Steer Loaders	Aggregated	9999	Diesel	1.33016E-05	1.60949E-05	1.91543E-05	9.21048E-05	0.000244661	0.02935	8.02814E-06	7.38589E-06	8.02814E-06	2.70957E-07	2.39552E-07	952.2314756	50.04001	0.254173	50040.00979
San Bernardino	2020	ConstMin - Surfacing Equipment	Aggregated	50	Diesel	1.53947E-05	1.86275E-05	2.21683E-05	0.000136805	0.00014743	0.020833	7.52676E-06	6.92462E-06	7.52676E-06	1.92153E-07	1.70039E-07	675.9148808	1070.615	4.49646	38550.30629
San Bernardino	2020	ConstMin - Surfacing Equipment	Aggregated	75	Diesel	1.30445E-05	1.57838E-05	1.87841E-05	0.00011132	0.000185466	0.015874	1.15808E-05	1.06544E-05	1.15808E-05	1.46376E-07	1.29565E-07	515.0289386	495.2477	1.959995	32931.80637
San Bernardino	2020	ConstMin - Surfacing Equipment	Aggregated	100	Diesel	5.79865E-05	7.01636E-05	8.35005E-05	0.000774652	0.000762285	0.119621	4.30382E-05	3.95951E-05	4.30382E-05	1.10422E-06	9.76331E-07	3880.974448	2770.095	10.49174	248760.8752
San Bernardino	2020	ConstMin - Surfacing Equipment	Aggregated	175	Diesel	5.36781E-05	6.49505E-05	7.72965E-05	0.000643922	0.000754113	0.111974	3.69323E-05	3.39777E-05	3.69323E-05	1.03365E-06	9.13918E-07	3632.879312	1719.671	6.802336	233288.2855
San Bernardino	2020	ConstMin - Surfacing Equipment	Aggregated	300	Diesel	7.85883E-05	9.50919E-05	0.000113167	0.000598568	0.001436436	0.221281	4.63851E-05	4.26743E-05	4.63851E-05	2.0435E-06	1.80607E-06	7179.222517	2018.543	8.41645	460271.3581
San Bernardino	2020	ConstMin - Surfacing Equipment	Aggregated	600	Diesel	0.000140816	0.000170387	0.000202775	0.001442022	0.002131145	0.701557	7.66617E-05	7.05288E-05	7.66617E-05	6.48202E-06	5.72601E-06	22761.23705	3594.693	12.79762	1460594.192
San Bernardino	2020	ConstMin - Surfacing Equipment	Aggregated	750	Diesel	8.53797E-05	0.000103309	0.000122947	0.000670066	0.001572385	0.345936	5.54418E-05	5.10065E-05	5.54418E-05	3.19579E-06	2.82348E-06	11223.51057	1131.829	4.035284	719854.055
San Bernardino	2020	ConstMin - Surfacing Equipment	Aggregated	9999	Diesel	4.39911E-05	5.32292E-05	6.33472E-05	0.000250273	0.001042406	0.114825	2.48869E-05	2.28959E-05	2.48869E-05	1.0603E-06	9.37189E-07	3725.380737	272.7656	1.037645	238974.306
San Bernardino	2020	ConstMin - Sweepers/Scrubbers	Aggregated	25	Diesel	2.06417E-05	2.49764E-05	2.9724E-05	6.86333E-05	4.72595E-05	0.003611	6.49725E-06	5.97747E-06	6.49725E-06	3.27698E-08	2.94756E-08	117.1673354	178.8483	0.244421	4471.206421
San Bernardino	2020	ConstMin - Sweepers/Scrubbers	Aggregated	50	Diesel	0.002571279	0.003111247	0.003702641	0.014297406	0.011844274	1.367814	0.001073971	0.000988054	0.001073971	1.2569E-05	1.11639E-05	44377.22502	47486.39	68.80443	1694524.081
San Bernardino	2020	ConstMin - Sweepers/Scrubbers	Aggregated	75	Diesel	0.000401519	0.000485838	0.000578188	0.002827606	0.004000808	0.371969	0.00032234	0.000296552	0.00032234	3.427E-06	3.03596E-06	12068.13849	7042.695	12.34325	510256.5978
San Bernardino	2020	ConstMin - Sweepers/Scrubbers	Aggregated	100	Diesel	0.00131586	0.001592191	0.001894839	0.012469982	0.013912943	1.747614	0.001116763	0.001027422	0.001116763	1.61181E-05	1.42638E-05	56699.42046	30424.92	43.87352	2407113.956
San Bernardino	2020	ConstMin - Sweepers/Scrubbers	Aggregated	175	Diesel	0.000381083	0.000461111	0.00054876	0.003355861	0.004603667	0.528709	0.000236846	0.000217898	0.000236846	4.87674E-06	4.31525E-06	17153.37611	4552.997	6.477149	727716.1084
San Bernardino	2020	ConstMin - Sweepers/Scrubbers	Aggregated	300	Diesel	0.000110869	0.000134152	0.000159652	0.000684339	0.001662579	0.317514	5.33876E-05	4.91166E-05	5.33876E-05	2.93225E-06	2.5915E-06	10301.38293	2084.018	2.933049	437026.6209
San Bernardino	2020	ConstMin - Sweepers/Scrubbers	Aggregated	600	Diesel	3.45134E-05	4.17613E-05	4.96994E-05	0.00056819	0.000479229	0.04288	2.4192E-05	2.22566E-05	2.4192E-05	3.9541E-07	3.4998E-07	1391.189803	178.8483	0.244421	59019.92475
San Bernardino	2020	ConstMin - Sweepers/Scrubbers	Aggregated	9999	Diesel	2.10653E-05	2.5489E-05	3.0334E-05	0.000109696	0.000441402	0.055094	1.2525E-05	1.1523E-05	1.2525E-05	5.08741E-07	4.49671E-07	1787.46811	89.42413	0.12221	75831.66089
San Bernardino	2020	ConstMin - Tractors/Loaders/Backho	Aggregated	50	Diesel	0.005291803	0.006403081	0.007620196	0.038862287	0.033945003	4.453907	0.002221772	0.00204403	0.002221772	4.10198E-05	3.63522E-05	144502.104	181092.5	358.7469	6865038.594
San Bernardino	2020	ConstMin - Tractors/Loaders/Backho	Aggregated	75	Diesel	0.001780467	0.002154365	0.002563872	0.007175358	0.016915428	0.707116	0.001356685	0.00124815	0.001356685	6.48422E-06	5.77138E-06	22941.59227	16709.86	76.24935	1203766.8
San Bernardino	2020	ConstMin - Tractors/Loaders/Backho	Aggregated	100	Diesel	0.035007651	0.042359258	0.050411017	0.477200049	0.430372533	70.77511	0.026927726	0.024773508	0.026927726	0.000653301	0.000577657	2296220.347	1445657	2359.605	120188219.8
San Bernardino	2020	ConstMin - Tractors/Loaders/Backho	Aggregated	175	Diesel	0.004799706	0.005807645	0.006911577	0.073456062	0.057121426	12.37074	0.002877994	0.002647755	0.002877994	0.00011423	0.000100968	401355.1323	147704.4	272.4977	21178068
San Bernardino	2020	ConstMin - Tractors/Loaders/Backho	Aggregated	300	Diesel	0.002731284	0.003304854	0.003933049	0.018002939	0.039978973	7.651128	0.001334654	0.001227882	0.001334654	7.06565E-05	6.24475E-05	248232.4364	62853.74	114.124	13048596.75
San Bernardino	2020	ConstMin - Tractors/Loaders/Backho	Aggregated	600	Diesel	0.00325514	0.003938719	0.004687401	0.026780018	0.04294526	10.1782	0.00151734	0.001395953	0.00151734	9.40049E-05	8.30731E-05	330220.5256	51952.17	98.74916	17487937.85
San Bernardino	2020	ConstMin - Tractors/Loaders/Backho	Aggregated	750	Diesel	7.40554E-05	8.9607E-05	0.00010664	0.000692025	0.000824735	0.34425	2.27427E-05	2.09233E-05	2.27427E-05	3.18054E-06	2.80972E-06	11168.80939	933.8869	1.374988	593188.5483
San Bernardino	2020	ConstMin - Tractors/Loaders/Backho	Aggregated	9999	Diesel	0.000956436	0.001157287	0.001377268	0.006822984	0.022410183	3.478539	0.000454846	0.000418458	0.000454846	3.21321E-05	2.83914E-05	112857.3528	3198.611	5.249955	5918578.966
San Bernardino	2020	ConstMin - Trenchers	Aggregated	50	Diesel	0.001997845	0.002417393	0.002876897	0.012911295	0.012492964	1.57505	0.000951219	0.000875121	0.000951219	1.45022E-05	1.28553E-05	51100.75198	44257.18	117.6365	1765682.103
San Bernardino	2020	ConstMin - Trenchers	Aggregated	75	Diesel	0.000155934	0.000188681	0.000224545	0.00089496	0.001577639	0.10512	0.000108268	9.96068E-05	0.000108268	9.67205E-07	8.57972E-07	3410.490662	1852.225	7.084926	130759.9839
San Bernardino	2020	ConstMin - Trenchers	Aggregated	100	Diesel	0.000927132	0.00112183	0.00133507	0.007336021	0.010275835	1.036218	0.000779192	0.000716857	0.000779192	9.55253E-06	8.45747E-06	33618.93662	15394.26	47.45564	1291499.207
San Bernardino	2020	ConstMin - Trenchers	Aggregated	175	Diesel	0.000154889	0.000187415	0.000223039	0.001483196	0.001986881	0.233054	0.00010159	9.34628E-05	0.00010159	2.15005E-06	1.90215E-06	7561.177606	2040.251	7.218604	291946.4748
San Bernardino	2020	ConstMin - Trenchers	Aggregated	300	Diesel	0.000308954	0.000373834	0.000444894	0.001762186	0.004581602	0.565823	0.000184597	0.000169829	0.000184597	5.22205E-06	4.61817E-06	18357.50282	3078.195	10.02584	704391.8678
San Bernardino	2020	ConstMin - Trenchers	Aggregated	600	Diesel	0.000260878	0.000315663	0.000375665	0.00266273	0.003701067	0.759523	0.000139128	0.000127998	0.000139128	7.01434E-06	6.19912E-06	24641.87372	2431.512	6.81757	944605.7996
San Bernardino	2020	ConstMin - Trenchers	Aggregated	750	Diesel	2.86934E-05	3.4719E-05	4.13184E-05	0.000447054	0.000292325	0.247925	4.26521E-06	3.92399E-06	4.26521E-06	2.29133E-06	2.02353E-06	8043.651796	478.1909	1.069423	309252.3016
San Bernardino	2020	ConstMin - Trenchers	Aggregated	9999	Diesel	3.72735E-05	4.51009E-05	5.36739E-05	0.000535335	0.000517487	0.020551	2.38949E-05	2.19833E-05	2.38949E-05	1.88885E-07	1.67734E-07	666.7517988	29.82169	0.133678	25646.65625
San Bernardino	2020	OFF - Light Commercial - Air Compresso	Aggregated	50	Diesel	0.001210015	0.001440018	0.001742422	0.00920531	0.007830193	1.03677	0.000430727	0.000396269	0.000430727	1.34028E-05	8.74977E-06	34780.85	34003.4	41.77	1258125.8
San Bernardino	2020	OFF - Light Commercial - Generator Se	Aggregated	25	Diesel	0.002027014	0.002412314	0.0029189	0.012523539	0.019233072	2.42369	0.000879084	0.000808757	0.000879084	3.38283E-05	2.0302E-05	80701.5	132732.3	393.13	1908654.35
San Bernardino	2020	OFF - Light Commercial - Generator Se	Aggregated	50	Diesel	0.002311653	0.002751058	0.00332878	0.019838671	0.020130176	2.869531	0.000924827	0.000850841	0.000924827	3.70959E-05	2.40988E-05	95794.25	68466.7	202.76	2259401.1
San Bernardino	2020	Portable Equipment - Non-Rental Gen	Aggregated	100	Diesel	0.001634454	0.001977689	0.002353613	0.029765908	0.019526856	4.009429	0.001522499	0.001400699	0.001522499	3.70201E-05	3.27244E-05	130081.5153	87005.75	66.23473	8588255.284
San Bernardino	2020	OFF - ConstMin - Cement and Mortar M	Aggregated	25	Diesel	0.000100855	0.000120026	0.000145231	0.000701627	0.000905807	0.122482	3.59963E-05	3.31166E-05	3.59963E-05	1.83555E-06	1.02566E-06	4077.05	12329.7	41.13	127144.1

EMFAC2017 (v1.0.2) Emission Rates
Region Type: County
Region: SAN BERNARDINO
Calendar Year: 2020
Season: Annual
Vehicle Classification: EMFAC2011 Categories
Units: miles/day for VMT, trips/day for Trips, g/mile for RUNEX, PMBW and PMTW, g/trip for STREX, HTSK and RUNLS, g/vehicle/day for IDLEX, RESTL and DIURN

Region	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	Population	VMT	Percent VMT	Trips	ROG_RUNEX	CO_RUNEX	NOx_RUNEX	PM10_Total	PM2.5_Total	CO2_RUNEX	CH4_RUNEX	N2O_RUNEX	SOx_RUNEX
SAN BERNARDINO	2020	LDA	Aggregated	Aggregated	GAS	871457.6	36867296.74	61%	4100557	0.012916992	0.780862454	0.051313349	0.046290247	0.019166238	280.1057766	0.003262498	0.00540571	0.002771874
SAN BERNARDINO	2020	LDA	Aggregated	Aggregated	DSL	6569.597	293430.672	0%	31275.43	0.017714752	0.223086628	0.107478951	0.054488848	0.027067543	208.8168286	0.000822816	0.032823098	0.00197407
SAN BERNARDINO	2020	LDT1	Aggregated	Aggregated	GAS	92778.61	3339879.477	6%	417651.8	0.042428406	1.844117053	0.17406018	0.047315021	0.02010865	328.5129241	0.009445319	0.012050931	0.003250902
SAN BERNARDINO	2020	LDT1	Aggregated	Aggregated	DSL	59.61067	1067.91221	0%	194.7341	0.239677641	1.469599576	1.352674518	0.231783563	0.196692567	414.5902215	0.011132568	0.065167809	0.003919369
SAN BERNARDINO	2020	LDT2	Aggregated	Aggregated	GAS	286801	10910046.75	18%	1330042	0.023060588	1.179889495	0.121363844	0.046399854	0.019267069	358.3239942	0.005472835	0.00905234	0.003545906
SAN BERNARDINO	2020	LDT2	Aggregated	Aggregated	DSL	1267.753	57700.70142	0%	6291.57	0.01580499	0.120933106	0.053824905	0.051032622	0.023760831	282.8482272	0.000734112	0.044459802	0.002673933
SAN BERNARDINO	2020	MDV	Aggregated	Aggregated	GAS	243585.8	8975648.035	15%	1110418	0.035564533	1.502355447	0.160982364	0.046446728	0.019311765	440.2116679	0.007608413	0.011450101	0.004356251
SAN BERNARDINO	2020	MDV	Aggregated	Aggregated	DSL	4030.525	178779.223	0%	19675.7	0.01395302	0.209902333	0.083743595	0.051579856	0.024284392	381.6388235	0.000648091	0.059988308	0.003607859
Total							60623849.51											
SAN BERNARDINO	2020	T7 NOOS	Aggregated	Aggregated	DSL	2173.261	393237.4448		31729.62	0.054518823	0.266674927	2.860859509	0.146781453	0.082379925	1343.082606	0.002532258	0.211113882	0.012688778
SAN BERNARDINO	2020	LHD2	Aggregated	Aggregated	DSL	8374.807	309443.7659	68%	105344.5	0.090780203	0.624825398	2.785985371	0.122831359	0.061934715	537.3543464	0.004216567	0.08446462	0.005079931
SAN BERNARDINO	2020	LHD2	Aggregated	Aggregated	GAS	4171.44	142454.4099	32%	62148.24	0.029026807	0.770711946	0.261245274	0.098268012	0.041220465	939.2688442	0.006376352	0.016435791	0.009294827
Total							451898.1758											
Construction Workers (LDA/LDT1/LDT2)										0.0170175	0.9305345	0.0744772	0.0464359	0.0193026	299.4264121	0.0041157	0.0068112	0.0029624
Pick-Ups and Other Light/Medium Duty Road Vehicles (LDT1/LDT2/MDV)										0.0305234	1.3878147	0.1436240	0.0466074	0.0194613	385.4006485	0.0068071	0.0108742	0.0038122
18-Wheeler - (Heavy-Heavy Duty Diesel Neighboring Out-of-state Truck)										0.0545188	0.2666749	2.8608595	0.1467815	0.0823799	1343.0826058	0.0025323	0.2111139	0.0126888
Flat Bed Large Pick-Up for Material Deliveries to Site (off 18-Wheeler) (LHD2)										0.0713133	0.6708140	1.9900973	0.1150881	0.0554048	664.0521197	0.0048974	0.0630195	0.0064086

Fugitive Dust Emissions (Earthwork and Concrete Batching)

Earthwork Fugitive Particulate Matter Emissions - Bulldozing, Scraping and Grading						Unmitigated		Unmitigated	
Activity	**Equipment**	**Daily Activity Level**	**Total Activity Level**	**PM10 Emission Factor (lb/activity)**	**PM2.5 Emission Factor (lb/activity)**	**PM10 (lb/day)**	**PM2.5 (lb/day)**	PM_{10} (tons)	$PM_{2.5}$ (tons)
Boulder Removal	1	9.0	9.0	0.753	0.415	6.77	3.73	0.0406	0.0224
Site Preparation and Grading	2	9.0	18.0	0.753	0.415	13.55	7.47	0.3387	0.1867
Tower Foundation and Tower Stack + Fence	0	0.0	0.0	0.753	0.415	0.00	0.00	0.0000	0.0000

Total Earthwork Fugitive Dust Emissions	PM10 (lbs/day)	PM2.5 (lbs/day)
Boulder Removal	6.77	3.7333
Site Preparation and Grading	13.55	7.4667
Tower Foundation and Tower Stack + Fence	0.00	0.0000

Concrete Batch Plant Emissions

Batch Plant Activity	PM10 Emission Factor (lb/yd^3)	PM10 (lb/day)	PM2.5 (lb/day)	PM10 (tons/year)	PM2.5 (tons/year)
Aggregate delivery to ground storage (3-05-011-21)	0.0031	0.0210	0.0031	0.0005	0.0001
Sand delivery to ground storage (3-05-011-22)	0.0007	0.0047	0.0007	0.0001	0.0000
Aggregate transfer to conveyor (3-05-011-23)	0.0031	0.0210	0.0031	0.0005	0.0001
Sand transfer to conveyor (3-05-011-24)	0.0007	0.0047	0.0007	0.0001	0.0000
Aggregate transfer to elevated storage (3-05-011-04)	0.0031	0.0210	0.0031	0.0005	0.0001
Sand transfer to elevated storage (3-05-011-05)	0.0007	0.0047	0.0007	0.0001	0.0000
Cement delivery to Silo (3-05-011-07 controlled)	0.0001	0.0007	0.0001	0.0000	0.0000
Cement supplement delivery to Silo (3-05-011-17 controlled)	0.0002	0.0014	0.0002	0.0000	0.0000
Weigh hopper loading (3-05-011-08)	0.0038	0.0257	0.0039	0.0006	0.0001
Central mix loading (3-05-011-09)	0.0874	0.5916	0.0887	0.0130	0.0020
Total		0.6965	0.1045	0.0153	0.0023

Source: AP-42. Section 11.12 Concrete Batching. Table 11.12-6
Source (PM2.5 percentage): https://www.arb.ca.gov/ei/speciate/profilereference/concretebatching_pm3431.pdf
PM2.5 calculated as 15% of PM10.

Concrete Requirements

Component	Quantity	Cubic Ft. Per Unit	CY	CY/day
Carriers - Solar	3	1750	194.44	4.42
Carriers - Equipment Pad	3	30	3.33	0.08
Tower Foundation and Fencing	1	-	100.00	2.27
Total			298	6.77

Notes:
Based on information from client (Email comm. 6/28/2021): *There will be three carriers. Each will have (14) 5' x 5' x 5' blocks for their solar and an equipment pad 5' x 12' x 6" and 100 CY for foundation and fencing.*
All concrete batching assumed to occur during Tower Foundation and Tower Stack + Fence phase (44 days)
Additional generator conservatively added to Tower Foundation and Tower Stack phase to provide power to concrete batch plant.

Construction Water Energy Estimates

Source	Total Construction Water Use (Mgal)	Total Electricity Demand from Water Demand (KWh)	Total tons CO_2e
Estimated construction water usage	0.0364	474	0.0931

Notes: Based on conservative estimate of 36,400 gallons of water during project construction (180 CY).

CalEEMod Water Electricity Factors	Electricity Intensity Factor To Supply (kWh/Mgal)	Electricity Intensity Factor To Treat (kWh/Mgal)	Electricity Intensity Factor To Distribute (kWh/Mgal)	Electricity Intensity Factor For Wastewater Treatment (kWh/Mgal)
Total	9727	111	1272	1911

Source: CalEEMod 2020.4.0 (Appendix D)

SCE Emission Factor	pounds CO_2e/MWh	tons CO_2e/KWh
	393	0.0001965

Source: CalEEMod 2020.4.0 (Appendix D)

Paved Roads Fugitive Dust Emissions

Paved Roads	100%

Truck Delivery	Vehicle Type	No.	Miles Per Day	Paved Road Dust Emissions (lbs/day) PM10	PM2.5	Paved Road Dust Emissions (tons) PM10	PM2.5
Tower Foundation and Tower Stack + Fence	Haul Truck/Material Truck (18 Wheeler)	1	220	0.908	0.223	0.0005	0.0001
Solar Panels and Carrier Equipment	Haul Truck/Material Truck (18 Wheeler)	1	220	0.908	0.223	0.0005	0.0001
Flat Bed Large Pick-Up (Construction Equipment Mobilization - Boulder Removal)	Haul Truck/Material Truck (LHDT2)	4	48	0.792	0.194	0.0004	0.0001
Flat Bed Large Pick-Up (Construction Equipment Mobilization - Site Prep-Grading)	Haul Truck/Material Truck (LHDT2)	6	72	1.783	0.438	0.0009	0.0002
Equipment Demobilization (Tower Foundation and Tower Stack/Fence)	Haul Truck/Material Truck (LHDT2)	12	144	7.130	1.750	0.0071	0.0018

Phase	Vehicle Type	No.	Miles Per Day	PM10 (lbs/day)	PM2.5 (lbs/day)	PM10 (tons/phase)	PM2.5 (tons/phase)
Boulder Removal	Worker/Pick Up	20	12	0.16	0.04	0.001	0.000
Site Preparation and Grading	Worker/Pick Up	20	12	0.16	0.04	0.004	0.001
Tower Foundation and Tower Stack + Fence	Worker/Pick Up	20	12	0.16	0.04	0.003	0.001
PM emissions include offsite travel. Onsite travel assumed to be unpaved roads.							

Paved Road Dust $EF_{DUST} = [(k(sL)^{0.91} \times (W)^{1.02}](1 - P/4N))$

Source: AP-42 Section 13.2.1 (Paved Roads) - http://www.epa.gov/ttnchie1/ap42/ch13/final/c13s0201.pdf

Variable	Value	Description
k (PM10)	0.0022	particle size multiplier for particle size range and units of interest (lb/VMT)
k (PM2.5)	0.00054	particle size multiplier for particle size range and units of interest (lb/VMT)
sL	0.1	road surface silt loading (g/m^2)
W	2.4	average weight (tons) of vehicles (2.4 tons)
W	14.75	haul truck tons
P	30	number of "wet" days with at least 0.254 mm of precipitation during the averaging period
N	365	number of days in averaging period

Pickup and Worker

EF (PM10)	0.000647473	lb/VMT
EF (PM2.5)	0.000158925	lb/VMT

Haul Truck

Variable	Value	Description
k		particle size multiplier for particle size range and units of interest
s		surface material silt content (%)
M		surface material moisture content (%)
S		mean vehicle speed (mph)
C		emission factors for 1980's vehicle exhaust, brake wear, and tire wear
P		number of "wet" days with at least 0.254 mm of precipitation during the averaging period
EF (PM10)	0.004126423	lb/VMT
EF (PM2.5)	0.001012849	lb/VMT

Unpaved Road Dust $EF_{DUST} = (((k(s/12)^{1} (S/30)^{0.5})/(M/0.5)^{0.2}) - C) (1 - P/365)$

Fugitive Dust - Unpaved Roads

	Daily On-Site Construction Motor Vehicle Fugitive Particulate Matter Emissions														
	Vehicle Type	No.	Mi/Veh-Day	Surface Type	Silt Loading (g/m^2)/ Silt Content (%)[a]	Vehicle Weight (tons)	Uncontrolled Emission Factors (lb/mi)[b]		Uncontrolled Emissions (lb/day)[c]		Control Efficiency[d]	Controlled Emissions (lb/day)[e]		Controlled Emissions (tons)	Controlled Emissions (tons)
							PM10	PM2.5	PM10	PM2.5		PM10	PM2.5	PM10	PM2.5
Boulder Removal	Worker/Pick up Truck	8	1.75	Unpaved	4.3	2.4	0.58	0.05	8.1	0.7	57%	3.5	0.3	0.02082	0.00174
Boulder Removal - Equipment Mobilization	Truck	4	1.75	Unpaved	4.3	14.75	1.43	0.12	10.0	0.8	57%	4.3	0.4	0.00215	0.00018
Site Preparation and Grading	Worker/Pick up Truck	8	1.75	Unpaved	4.3	2.4	0.58	0.05	8.1	0.7	57%	3.5	0.3	0.08677	0.00723
Site Prep and Grading - Equipment Mobilization	Truck	6	1.75	Unpaved	4.3	14.75	1.43	0.12	15.0	1.3	57%	6.5	0.5	0.00323	0.00027
Tower Foundation and Tower Stack + Fence	Worker/Pick up Truck	8	1.75	Unpaved	4.3	2.4	0.58	0.05	8.1	0.7	57%	3.5	0.3	0.07636	0.00168
Tower Foundation - Equipment Demob	Truck	16	1.75	Unpaved	4.3	14.75	1.43	0.12	40.0	3.3	57%	17.2	1.4	0.01721	0.00143

Note: Totals may not match sum of individual values because of rounding.

[a] Unpaved surface silt content from USEPA, AP-42, July 1998, Table 11.9-3 Typical Values for Correction Factors Applicable to the Predictive Emission Factor Equations

[b] Equations:

EF (unpaved) = $k_u (s/12)^a (W/3)^b$ Ref: AP-42, Section 13.2.2, "Unpaved Roads," November 2006

Constants:

k_u =	1.8	(Particle size multiplier for PM)
	0.15	(Particle size multiplier for PM2.5)
a =	1	for PM10
	1	for PM2.5
b =	0.5	for PM10
	0.5	for PM2.5

[c] Uncontrolled emissions [lb/day] = Emission factor [lb/mi] x Number x Daily miles traveled [mi/vehicle-day]

[d] Control efficiency from limiting maximum speed to 15 mph (57%), from SCAQMD Table XI-A, Mitigation Measure Examples, Fugitive Dust from Construction & Demolition, http://www.aqmd.gov/home/rules-compliance/ceqa/air-quality-analysis-handbook/mitigation-measures-and-control-efficiencies/fugitive-dust

[e] Controlled emissions [lb/day] = Uncontrolled emissions [lb/day] x (1 - Control efficiency [%])

Fugitive Dust Emission Factors

Truck Loading Fugitive Dust Emission Factors

$EF_D = k \times (0.0032) \times ((U/5)^{1.3})/((M/2)^{1.4})$

Variable	Amount	Units	
EF (PM_{10})	0.0003	lb/ton	
EF ($PM_{2.5}$)	0.00004	lb/ton	
k (PM_{10})	0.35	factor	
k ($PM_{2.5}$)	0.053	factor	
U (mean wind speed)	7.90	miles/hr	WRCC average Annual Wind Speed Data for Blythe Airport
M (moisture content)	7.90	percent	USEPA, AP-42, July 1998, Table 11.9-3 Typical Values for Correction Factors Applicable to the Predictive Emission Factor Equations
Soil density (CalEEMod default)	1.26	tons/cy	
Rip rap density	2.23	tons/cy	
Derrick/Grouted stone density	1.96	tons/cy	

E (lbs) = EF (lb/ton) x TP (tons)

Bulldozing, Scraping and Grading

PM10 Emission Factor [lb/hr] = 0.75 x (silt content [%])$^{1.5}$ / (moisture)$^{1.4}$

PM2.5 Emission Factor [lb/hr] = 0.60 x (silt content [%])$^{1.2}$ / (moisture)$^{1.3}$

Reference: AP-42, Table 11.9-1, July 1998

Parameter	Value	Basis
Silt Content	6.9	USEPA, AP-42, July 1998, Table 11.9-3 Typical Values for Correction Factors Applicable to the Predictive Emission Factor Equations
Moisture	7.9	USEPA, AP-42, July 1998, Table 11.9-3 Typical Values for Correction Factors Applicable to the Predictive Emission Factor Equations

PM10 Emission Factor	0.75	lb/hr
PM2.5 Emission Factor	0.41	lb/hr

Emissions [pounds per day] = Controlled emission factor [pounds per hour] x Bulldozing, scraping or grading time [hours/day]

Operational Emissions

On-Road Vehicle Trips and Emergency Generator

						Maximum Daily Emissions Summary (lbs/day)										Annual Emissions Summary (tons)									
	Maximum Daily Trips	**Distance**	**Average Daily Mileage**	**Frequency Per Year**	**Annual Mileage**	**ROG**	**CO**	**NOx**	**PM10**	**PM2.5**	**SOx**	**CO2**	**CH_4**	**N_2O**	**CO2e**	**ROG**	**NO_x**	**CO**	**PM10**	**PM2.5**	**SOx**	**CO_2**	**CH_4**	**N_2O**	**CO2e**
Worker Trips (Running Exhaust)	18	13.75	248	12	2,970	0.01	0.51	0.04	0.03	0.01	0.00	163.38	0.00	0.04	175.20	0.00	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00	1.05
Worker Trips Fugitive Dust - Unpaved Roads	18	1.75	31	12	378	-	-	-	18.16	1.51		-	-	-	-	-	-	-	0.11	0.01	-	-	-	-	-
Worker Trips Fugitive Dust - Paved Roads	18	12	216	12	2,970	-	-	-	0.89	0.22		-	-	-	-	-	-	-	0.0053	0.0013	-	-	-		
					Total	**0.01**	**0.51**	**0.04**	**19.08**	**1.74**	**0.00**	**163.38**	**0.00**	**0.04**	**175.20**	**0.00**	**0.00**	**0.00**	**0.11**	**0.01**	**0.00**	**0.98**	**0.00**	**0.00**	**1.05**

Notes: Assumes three maintenance-related trips per month.

Stationary Source Emissions

						Maximum Daily Emissions Summary (lbs/day)										Annual Emissions Summary (tons)									
	Quantity	Hrs Per Week	Weekly Fuel Usage (gal)	Weeks Per Year	Annual Fuel Usage (gal)	**ROG**	**CO**	**NOx**	**PM10**	**PM2.5**	**SOx**	**CO2**	**CH_4**	**N_2O**	**CO_2e**	**ROG**	**CO**	**NO_x**	**PM10**	**PM2.5**	**SOx**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Emergency Generator	3	0.5	6.6	52	343.2	0.55	0.85	0.92	0.03	0.03	0.00	82.50	0.00	0.01	84.11	0.01	0.02	0.02	0.00	0.00	0.00	2.15	0.00	0.00	2.19

Fuel Consumption (gal/hr)	4.4

Source: LPG Fuel Consumption for 35 kW standby generator at 100% Load
https://www.powerequipmentdirect.com/Briggs-&-Stratton-76130/p78245.html

Emission Factors	lb/gal								
	ROG	**CO**	**NOx**	**PM10**	**PM2.5**	**SOx**	**CO2**	**CH_4**	**N_2O**
Propane Fired Engine, Uncontrolled	0.083	0.129	0.139	0.005	0.005	0.00035	12.50	0.0002	0.0009

Source: Emission factors for ROG, CO, NOx, PM10, PM2.5, and SOx sourced from SDAPCD Engine, Propane Fired, Uncontrolled Emissions.
https://www.sdapcd.org/content/dam/sdc/apcd/PDF/Misc/EFT/Liquid_Combustion/APCD_Engine_Propane_Fired_Uncontrolled.pdf
Emission factors for CO2, CH4, and N2O from AP-42 Table 1.5-1 LPG Combustion (https://www.epa.gov/sites/production/files/2020-09/documents/1.5_liquefied_petroleum_gas_combustion.pdf)

Constants	
lb	grams
1	453.59237
ton	lbs
1	2000
ton	grams
1	907185
GWP CO2e	CH4
28	1
GWP CO2e	N2O
265	1
ton	lbs
1	2000
kW	hp
1	1.34102
m3/hr	gal/hr
1	264.175

Appendix C

Pre-Project Botanical Survey Results Report

AECOM
401 West A St.
Suite 1200
San Diego, CA 92101
www.aecom.com

619.610.7600 tel
619.610.7601 fax

September 3, 2015

Lara Kobelt
Needles Field Office
Bureau of Land Management
1303 South U.S. Highway 95
Needles, California 92363

RE: Nipton Communication Site – 2013 - 2015 Pre-Project Botanical Survey Results Report, San Bernardino County, California

Dear Ms. Kobelt:

This letter report summarizes the results of pre-project vegetation mapping and special-status plant surveys conducted by AECOM during spring and fall 2013, 2014, and spring 2015 within the Nipton Communication Site project area. Surveys were conducted on behalf of InterConnect Towers.

Project Location

The Nipton Communication Site, hereafter referred to as the project site, is located in San Bernardino County, California, approximately 10 miles (16.1 kilometers) south of the California/Nevada state line, immediately southwest of the junction of Interstate 15 (I-15) and Nipton Road, in the far eastern half of Section 33 Township 16 North, Range 14 East (Figure 1). The center of the communication tower would be located at 35°28'03.0"N, 115°28'10.0"W at an elevation of approximately 4,460 feet (1,359 meters) above mean sea level (Figure 2). The proposed site and all ancillary components would be located entirely on public lands managed by the Bureau of Land Management (BLM).

Project Description

The project site would consist of an irregularly shaped 6,240-square-foot (0.143-acre) lease area, within which would be located a fenced communication site compound. The project would also include the use of an existing access road measuring 375 feet (114.3 meters) in length and 14 feet (4.3 meters) in width, as well as the construction and use of a new access road segment measuring approximately (1.73 miles; 2.78 kilometers) in length and an average of 25 feet (7.6 meters) in width. Five vehicle pull-off/passing areas measuring 25 feet (7.6 meters) by 100 feet (30.5 meters) would be located at appropriate intervals along the new roadway.

Commercial electric power would be provided to the site from an adjacent distribution line approximately 2,640 feet (805 meters) south of the site (Figure 2). The electric power easement would run on a southerly/northerly alignment from the communication site lease area to an existing Southern California Edison (SCE) distribution power pole lying south of the I-15 right-of-way.

Construction of the electric distribution line would occur before the construction of the communication site. The communication site and the access road would be graded prior to the start of construction of the electric distribution line. The graded communication site would then be used as a temporary helicopter landing pad for the construction of the electric distribution line. Poles and digging equipment would be delivered to location via helicopter. The helicopter would be used to set each wood pole into position and string the conductors. A 0.18-acre (0.07-hectare) temporary staging area measuring 80-foot by 100-foot (24-meter by 30.5-meter) would be located in a previously disturbed parking area.

Disturbance associated with the electric distribution line outside of the communication site lease area would be limited to the installation of 12 - Class 3 Douglas Fir wood poles, approximately 14 inches (36 centimeters) in diameter. Each pole would be approximately 45 feet (13.8 meters) tall as measured from ground level after installation. Excavation for the new utility poles would be performed by hand utilizing an air powered hand auger and jack hammer. The holes prepared for the new utility poles would be approximately 2 feet (61 centimeters) in diameter and 4.5 to 6 feet (137 to 183 centimeters) in depth. No cranes would be required for setting the poles. Backfill would be the excavated native soils compacted with an air powered tamper. The poles may be set in a concrete caisson using PreCast Concrete Sonotubes. No imported soils would be required. No adjacent access road would be required for installation.

Equipment at the site would include a self-supporting, three-legged, lattice-type structure measuring 196 feet (59.7 meters) in height; an equipment shelter, likely a 20-foot (6.1-meter) by 48-foot (14.6-meter) concrete masonry block building; four 25-kilowatt (kW) standby generators located inside the equipment shelter; and four 2,000-gallon (7,570-liter) propane tanks. The tower, shelter, and propane tanks would be enclosed within a chain-link fence measuring 10 feet (3 meters) in height. Fencing would be constructed of 1.5-inch (3.8-centimeter) closed-loop anti-climb, anti-cut materials. A gate would provide access into the compound for persons and vehicles. A downward-shielded security light would be mounted to the outside of the equipment shelter and would be activated by a motion sensor.

Access to the project site would begin at the Nipton Road interchange and would travel northwesterly along an existing graded dirt road for approximately 375 feet (114.3 meters). From this point, a new dirt roadway would be graded in a southwesterly direction, approximately (1.73 miles; 2.78 kilometers) to the proposed communication site at the top of a hill. The total elevation gain from the base of the hill to the proposed communication site location is approximately 900 feet (274.3 meters) (Figure 2). The roadway would be constructed to a width of 14 feet (4.3 meters) to accommodate trucks and other large vehicles required during construction and operation of the site. Up to 50 feet (15.2 meters) of upslope and downslope fall-off disturbance could occur on either side of the roadway along the steeper stretches.

The initial portion of the new roadway would travel for approximately 450 feet (137.2 meters) along the bottom of an ephemeral desert wash before circling around a low hill and passing through a low saddle. The roadway would then cross another ephemeral wash and begin to climb up the ridge to the site.

The new roadway segment would cross the aforementioned ephemeral desert wash approximately 3,650 feet (1,113 meters) along the alignment. At the location of the proposed crossing, the wash is approximately 16 feet (4.9 meters) in width. Although substantial surface flows within this waterway are infrequent, improvements at the crossing would need to be made to ensure serviceability of the roadway following major storm water runoff events. This would be accomplished by placement of ribbed galvanized steel pipes placed directly on the streambed. The pipes would then be overlain with rock riprap and gravel. Inflow and outflow areas would also be hardened with riprap to prevent scouring both upstream and downstream of the crossing. The quantity and size of the pipes at the crossing would be designed to accommodate projected peak flows along the watercourse, but preliminary indications based on experience with similar projects in similar locations indicate that a minimum of three 36-inch-diameter (91-centimeter-diameter) pipes would be required. The roadway surface at the crossing would be 14 feet (4.3 meters) in width, consistent with the rest of the roadway.

Site Description and Environmental Setting

For purposes of this report, the “survey area” includes the lease area, staging area, the proposed access road, electric distribution line, and the buffer area, which extend out to 656 feet (200 meters) from the project site perimeter. Per BLM direction, the buffer area associated with access road did not traverse or extend to the southeast side of I-15.

Topographically the project site begins at the proposed access road, which follows a low ridgeline toward the lease area. The buffer area is rugged mountainous terrain and is a part of the Clark Mountain Range. To the south of Clark Mountain Range is Wheaton Wash, generally on the south side of I-15 in the survey area. Elevations in the survey area and north-south utility pole project area range from approximately 3,412 to 4,724 feet (1,040 meters to 1,440 meters) above mean sea level.

The climate of this desert region is a typical arid desert climate characterized by low precipitation and atmospheric humidity, high summer temperatures and relatively cool winter temperatures. There are strong fluctuations in daily temperatures. Precipitation is generally bimodal, with winter/spring rains in December through March and a spike in precipitation in August during the monsoon season (NOAA 2013; USGS 2013).

Survey Methodology

Botanical surveys were initially conducted in 2013. The project was redesigned in 2014, and vegetation mapping was conducted again in 2014. Following the completion of 2014 surveys, an electric distribution line was added to the project. Therefore, botanical surveys were conducted again on April 10, 2015 for the electric distribution line discussed in this report.

Vegetation Mapping

Vegetation mapping and classification were conducted in the field using a tablet PC with ArcGIS software and a global positioning system (GPS) receiver. Vegetation mapping was conducted throughout the entire survey area extending out to a 656-foot (200-meter) buffer. Vegetation mapping was accomplished by walking transects throughout the site to ensure full visual coverage of the survey area. Determinations of vegetation classification were designated in the field and classified according to Holland (1986). Per BLM direction, the 656-foot (200-meter) buffer did not extend to the southeast side of I-15. No surveys were conducted within the I-15 fence line. Photos were taken at each potential pole location along the proposed electric distribution line.

Special-Status Plant Surveys

Surveys were conducted by qualified botanists familiar with the flora of the Mojave Desert region. Focused special-status plant surveys were conducted within the project site and 100-foot (30-meter) buffer area by walking meandering transects spaced approximately 25 to 50 feet (7.6 to 15.2 meters) apart. All observable and readily identifiable vascular plant species encountered during the field surveys were identified and recorded to a taxonomic level to determine rarity. All sensitive plant species encountered during the field surveys were identified, recorded, and mapped with a GPS unit. Plant species were identified using the Jepson Manual (Baldwin *et al*. 2012).

Survey target species included those covered under the Federal Endangered Species Act or California Endangered Species Act (CESA) (CDFG 2009); BLM sensitive species under the jurisdiction of the Needles Field Office (BLM Sensitive) (BLM 2009); and/or included on the California Native Plant Society's (CNPS) Rare Plant Rank as 1A (presumed extinct in California), 1B (rare, threatened, or endangered in California and elsewhere), or 2 (rare, threatened, or endangered in California, but more common elsewhere) (CNPS 2014). CNPS Rare Plant Rank 1A, 1B, and 2 species are considered special-status plant species if they meet the definitions of Section 1901, Chapter 10 (Native Plant Protection Act) or Sections 2050 through 2098 (CESA) (CNPS 2001).

AECOM botanists conducted searches of the California Department of Fish and Wildlife's (CDFW) California Natural Diversity Database (CNDDB) for plant species meeting the above criteria and occurring within a 5-mile radius of the survey area (CDFW 2014). Seventy-four special-status species were identified from the CNDDB search as occurring in the vicinity of the survey area. These species are discussed in detail in Table 1.

Table 1. Probability of Occurrence of Special-Status Plant Species Known from the Vicinity of the Nipton Communication Site Survey Area

Scientific Name	Common Name	Sensitivity Status[1]	Habitat	Probability of Occurrence
Acmispon argyraeus	scrub lotus	BLM:	Pinyon and juniper	Not expected. The

Scientific Name	Common Name	Sensitivity Status[1]	Habitat	Probability of Occurrence
var. *multicaulis*		Sensitive CNPS: 2.3	woodland, granitic. Elevation 1,200–1,500 meters. Perennial herb. Blooms April–June.	preferred habitat of this species does not occur within the survey area.
Ageratina herbacea	desert ageratina	CNPS: 2.3	Pinyon-juniper woodland. Rocky sites. Elevation 1,525–2,200 meters. Perennial herb. Blooms July–October.	Not expected. The preferred habitat of this species does not occur within the survey area.
Aliciella triodon	coyote gilia	CNPS: 2.2	Great basin scrub, pinyon and juniper woodland, fine clayey sand or sand. Elevation 610–1,700 meters. Annual herb. Blooms April–June.	Not expected. The preferred habitat of this species does not occur within the survey area.
Allium nevadense	Nevada onion	CNPS: 2.3	Pinyon-juniper woodland, sandy or gravelly slopes in desert mountains. Elevation 1,300–1,700 meters. Perennial bulbiferous herb. Blooms April–May.	Not expected. The preferred habitat of this species does not occur within the survey area.
Androstephium breviflorum	small-flowered androstephiu m	CNPS: 2.2	Mojavean desert scrub, desert dunes, bajadas. One site known from sand dunes. Elevation 270–1,600 meters. Perennial bulbiferous herb. Blooms March–April.	Not expected. The preferred habitat of this species does not occur within the survey area.
Arctomecon merriamii	white bear poppy	CNPS: 2.2	Chenopod scrub, Mojavean desert scrub, rocky slopes, calcareous soil, loose shale, or sandy washes. Elevation 490–1,585 meters. Perennial herb. Blooms April–May.	Not expected. The preferred habitat of this species does not occur within the survey area.
Argyrochosma limitanea var. *limitanea*	southwestern false cloak-fern	CNPS: 2.3	Pinyon and juniper woodland. in crevices, especially bases of calcareous rocks. Elevation 1,800 meters. Perennial rhizomatous herb. Blooms April–October.	Not expected. The preferred habitat of this species does not occur within the survey area.
Asclepias nyctaginifolia	Mojave milkweed	CNPS: 2.1	Mojavean desert scrub, pinyon-juniper woodland. Elevation 1,000–1,700 meters. Perennial herb. Blooms May–June.	Not expected. The preferred habitat of this species does not occur within the survey area.
Astragalus allochrous var. *playanus*	playa milk-vetch	CNPS: 2.2	Mojavean desert scrub, sandy flats, in creosote	Not expected. The preferred habitat of this

Scientific Name	Common Name	Sensitivity Status[1]	Habitat	Probability of Occurrence
			bush scrub. Known in California only from two occurrences near Goffs. Elevation 780–805 meters. Perennial herb. Blooms April.	species does not occur within the survey area.
Astragalus bernardinus	San Bernardino milk-vetch	CNPS: 1B.2	Joshua tree woodland, pinyon and juniper woodland, granitic or carbonate rock. Elevation 900–2,000 meters. Perennial herb. Blooms April–June.	Not expected. The preferred habitat of this species does not occur within the survey area.
Astragalus cimae var. *cimae*	Cima milk-vetch	CNPS: 1B.2	Great basin scrub, Joshua tree woodland, pinyon-juniper woodland, mesas and stony hillsides, in stiff, calcareous clay soils, commonly among or sheltering under sagebrush. Elevation 890–1,850 meters. Perennial herb. Blooms April–May.	Not expected. The preferred habitat of this species does not occur within the survey area.
Astragalus tidestromii	Tidestrom's milk-vetch	CNPS: 2.2	Mojavean desert scrub, washes; limestone. Elevation 600–1,585 meters. Perennial herb. Blooms April–July.	Not expected. The preferred habitat of this species does not occur within the survey area.
Astrolepis cochisensis ssp. *cochisensis*	scaly cloak fern	CNPS: 2.3	Joshua tree woodland, pinyon and juniper woodland. Elevation 900–1,800 meters. Perennial rhizomatous herb. Blooms April–October.	Not expected. The preferred habitat of this species does not occur within the survey area.
Berberis fremontii	Fremont barberry	CNPS: 3	Chaparral, pinyon-juniper woodland, Joshua tree woodland, dry rocky points and slopes. Elevation 840–1,850 meters. Evergreen shrub. Blooms April–June.	Not expected. The preferred habitat of this species does not occur within the survey area.

Scientific Name	Common Name	Sensitivity Status[1]	Habitat	Probability of Occurrence
Bouteloua trifida	three-awned grama	CNPS: 2.3	Mojavean desert scrub, limestone ravines and rocky hills, sometimes in narrow crevices. Associates include *Agave utahensis*, *Salvia funerea*. Elevation 700–2,000 meters. Perennial herb. Blooms May–September.	Not expected. The preferred habitat of this species does not occur within the survey area.
Cheilanthes wootonii	Wooton's lace fern	CNPS: 2.3	Joshua tree woodland, pinyon-juniper woodland, in crevices and rocky sites. Elevation 1,450–1,900 meters. Perennial rhizomatous herb. Blooms May–October.	Not expected. The preferred habitat of this species does not occur within the survey area.
Cirsium arizonicum var*. tenuisectum*	desert mountain thistle	CNPS: 1B.2	Joshua tree woodland, Mojavean desert scrub, pinyon and juniper woodland; rocky sites. Elevation 1,500–2,800 meters. Perennial herb. Blooms June–November.	Not expected. The preferred habitat of this species does not occur within the survey area.
Cordylanthus parviflorus	small-flowered bird's-beak	CNPS: 2.3	Joshua tree woodland, pinyon-juniper woodland, Mojavean desert scrub. Elevation 700–2,200 meters.	Not expected. The preferred habitat of this species does not occur within the survey area.
Coryphantha chlorantha	desert pincushion	CNPS: 2.1	Mojavean desert scrub, Sonoran desert scrub, Joshua tree woodland, pinyon and juniper woodland. Calcareous substrates; rocky and gravelly sites. Elevation 300–2,400 meters. Perennial stem succulent. Blooms April–September.	Detected. One individual was detected on the hill slope in the southern portion of the survey area.
Coryphantha vivipara var*. rosea*	viviparous foxtail cactus	CNPS: 2.2	Mojavean desert scrub, pinyon and juniper woodland. On gravelly limestone or volcanic slopes and brushy hillsides. Elevation 1,250–2,700 meters. Perennial stem succulent. Blooms May–June.	Not expected. The preferred habitat of this species does not occur within the survey area.
Cymopterus gilmanii	Gilman's cymopterus	CNPS: 2.3	Mojavean desert scrub. Carbonate; dry rocky slopes in creosote bush scrub; from the Last Chance Range to Death	Not expected. The preferred habitat of this species does not occur within the survey area.

Scientific Name	Common Name	Sensitivity Status[1]	Habitat	Probability of Occurrence
			Valley. Elevation 1,000–2,000 meters. Perennial herb. Blooms April–May.	
Cymopterus multinervatus	purple-nerve cymopterus	CNPS: 2.2	Mojavean desert scrub, pinyon and juniper woodland, Joshua tree woodland; sandy or gravelly places. Elevation 790–1,800 meters. Perennial herb. Blooms March–April.	Not expected. The preferred habitat of this species does not occur within the survey area.
Elymus salina	Salina Pass wild-rye	CNPS: 2.3	Pinyon and juniper woodland; rocky. Elevation 1,350–2,135 meters. Perennial rhizomatous herb. Blooms May–June.	Not expected. The preferred habitat of this species does not occur within the survey area.
Enneapogon desvauxii	nine-awned pappus grass	CNPS: 2.2	Pinyon and juniper woodland. On decomposed granite or in gravelly limestone soils. Elevation 1,240–1,825 meters. Perennial herb. Blooms August–September.	Detected. A large population of this species occurs within the survey area.
Eremogone congesta var. *charlestonensis*	Charleston sandwort	CNPS: 1B.3	Pinyon and juniper woodland; sandy. In California, known only from the New York Mountains. Elevation 2,200–2,225 meters. Perennial herb. Blooms June.	Not expected. The preferred habitat of this species does not occur within the survey area.
Erigeron uncialis var. *uncialis*	limestone daisy	CNPS: 1B.2	Great basin scrub, subalpine coniferous forest, pinyon and juniper woodland; crevices of limestone cliffs. Elevation 1,900–2,900 meters. Perennial herb. Blooms May–July.	Not expected. The preferred habitat of this species does not occur within the survey area.
Erigeron utahensis	Utah daisy	CNPS: 2.3	Pinyon-juniper woodland. Limestone. Elevation 1,500–2,320 meters. Perennial herb. Blooms May–June.	Not expected. The preferred habitat of this species does not occur within the survey area.
Eriodictyon angustifolium	narrow-leaved yerba santa	CNPS: 2.3	Pinyon-juniper woodland. In California, known only from the New York Mountains. Elevation 1,500–1,900 meters. Evergreen shrub. Blooms May–August.	Not expected. The preferred habitat of this species does not occur within the survey area.

Scientific Name	Common Name	Sensitivity Status[1]	Habitat	Probability of Occurrence
Eriogonum thornei	Thorne's buckwheat	CESA: Endangered BLM: Sensitive CNPS: 1B.2	Pinyon-juniper woodland. On sandy loam of weathered quartz monzonite with high copper content. Elevation 1,800–1,830 meters. Shrub. Blooms July–August.	Not expected. The preferred habitat of this species does not occur within the survey area.
Eriogonum umbellatum var. *juniporinum*	juniper sulphur-flowered buckwheat	CNPS: 2.3	Pinyon-juniper woodland, Mojavean desert scrub. Sandy soil. Elevation 1,300–2,500 meters.	Not expected. The preferred habitat of this species does not occur within the survey area.
Erioneuron pilosum	hairy erioneuron	CNPS: 2.3	Pinyon-juniper woodland. Rocky or gravelly places; can be on carbonate. Elevation 1,500–2,000 meters. Perennial herb. Blooms May–June.	Not expected. The preferred habitat of this species does not occur within the survey area.
Euphorbia exstipulata var. *exstipulata*	Clark Mountain spurge	CNPS: 2.1	Mojavean desert scrub. Rocky slopes. In California, known only from Clark Mountain. Elevation 1,800–2,000 meters. Annual herb. Blooms September.	Not expected. The preferred habitat of this species does not occur within the survey area.
Galium proliferum	desert bedstraw	CNPS: 2.2	Joshua tree woodland, Mojavean desert scrub, pinyon and juniper woodland. Rocky, limestone substrate. Elevation 1,190–1,570 meters. Annual herb. Blooms March–June.	Not expected. The preferred habitat of this species does not occur within the survey area.
Galium wrightii	Wright's bedstraw	CNPS: 2.3	Pinyon-juniper woodland, lower montane coniferous forest. Rocky, limestone areas with juniper or pinyon-juniper woodland in California. Elevation 1,600–2,000 meters. Perennial herb. Blooms June–October.	Not expected. The preferred habitat of this species does not occur within the survey area.
Glossopetalon pungens	pungent glossopetalon	BLM: Sensitive CNPS: 1B.2	Pinyon-juniper woodland, chaparral. Restricted to limestone; associated with *Heuchera rubescens*, *Petrophytum*, and *Cheilanthes*. Elevation 1,700–2,000 meters.	Not expected. The preferred habitat of this species does not occur within the survey area.

Scientific Name	Common Name	Sensitivity Status[1]	Habitat	Probability of Occurrence
Grusonia parishii	Parish's club-cholla	CNPS: 2.2	Mojavean desert scrub, Sonoran desert scrub, Joshua tree woodland. Sandy sites. Elevation 300–1,524 meters. Perennial stem succulent. Blooms May–July.	Not expected. The preferred habitat of this species does not occur within the survey area.
Hedeoma drummondii	Drummond's false pennyroyal	CNPS: 2.2	Great basin scrub, pinyon and juniper woodland. Gravelly, rocky, usually calcareous substrates. Known in California from a single occurrence in Keystone Canyon. Elevation 1,400–1,700 meters. Perennial herb. Blooms May–July.	Not expected. The preferred habitat of this species does not occur within the survey area.
Hymenopappus filifolius var. *eriopodus*	hairy-podded fine-leaf hymenopappus	CNPS: 2.3	Pinyon and juniper woodland. Carbonate substrates. Elevation 1,600–1,700 meters. Perennial herb. B looms May–July.	Not expected. The preferred habitat of this species does not occur within the survey area.
Ivesia jaegeri	Jaeger's ivesia	BLM: Sensitive CNPS: 1B.3	Pinyon-juniper woodland, upper montane coniferous forest. In California, on limestone cliffs in pinyon-juniper or pinyon-white fir forest. Elevation 1,815–3,600 meters. Perennial herb. Blooms June–July.	Not expected. The preferred habitat of this species does not occur within the survey area.
Juncus interior	inland rush	CNPS: 2.2	Pinyon and juniper woodland. In washes in sand. Elevation 1,830–1,840 meters. Perennial herb. Blooms June–August.	Not expected. The preferred habitat of this species does not occur within the survey area.
Juncus nodosus	knotted rush	CNPS: 2.3	Meadows, marshes, and swamps. Mesic sites and lake margins. Elevation 1,130–1,700 meters. Perennial rhizomatous herb. Blooms July–September.	Not expected. The preferred habitat of this species does not occur within the survey area.

Scientific Name	Common Name	Sensitivity Status[1]	Habitat	Probability of Occurrence
Linum puberulum	plains flax	CNPS: 2.3	Pinyon and juniper woodland, Great basin scrub, Joshua tree woodland, Mojavean desert scrub. Dry ridges. Elevation 1,000–2,500 meters. Perennial herb. Blooms May–July.	Not expected. The preferred habitat of this species does not occur within the survey area.
Lithospermum incisum	plains stoneseed	CNPS: 2.3	Pinyon-juniper woodland. Elevation 1,650–1,720 meters. Perennial herb. Blooms May.	Not expected. The preferred habitat of this species does not occur within the survey area.
Menodora scabra	rough menodora	CNPS: 2.3	Joshua tree woodland, Mojavean desert scrub, pinyon and juniper woodland. Rocky soils; canyons. Elevation 1,200–1,800 meters. Perennial herb. Blooms May–June.	Not expected. The preferred habitat of this species does not occur within the survey area.
Mentzelia polita	polished blazing star	BLM: Sensitive CNPS: 1B.2	Mojavean desert scrub. Carbonate soils. Elevation 1,200–1,500 meters. Perennial herb. Blooms April–August.	Not expected. The preferred habitat of this species does not occur within the survey area.
Mentzelia pterosperma	wing-seed blazing star	CNPS: 2.2	Mojavean desert scrub. Clay, gypseous substrates. Elevation 1,140 meters. Annual/perennial herb. Blooms April–June.	Not expected. The preferred habitat of this species does not occur within the survey area.
Mirabilis coccinea	red four o’clock	CNPS: 2.3	Pinyon and juniper woodland. Elevation 1,070–1,800 meters. Perennial herb. Blooms May–July.	Not expected. The preferred habitat of this species does not occur within the survey area.
Monardella eremicola	Clark Mountain monardella	CNPS: 1B.3	Pinyon and juniper woodland, riparian scrub (desert). Granitic or carbonate. Usually in bedrock cracks and benches along canyon washes. Elevation 1,500–2,100 meters. Shrub. Blooms June–August.	Not expected. The preferred habitat of this species does not occur within the survey area.
Muhlenbergia arsenei	tough muhly	CNPS: 2.3	Pinyon-juniper woodland. On steep slopes and ridgetops. Granite and limestone substrate. Elevation 1,400–2,000 meters. Perennial rhizomatous herb. Blooms August–October.	Not expected. The preferred habitat of this species does not occur within the survey area.

Scientific Name	Common Name	Sensitivity Status[1]	Habitat	Probability of Occurrence
Muhlenbergia fragilis	delicate muhly	CNPS: 2.3	Pinyon-juniper woodland. Open, more-or-less disturbed limestone gravelly wash. Elevation 515 meters. Annual herb. Blooms October.	Not expected. The preferred habitat of this species does not occur within the survey area.
Muhlenbergia pauciflora	few-flowered muhly	CNPS: 2.3	Pinyon-juniper woodland. Sandy loam soils with *Pinus monophylla*, *Quercus turbinella*, and *Garrya*. Elevation 1,745 meters. Perennial rhizomatous herb. Blooms September–October.	Not expected. The preferred habitat of this species does not occur within the survey area.
Munroa squarrosa	false buffalo-grass	CNPS: 2.2	Pinyon-juniper woodland. Open, gravelly or rocky places. In California, known only from the Clark and New York Mountains. Elevation 1,500–2,400 meters. Annual herb. Blooms October.	Not expected. The preferred habitat of this species does not occur within the survey area.
Nama dichotomum var*. dichotomum*	forked purple mat	CNPS: 2.3	Pinyon-juniper woodland. Granite or limestone slopes, ridgetops. Elevation 1,900–2,200 meters. Annual herb. Blooms September–October.	Not expected. The preferred habitat of this species does not occur within the survey area.
Oenothera cavernae	cave evening-primrose	CNPS: 2.1	Great basin scrub, Joshua tree woodland, Mojavean desert scrub. Gravelly, often calcareous substrate. Elevation 760–1,280 meters. Annual herb. Blooms March–November.	Not expected. The preferred habitat of this species does not occur within the survey area.
Oenothera longissima	long-stem evening-primrose	CNPS: 2.2	Mojavean desert scrub, pinyon and juniper woodlands. Seasonally mesic sites. Elevation 1,000–1,700 meters. Annual/perennial herb. Blooms July–September.	Not expected. The preferred habitat of this species does not occur within the survey area.
Pellaea truncata	spiny cliff-brake	CNPS: 2.3	Pinyon-juniper woodland. Granitic boulders and fissures in granite cliffs, also in volcanic or sandy limestone soils. Elevation 1,200–2,150 meters.	Not expected. The preferred habitat of this species does not occur within the survey area.

Scientific Name	Common Name	Sensitivity Status[1]	Habitat	Probability of Occurrence
			Perennial rhizomatous herb. Blooms April–June.	
Penstemon thompsoniae	Thompson's beardtongue	CNPS: 2.3	Pinyon-juniper woodland. Limestone soils; gravelly sites. Elevation 1,500–2,700 meters. Perennial herb. Blooms May–June.	Not expected. The preferred habitat of this species does not occur within the survey area.
Penstemon utahensis	Utah beardtongue	CNPS: 2.3	Chenopod scrub, Great basin scrub, Mojavean desert scrub, pinyon-juniper woodland. Rocky sites. Elevation 1,065–2,500 meters. Perennial herb. Blooms April–May.	Not expected. The preferred habitat of this species does not occur within the survey area.
Phacelia anelsonii	Aven Nelson's phacelia	CNPS: 2.3	Joshua tree woodland, pinyon and juniper woodland. Shady places in rich soil, base of sandstone or limestone cliffs, among rocks or in washes. Elevation 1,200–1,575 meters. Annual herb. Blooms April–May.	Not expected. The preferred habitat of this species does not occur within the survey area.
Phacelia barnebyana	Barneby's phacelia	CNPS: 2.3	Great basin scrub, pinyon and juniper woodland. Gravelly and rocky, usually calcareous substrates. Elevation 1,600–2,700 meters. Annual herb. Blooms May–July.	Not expected. The preferred habitat of this species does not occur within the survey area.
Phacelia coerulea	sky-blue phacelia	CNPS: 2.3	Mojavean desert scrub, pinyon-juniper woodland. Elevation 1,400–2,000 meters. Annual herb. Blooms April–May.	Detected. One individual located along the proposed electric distribution line.
Phacelia perityloides var. *jaegeri*	Jaeger's phacelia	CNPS: 1B.3	Pinyon-juniper woodland. Rocky, often limestone soils. Elevation 1,830–2,345 meters. Perennial herb. Blooms May–July.	Not expected. The preferred habitat of this species does not occur within the survey area.
Phacelia pulchella var. *goodingii*	Goodding's phacelia	CNPS: 2.3	Mojavean desert scrub. Clay soils, often alkaline; flats. Elevation 785–1,000 meters. Annual herb. Blooms April–June.	Not expected. The preferred habitat of this species does not occur within the survey area.
Physalis lobata	lobed ground-cherry	CNPS: 2.3	Mojavean desert scrub, playas. Decomposed granite soil, alkaline dry lakes. Elevation 500–800 meters. Perennial herb. Blooms May–January.	Not expected. The preferred habitat of this species does not occur within the survey area.

Scientific Name	Common Name	Sensitivity Status[1]	Habitat	Probability of Occurrence
Physaria chambersii	Chambers' physaria	CNPS: 2.3	Pinyon-juniper woodland. Limestone soils; rocky sites. Elevation 1,500–2,590 meters. Perennial herb. Blooms April–May.	Not expected. The preferred habitat of this species does not occur within the survey area.
Polygala acanthoclada	thorny milkwort	CNPS: 2.3	Chenopod scrub, Joshua tree woodland, pinyon-juniper woodland. Elevation 760–2,285 meters. Shrub. Blooms May–August.	Not expected. The preferred habitat of this species does not occur within the survey area.
Sanvitalia abertii	Abert's sanvitalia	CNPS: 2.2	Pinyon-juniper woodland. Rocky limestone slopes and washes. Known in California only from the Clark and New York Mountains. Elevation 1,570–1,800 meters. Annual herb. Blooms August–September.	Not expected. The preferred habitat of this species does not occur within the survey area.
Schkuhria multiflora var. *multiflora*	many-flowered schkuhria	CNPS: 2.3	Pinyon-juniper woodland. Sandy soils. Elevation 1,500–1,700 meters. Annual herb. Blooms September–October.	Not expected. The preferred habitat of this species does not occur within the survey area.
Sclerocactus johnsonii	Johnson's bee-hive cactus	CNPS: 2.2	Mojavean desert scrub. Granitic soils. Elevation 500–1,200 meters. Perennial stem succulent. Blooms April–May.	Not expected. The preferred habitat of this species does not occur within the survey area.
Sphaeralcea rusbyi var. *eremicola*	Rusby's desert-mallow	BLM: Sensitive CNPS: 1B.2	Mojavean desert scrub, Joshua tree woodland. Sometimes on carbonate; sometimes in washes. Known only from Death Valley National Park and Clark Mountain. Elevation 965–1,500 meters. Perennial herb. Blooms March–June.	Not expected. The preferred habitat of this species does not occur within the survey area.
Stipa arida	Mormon needle grass	CNPS: 2.3	Joshua tree woodland, pinyon and juniper woodland, on carbonate. Elevation 500–2,570 meters. Perennial herb. Blooms May–July.	Not expected. The preferred habitat of this species does not occur within the survey area.
Stipa divaricata	small-flowered rice grass	CNPS: 2.3	Pinyon and juniper woodland, gravelly, carbonate. Elevation 700–2,950 meters.	Not expected. The preferred habitat of this species does not occur within the survey area.

Scientific Name	Common Name	Sensitivity Status[1]	Habitat	Probability of Occurrence
			Perennial herb. Blooms June–September.	
Tetracoccus hallii	Hall's tetracoccus	CNPS 4.3	Mojavean desert scrub. Elevation 30–1,200 meters. Deciduous shrub. Blooms January–May.	Not expected. The preferred habitat of this species does not occur within the survey area.
Thysanocarpus rigidus	rigid fringepod	CNPS: 1B.2	Pinyon and juniper woodland, dry rocky slopes. Elevation 600–2,200 meters. Annual herb. Blooms February–May.	Not expected. The preferred habitat of this species does not occur within the survey area.
Woodsia plummerae	Plummer's woodsia	CNPS: 2.3	Pinyon-juniper woodland. mesic sites; bases of granitic cliffs and boulders. Elevation 1,600–2,000 meters. Perennial rhizomatous herb. Blooms May–September.	Not expected. The preferred habitat of this species does not occur within the survey area.

[1] **Sensitivity Status Key**
California Endangered Species Act (CESA) – State endangered
Bureau of Land Management (BLM) Sensitive – BLM sensitive species
CNPS Rare Plant Rank 1A – presumed extinct in California
CNPS Rare Plant Rank 1B – rare, threatened, or endangered in California and elsewhere
CNPS Rare Plant Rank 2 – rare, threatened, or endangered in California, but more common elsewhere
-.1 Seriously endangered in California
-.2 Fairly endangered in California
-.3 Not very endangered in California

Results and Discussion

Vegetation Communities

Habitat within the survey area is composed mainly of Mojave creosote bush scrub (Holland 1986) (Figure 3). While shrub cover is sparse, common shrubs within the survey area for this community include creosote bush (*Larrea tridentata*), white bursage (*Ambrosia dumosa*), cheesebush (*Ambrosia salsola*), white ratany (*Krameria bicolor*), leafy California buckwheat (*Eriogonum fasciculatum* var. *foliolosum*), Eastern Mojave buckwheat (*Eriogonum fasciculatum* var. *polifolium*), Mojave yucca (*Yucca shidigera*), and Joshua tree (*Yucca brevifolia*). Common annual plant species include distant phacelia (*Phacelia distans*), trailing windmills (*Allionia incarnata*), Coulter's spiderling (*Boerhavia coulteri*), Wright's spiderling (*Boerhavia wrightii*), needle grama (*Bouteloua aristoides* var. *aristoides*), sixweeks grama (*Bouteloua barbata* var. *barbata*), and nine-awned pappus grass (*Enneapogon desvauxii*). Large and small washes with Mojave desert wash scrub habitat are also found within the survey area. Common shrubs within this habitat include catclaw (*Senegalia gregii*), bladder sage (*Scutellaria mexicana*), woolly bluestar (*Amsonia tomentosa*), and big galleta (*Hilaria rigida*). Soils appear to be mainly decomposed granite.

<u>Special-Status Plants</u>

Floristic surveys were initially conducted on April 10, May 29, and October 14, 2013. The project was redesigned in 2014, and floristic surveys were conducted again on April 1, 2014 for the project footprint described in this report. A final survey was performed on April 10, 2015 to document plants along the proposed electric distribution line route. Results of the 2013 surveys are included below for context; however, the previous survey area and project footprint are not discussed further in this report. Conditions were favorable for the detection and identification of woody perennial and spring and fall flowering annual vascular plants. Late season rainfall was adequate allowing for the detection of several fall flowering taxa.

The 2013, 2014, and 2015 surveys resulted in the detection of 124 plant species, three of which are nonnative (Appendix B). Of these taxa, three special-status species were detected: desert pincushion (*Coryphantha chlorantha*), nine-awned pappus grass (*Enneapogon desvauxii*), and skyblue phacelia (*Phacelia coerulea*).. One individual of desert pincushion was detected in the western portion of the project area during 2014 surveys (Figure 4). This species is included on CNPS as Rare Plant Rank 2.1, “seriously endangered in California, but more common elsewhere.”

Hundreds of individuals of nine-awned pappus grass were detected during 2013 fall surveys (Figure 4). This species is included on CNPS as Rare Plant Rank 2.2, “fairly endangered in California, but more common elsewhere.” Nine-awned pappus grass grows and flowers in summer and fall after summer monsoon rains. Populations may expand significantly following favorable summer rainy seasons, or contract if the summer rain is meager. Fall 2013 surveys were conducted in a better than average summer rainfall season so the plant appeared in significant numbers. This species was found in abundance at the Ivanpah solar site, at the Stateline solar site, and in adjacent Nevada in the past two years after sufficient summer rainfall (LaPre 2014). There are also known records surrounding the project site in the Consortium of California Herbaria (CCH) database (CCH 2014).

Skyblue phacelia (*Phacelia coerulea*) was observed in one small localized area at the south end of the proposed electric distribution line during 2015 spring surveys (Figure 4). Several plants were observed in the large sandy wash at this location growing near the existing access road. This species is included on CNPS as Rare Plant Rank 2.3, “not very threatened in California, more common elsewhere.”

Based on the rare plant results through spring of 2015, the only potential species expected to be detected in the fall of 2014 and 2015 is nine-awned pappus grass. AECOM requested and was approved by BLM to assume presence of this species throughout the project footprint and forego rare plant surveys in the fall of 2014 and 2015 (LaPre 2014, Kobelt 2015).

Should you have any questions, please contact me at (619) 666-4035.

Sincerely,

Joey Betzler

Joseph A. Betzler
Joseph.Betzler@aecom.com
Botanist

cc: Tom Gammon

Attachments: Figure 1 – Regional Map
Figure 2 – Vicinity Map
Figure 3 – Vegetation Map
Figure 4 – Special-Status Plant Map
Appendix A – Plant Species Observed within the Nipton Communication Site Survey Area
Appendix B – Site Photos

Literature Cited

Baldwin, B. G., D.H. Goldman, D. J. Keil, R. Patterson, T. J. Rosatti, and D. H. Wilken (editors). 2012. *The Jepson Desert*, second edition. University of California Press, Berkeley, CA.

Bureau of Land Management (BLM). 2009. *Survey Protocols for NEPA/ESA Compliance for BLM Special-Status Plant Species*.

California Department of Fish and Game (CDFG). 2009. *Guidelines for Assessing the Effects of Proposed Projects on Rare, Threatened, and Endangered Plants and Natural Communities*. Sacramento, CA, 7 pp.

California Department of Fish and Wildlife (CDFW). 2013. RareFind 3 computer program. California Natural Diversity Database (CNDDB) Search. State of California Resources Agency. Sacramento, CA.

California Native Plant Society (CNPS). 2001. Botanical Survey Guidelines. Pages 38–40 *in* California Native Plant Society's *Inventory of Rare and Endangered Vascular Plants of California* (D. P. Tibor, editor). Sixth edition. Special Publication No. 1, California Native Plant Society, Sacramento, CA. 387 pp.

California Native Plant Society (CNPS). 2013. Inventory of Rare and Endangered Plants (online edition, v8-02). California Native Plant Society. Sacramento, CA. Accessed July 11, 2013.

Consortium of California Herbaria (CCH) 2014. Data provided by the participants of the Consortium of California Herbaria (ucjeps.berkeley.edu/consortium/). Accessed July 24, 2014.

Holland, R. 1986. *Preliminary Descriptions of the Terrestrial Natural Communities of California*. Nongame Heritage Program, State of California, Department of Fish and Game.

Kobelt, Lara. 2015. Bureau of Land Management, California Desert District. Email communication. May 28, 2015

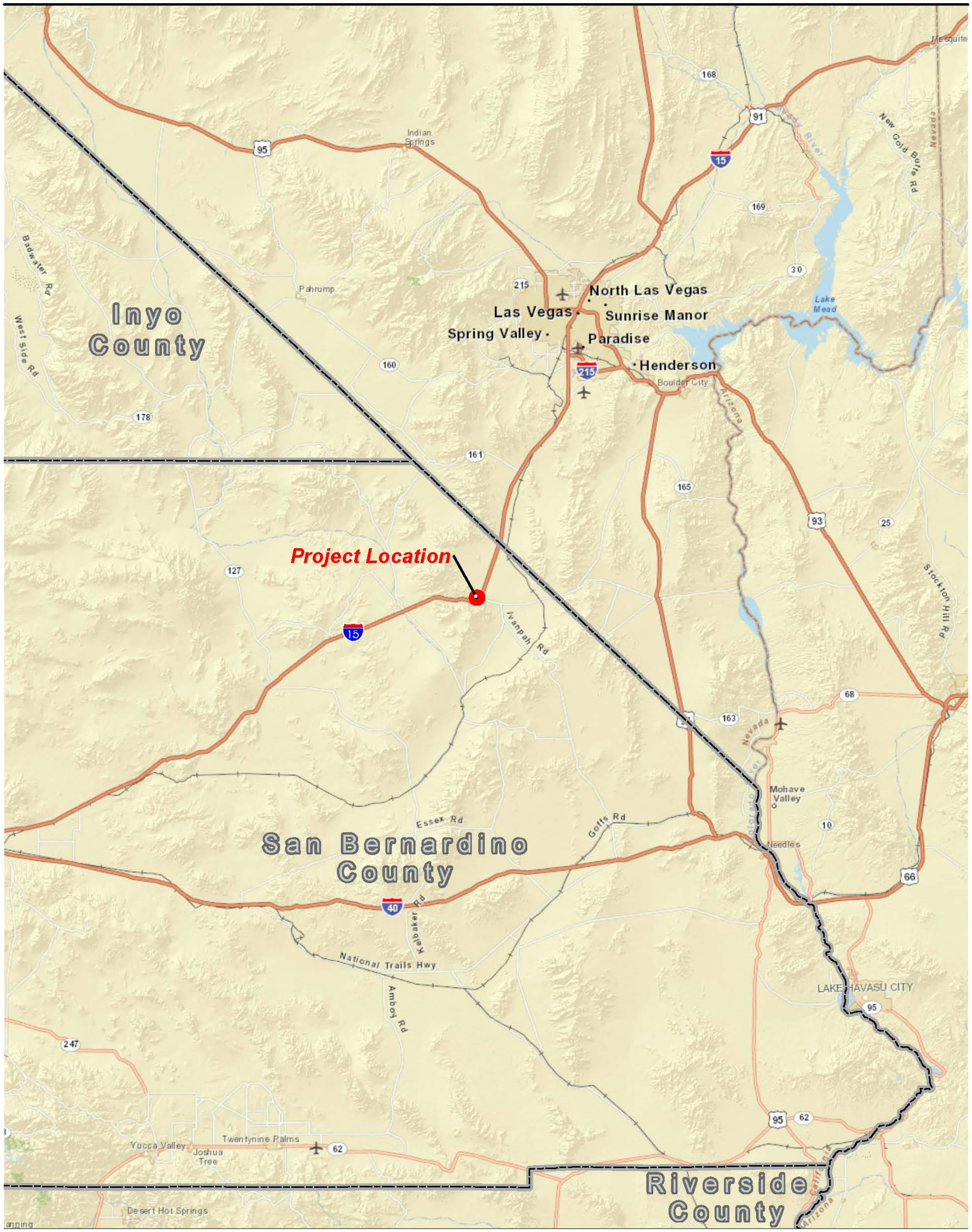
LaPre, Larry. 2014. Bureau of Land Management, California Desert District. Email communication. July 24, 2014

National Oceanic and Atmospheric Administration (NOAA). 2013. National Weather Service Climate Office for Barstow, California. Available at http://forecast.weather.gov/ MapClick.php?CityName=Needles&state=CA&site=VEF&textField1=34.8481&textField2=-114.613&e=0. Accessed May.

U.S. Fish and Wildlife Service (USFWS). 1996. *Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed, and Candidate Plants*. Sacramento, CA. 2 pp.

U.S. Geological Survey (USGS). 2013. Climate History of the Mojave Desert Region. Available at http://mojave.usgs.gov/climate-history/. Accessed May.

FIGURES



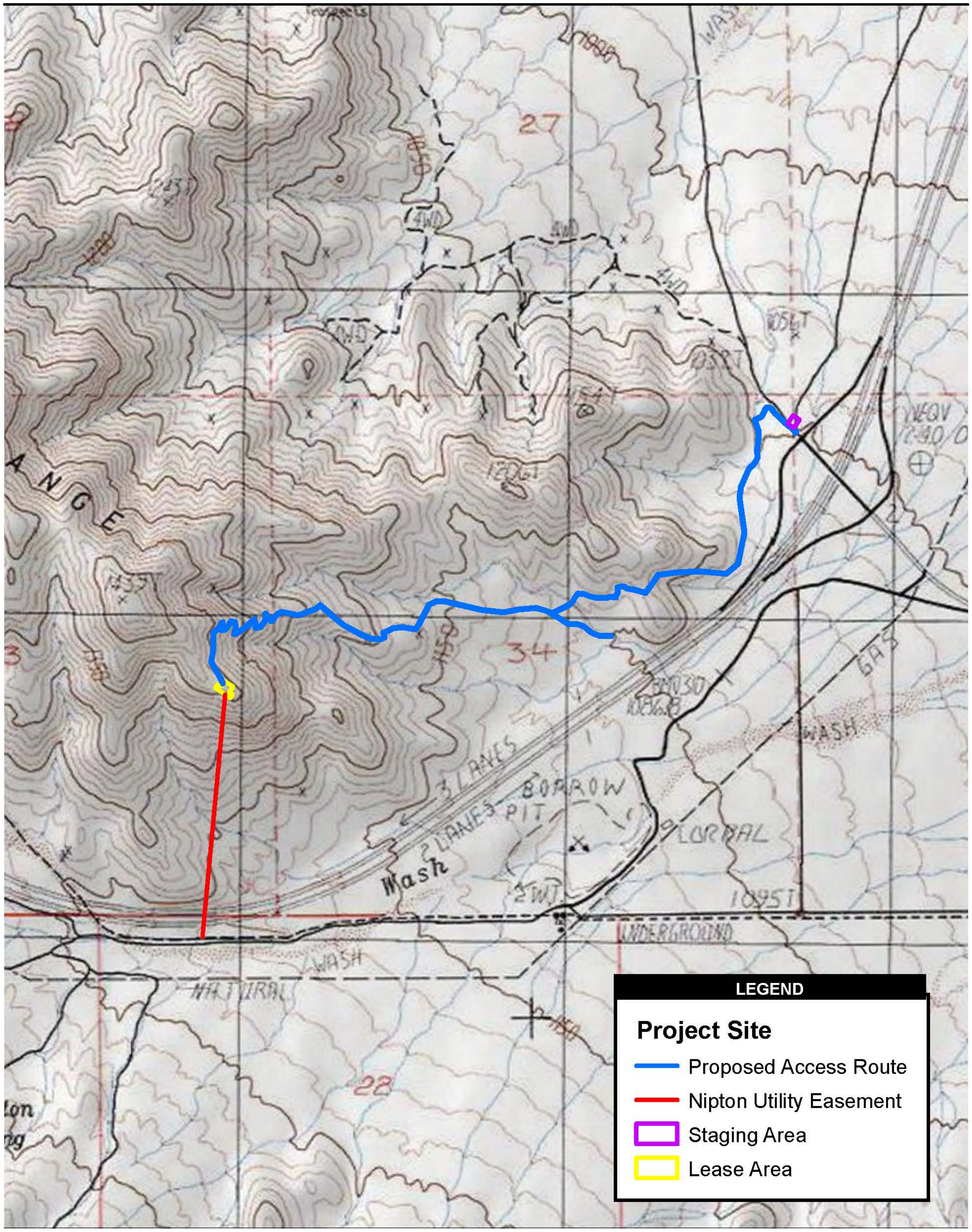
Source: ESRI 2012; SANGIS 2012

25 12.5 0 25 Miles

Scale: 1:1,584,000; 1 inch = 25 miles

Figure 1
Regional Map

Path: M:_Marketing Files through FY2014\Proposals\2013\Interconnect Towers\GIS\MXD\Botany_Survey_Report\Nipton\Nipton2015\Fig1_Regional_Map_Nipton.mxd, 6/2/2015



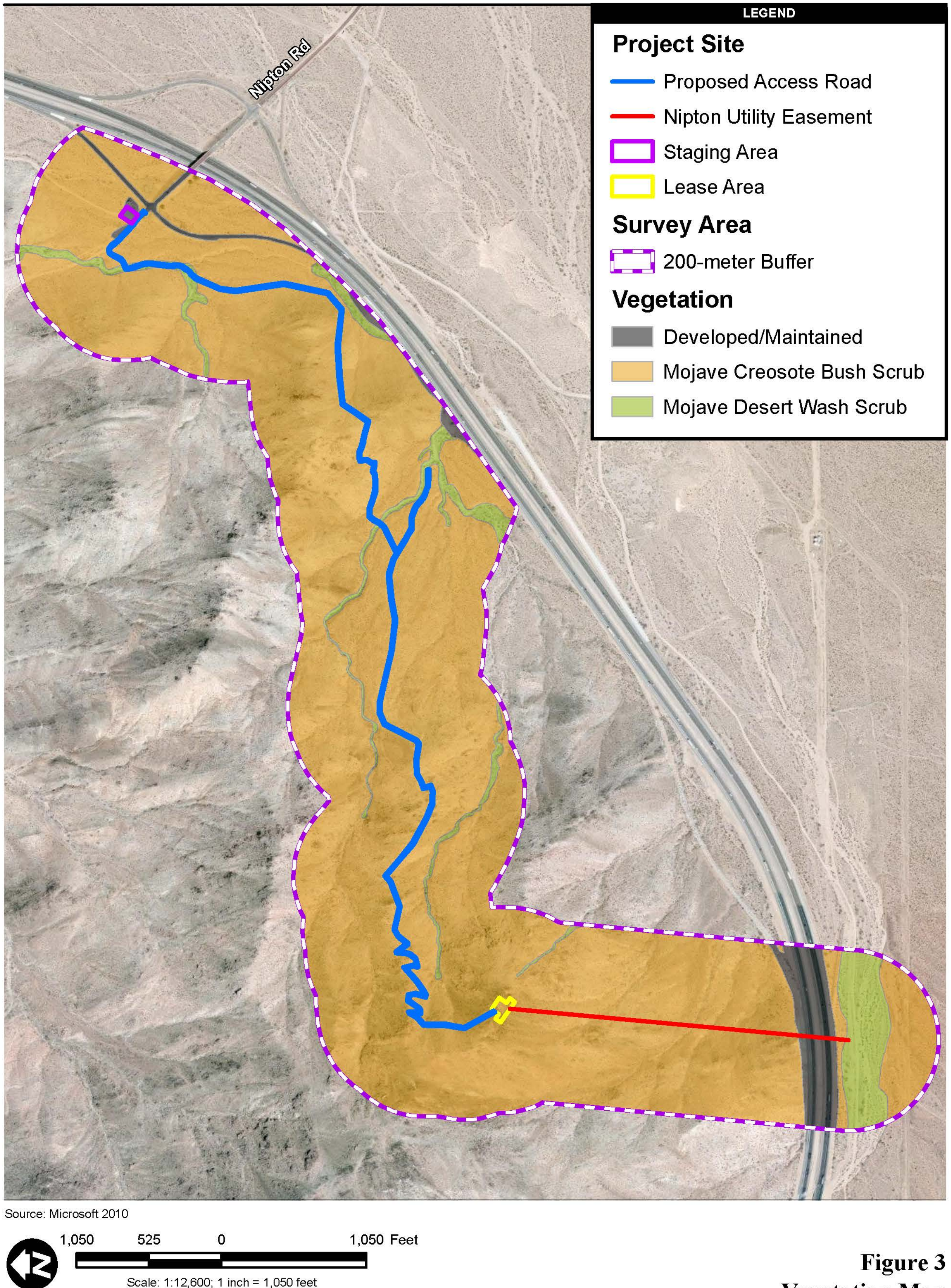
Source: USGS Topo Quad Mineral HIll, CA

1,500 750 0 1,500 Feet

Scale: 1:18,000; 1 inch = 1,500 feet

Figure 2
Vicinity Map

Path: M:_Marketing Files through FY2014\Proposals\2013\Interconnect Towers\GIS\MXD\Botany_Survey_Report\Nipton\Nipton2015\Figure2_Nipton_Vicinity.mxd, 6/2/2015, SorensenJ



Source: Microsoft 2010

Figure 3
Vegetation Map

Path: M:_Marketing Files through FY2014\Proposals\2013\Interconnect Towers\GIS\MXD\DT\DT_2015\Figure3_Nipton_VegMap.mxd, 6/2/2015, SorensenJ

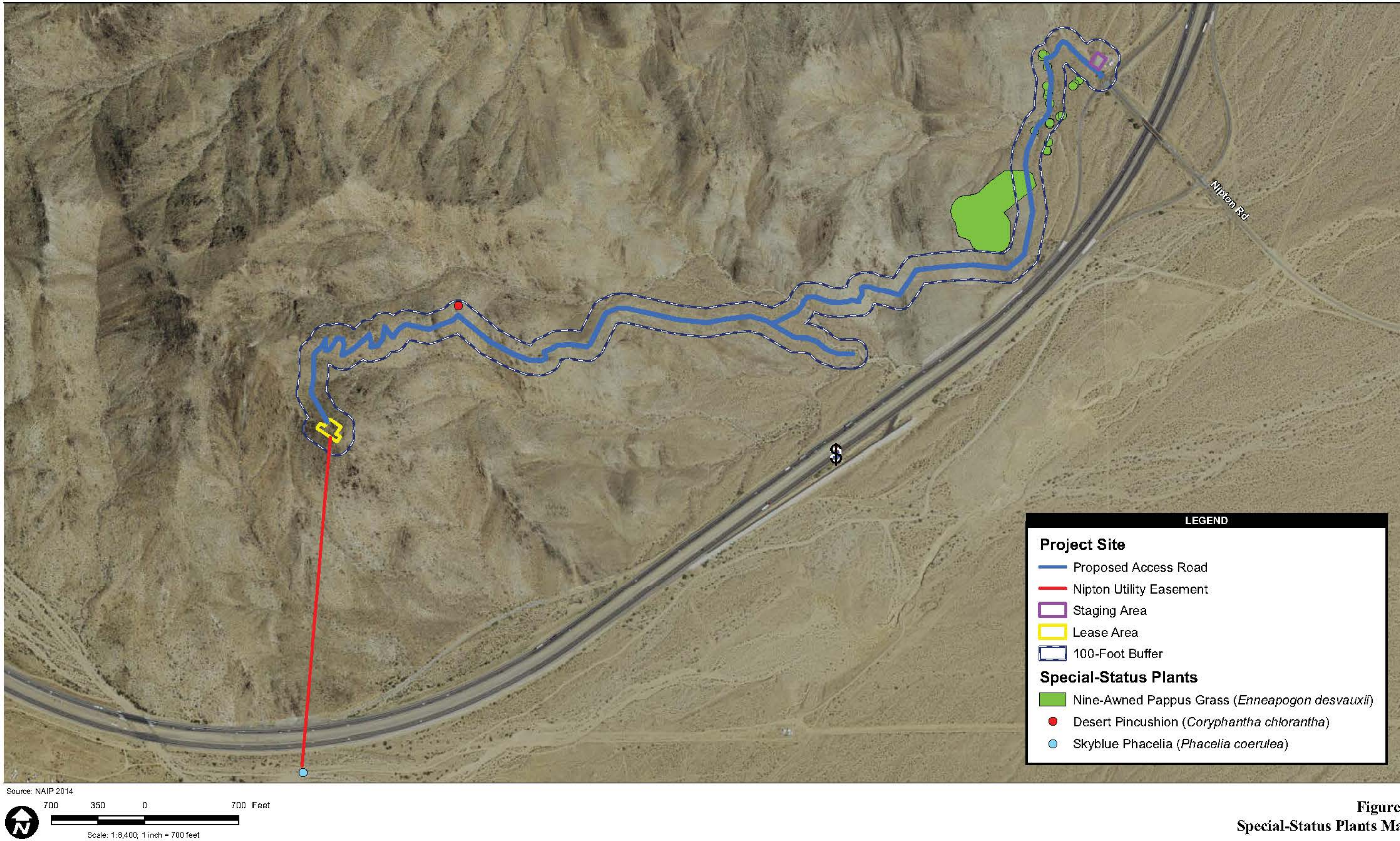


Figure 4
Special-Status Plants Map

Path: M:_Marketing Files through FY2014\Proposals\2013\Interconnect Towers\GIS\MXD\Figure4_Nipton_PlantMap.mxd, 8/12/2015, SorensenJ

APPENDIX A

PLANT SPECIES OBSERVED WITHIN THE NIPTON COMMUNICATION SITE

Appendix A
Plant Species Observed within the Nipton Communication Site

Family	Scientific Name	Common Name
Agavaceae	*Yucca schidigera*	Mojave yucca
Apocynaceae	*Amsonia tomentosa*	blue-star
Asteraceae	*Adenophyllum cooperi*	Cooper’s dogweed
	Ambrosia dumosa	white bur-sage
	Ambrosia eriocentra	woolly bur-sage
	Ambrosia salsola var. *salsola*	bur-sage
	Artemisia ludoviciana ssp. *ludoviciana*	Louisiana sage-wort
	Baccharis brachyphylla	short-leaved baccharis
	Baccharis sarothroides	Broom baccharis
	Bahiopsis parishii	Parish viguiera
	Bahiopsis reticulata	Death Valley goldeneye
	Baileya multiradiata	Desert marigold
	Bebbia juncea var. *aspera*	Sweetbush
	Brickellia incana	Woolly brickellbush
	Chaenactis fremontii	Pincushion flower
	Chaenactis xantiana	fleshy pincushion
	Encelia virginensis	Virgin River brittlebush
	Ericameria cooperi var. *cooperi*	Cooper’s goldenbush
	Ericameria paniculata	Mojave rabbitbrush
	Eriophyllum wallacei	Wallace’s woolly daisy
	Hymenoclea salsola	Burrobrush
	Gutierrezia sarothrae	matchweed
	Logfia filaginoides	California cottonrose
	Malacothrix glabrata	desert dandelion
	Palafoxia arida	Desert palafox
	Porophyllum gracile	odora
	Psilostrophe cooperi	Cooper’s paper-daisy
	Rafinesquia neomexicana	desert chicory
	Stephanomeria pauciflora	wire-lettuce
	Stylocline gnaphaloides	everlasting neststraw
	Thymophylla pentachaeta var. *belenidium*	five-needled thymophylla
	Trixis californica var. *californica*	California trixis
	Xylorhiza tortifolia var. *tortifolia*	Mojave-aster
Boraginaceae	*Amsinckia tessellata* var. *tessellata*	desert fiddleneck
	Cryptantha angustifolia	narrow-leaved cryptantha
	Cryptantha micrantha var. *micrantha*	red-root cryptantha
	Cryptantha nevadensis var. *nevadensis*	Nevada cryptantha
	Cryptantha pterocarya var. *pterocarya*	winged-nut cryptantha

Family	Scientific Name	Common Name
Boraginaceae	*Eucrypta micrantha*	small-flowered eucrypta
	Pectocarya linearis ssp. *ferocula*	narrow-toothed pectocarya
	Pectocarya penicillata	northern pectocarya
	Pectocarya platycarpa	Broadfruit combseed
	Phacelia coerulea[1]	Skyblue phacelia
	Phacelia crenulata	crenulate-leaved phacelia
	Phacelia perityloides var. *perityloides*	cliff phacelia
	Pholistoma membranaceum	white fiesta-flower
	Plagiobothrys arizonicus	Arizona popcornflower
Brassicaceae	*Brassica tournefortii*	Asian mustard
	Caulanthus lasiophyllus	California mustard
	Descurainia pinnata ssp. *glabra*	pinnate tansy-mustard
	Dithyrea californica	California shieldpod
	Lepidium densiflorum	dense-flowered peppergrass
	Lepidium fremontii	Frémont’s pepper-grass
Cactaceae	*Coryphantha chlorantha*[2]	desert pincushion
	Cylindropuntia acanthocarpa var. *coloradensis*	buckhorn cholla
	Cylindropuntia echinocarpa	Wiggins’ cholla
	Cylindropuntia ramosissima	pencil cactus
	Echinocactus polycephalus var. *polycephalus*	woolly-headed cactus
	Echinocereus engelmannii	Engelmann’s hedgehog-cactus
	Ferocactus cylindraceus	California barrel cactus
	Mammillaria tetrancistra	corkseed mammillaria
	Opuntia basilaris var. *basilaris*	beavertail
Chenopodiaceae	*Grayia spinosa*	spiny hop-sage
Ephedraceae	*Ephedra nevadensis*	Nevada jointfir
	Ephedra viridis	Mormon tea
Euphorbiaceae	*Chamaesyce albomarginata*	Whitemargin sandmat
	Euphorbia micromera	Sonoran sandmat
	Euphorbia polycarpa	smallseed sandmat
Fabaceae	*Acmispon strigosus*	strigose lotus
	Acmispon maritimus var. *brevivexillus*	Coastal lotus
	Astragalus mohavensis var. *mohavensis*	Mojave milkvetch
	Lupinus concinnus	bajada lupine
	Senegalia greggii	catclaw
Geraniaceae	*Erodium cicutarium**	redstem filaree
Krameriaceae	*Krameria bicolor*	white rhatany
	Krameria erecta	pima rhatany

Family	Scientific Name	Common Name
Lamiaceae	*Salvia dorrii* var. *pilosa*	Dorr's salvia
	Salvia columbariae	Chia
	Salvia mohavensis	Mojave salvia
	Scutellaria mexicana	bladder-sage
Loasaceae	*Mentzelia albicaulis*	white-stemmed blazing-star
Malvaceae	*Sphaeralcea ambigua* var. *ambigua*	apricot mallow
	Sphaeralcea emoryi	Emory's globemallow
Menodoraceae	*Menodora spinescens*	Spiny menodora
Nyctaginaceae	*Allionia incarnata* var. *incarnata*	trailing windmills
	Mirabilis laevis var. *villosa*	desert wishbone
Oleaceae	*Menodora spinescens* var. *spinescens*	spiny desert olive
Orobanchaceae	*Orobanche cooperi*	Desert broomrape
Papaveraceae	*Eschscholzia minutiflora*	small-flowered poppy
Phrymaceae	*Mimulus bigelovii* var. *bigelovii*	Bigelow's mimulus
Plantaginaceae	*Plantago ovata*	ovate plantain
	Achnatherum speciosum	Desert needlegrass
Poaceae	*Aristida adscensionis*	sixweeks three-awn
	Aristida purpurea	Purple threeawn
	Enneapogon desvauxii[3]	nine-awned pappus grass
	Bouteloua barbata	Sixweeks grama
	Bromus madritensis ssp. *Rubens**	red brome
	Dasyochloa pulchella	Low woollygrass
	Hilaria rigida	big galleta
	Muhlenbergia porteri	Bush muhly
	*Schismus barbatus**	Mediterranean grass
	Stipa speciosa	steppe-grass
	Tridens muticus var. *elongatus*	Slim tridens
Polemoniaceae	*Leptosiphon aureus*	golden desert-trumpets
	Linanthus demissus	desert-snow linanthus
Polygonaceae	*Chorizanthe brevicornu* var. *brevicornu*	brittle spineflower
	Chorizanthe rigida	devil's spineflower
	Eriogonum deflexum	Flatcrown buckwheat
	Eriogonum fasciculatum var. *fasciculatum*	California buckwheat
	Eriogonum fasciculatum var. *polifolium*	Mojave desert California buckwheat
	Eriogonum inflatum	desert trumpet
	Eriogonum reniforme	kidney-leaf wild buckwheat
Ranunculaceae	*Delphinium parishii* ssp. *parishii*	Parish's larkspur
	Delphinium spp.	larkspur
Rosaceae	*Coleogyne ramosissima*	black-brush
	Prunus fasciculata var. *fasciculata*	desert range almond

Family	Scientific Name	Common Name
Rutaceae	*Thamnosma montana*	Turpentinebroom
Solanaceae	*Lycium andersonii*	Anderson's desert-thorn
	Lycium cooperi	Cooper's box-thorn
	Nicotiana obtusifolia	Desert tobacco
	Physalis crassifolia	thick-leaved ground-cherry
Themidaceae	*Dichelostemma capitatum* ssp. *capitatum*	blue-dicks
Viscaceae	*Phoradendron californicum*	desert mistletoe
Zygophyllaceae	*Larrea tridentata*	creosote bush

* Nonnative species
1 CNPS Rare Plant Rank 2.3 - not very threatened in California, more common elsewhere
2 CNPS Rare Plant Rank 2.1 - seriously endangered in California, but more common elsewhere
3 CNPS Rare Plant Rank 2.2 - fairly endangered in California, but more common elsewhere

APPENDIX B

SITE PHOTOS

Photo 1 (Easting: 638804.15 Northing 3925185.43) View looking north near Wheaton Wash (south of the I-15 right-of-way).

Photo 2 (Easting: 638813.34 Northing 3925336.13) View looking north, just north of the I-15 fenced right-of-way.

Photo 3 (Easting: 638817.92 Northing 3925380.03) View looking north.

Photo 4 (Easting: 638822.38 Northing3925438.34) View looking north.

Photo 5 (Easting: 638822.38 Northing3925438.34) View looking north.

Photo 6 (Easting: 638849.46 Northing 3925740.08) View looking north.

Photo 7 (Easting: 638860.69 Northing 3925841.11) View looking north.

Photo 8 (Easting: 638872.65 Northing 3925960.01) View of the approximately 6,240-square-foot (0.143-acre) lease area.

Appendix D.1

Jurisdictional Delineation

Jurisdictional Delineation of Arid Streams for the Proposed Nipton Communication Site San Bernardino County, CA

Unnamed wash, San Bernardino County, CA

***Prepared for*:**
InterConnect Towers, LLC
27762 Antonio Parkway, #471
Ladera Ranch, CA 92694

***Contact*:**
Mr. Tom Gammon
T 202-255-7777

AECOM

Contacts:
John Parent, B.S.; Biologist
999 Town and Country Road, 2nd Floor;
Orange, CA 92868
T 714.689.7281
Email: John.Parent@aecom.com

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Appendices

1.0 EXECUTIVE SUMMARY

InterConnect Towers, LLC (Proponent) proposes to construct, operate, and maintain a multi-carrier communication site and ancillary components, including an access road, on Bureau of Land Management (BLM)-administered land. The Nipton Communication Site (Project) would consist of the following components:

- A single three-legged, 196-foot freestanding, self-supporting lattice communication tower with cabinets to house equipment; up to three 35-kilowatt backup generators with up to three 2,000-gallon propane tanks; and three solar arrays.
- New access road starting from Nipton Road and ending at the Project site that is up to 25 feet in width and 8,904 feet in length.

The Project is generally located in San Bernardino County, California, approximately 10 miles south of the California-Nevada state line, 1.25 miles southwest of the junction of Interstate 15 (I-15) and Nipton Road. (Figures 1 and 2).

AECOM conducted a jurisdictional delineation (JD) of ephemeral (or episodic) streams within the Project area using standard delineation methodologies: (a) Mapping the Ordinary High Water Mark (OHWM), which is used by the U.S. Army Corps of Engineers (USACE) for determining waters of the U.S. and indirectly used by the Regional Water Quality Control Board (RWQCB) for determining Waters of the State; and (b) Mapping Episodic Stream Activity (MESA) (where applicable) as utilized by the California Department of Fish and Wildlife (CDFW). The Study Area for jurisdictional waters includes the proposed route of the new access road plus a 25-foot buffer in any direction out from the road, and the communication tower site. The results described in Section 6 herein include the following jurisdictional features: two unnamed CDFW watercourses. In addition, numerous non-jurisdictional swales situated along a slope to the north of I-15 were mapped within the Study Area. Within the Study Area, the JD resulted in 0.10 acre of non-wetland waters of the State, and 0.48 acre of CDFW streambeds (Table 1-1). The total length of these jurisdictional features is 585 linear feet (Table 1-1). The JD also presents the impact analysis for a 25-foot-wide corridor, composed of the 14-foot-wide road and 5.5 feet of buffer on either side.

Table 1-1. Ephemeral Drainage Features within Study Area

	Waters of the State (acres)	Streambeds (acres)	Linear Feet
Feature			
A. Drainage East	0.1	0.47	567
B. Drainage West	~0.001	0.01	18
Total	**0.10**	**0.48**	**585**

2.0 PROPOSED PROJECT

2.1 Background and Purpose of Project

The Proponent seeks to provide improved cellular communication capability within the I-15 corridor and surrounding lands in the Ivanpah Valley and Mountain Pass areas. I-15 is a heavily traveled roadway that carries regional traffic between southern California and Las Vegas, with an average daily traffic count along this segment typically surpassing 40,000 vehicles per day (Caltrans 2016). This segment of I-15 and adjacent lands has been identified as having inadequate cellular transmission coverage, largely due to signal shadowing caused by topographic features. Of particular concern are the areas where I-15 passes through the Clark Mountain Range before entering the Ivanpah Valley. Wireless telecommunication providers (i.e., Verizon, AT&T, etc.) have determined a need for an additional communication site based on any or all of the following criteria:

- Need to provide signal coverage to an area or zone;
- Need to strengthen/densify coverage to an area or zone;
- Customer demand for coverage;
- Emergency Response Agency demand for coverage;
- Law Enforcement Agency demand for coverage; and
- Federal/Homeland Security demand for coverage.

The proposed Project site would remedy the existing coverage deficiencies in the area and would meet one or more of the objectives outlined above. The facility would be made available for collocated use by existing wireless telecommunication providers and other telecommunication service providers.

2.2 General Project Description

The Project would entail the issuance of an approximately 6.3-acre right-of-way (ROW) grant for the construction, operation, maintenance, and decommissioning and restoration of a multi-carrier communication site and ancillary components, including an access road, on BLM-administered land.

The applicant has filed an application for a 30-year ROW grant from the BLM for the proposed construction of the communication facility and associated access road. The Project site is not ancillary to an existing ROW. The proposed Project would be a multi-tenant wireless communication facility and would be designed to accommodate a minimum of four national carriers as well as government agencies (police, fire and resource, and highway patrol) for a total of six tenants.

The Project would consist of the following components:

- A 17,248 square foot lease area that includes a single three-legged, 196-foot freestanding, self-supporting lattice communication tower with cabinets to house equipment; three 21-foot by 80-foot solar arrays; and up to three 35-kilowatt backup generators with up to three 2,000-gallon propane tanks;
- New access road starting from Nipton Road and ending at the Project site that is up to 25 feet in width and 8,904 feet in length.
- An 80-foot by 100-foot temporary staging area in a previously disturbed area adjacent to the I-15/Nipton Road interchange

Detailed information about each of the proposed Project components is provided below.

Tower

The tower would be a self-supporting, three-legged, lattice-style structure, and would be 196 feet in height. The tower would serve as the structure upon which the communication equipment would be mounted. The tower would be placed upon a concrete slab foundation, and would consist of either cast-in-place caissons or shallow foundations designed to carry axial loads and moments of force applied by wind and other factors on the tower. The tower, foundations, and all other structures on the site would be built to professional standards and applicable building codes. Soil tests and other investigations would be performed within the location of the proposed site to determine the specific foundation requirements.

The structural members and bracing units of the tower would be constructed of industry-standard galvanized steel with a silver-gray color tone. The types of communication equipment installed on the tower would depend upon the specific carriers housed at the site and the equipment requirements for their specific systems, but would likely include a rectangular antenna array, omni antennas, and microwave dishes.

Equipment Cabinets, Backup Generators, Supporting Components, and Solar Arrays

The communication site would include equipment cabinets adjacent to the tower to house interior communication equipment. The equipment cabinets would be brought to the site by truck and installed onsite. The cabinets would include an environmental control system for heating, ventilation, and air conditioning (HVAC) to keep the interior within the temperature range required for the operation of the electronic communication equipment inside.

Electric power would be provided via photovoltaic solar panels. The solar power would consist of three 21-foot by 80-foot panels approximately 8 feet in height that would be mounted on concrete pads. The communication site would be enclosed within a chain-link fence measuring 8 feet in height, with three strands of barbed wire on the top, bringing the total height to 9 feet. Galvanized hardware mesh of 1-inch by 2-inch dimensions would be attached to the lower 18 inches of the chain-link fencing and buried to a 12-inch depth, in accordance with standard specifications for fencing in possible desert tortoise habitat. A gate would provide access into the compound for persons and vehicles. A downward-shielded security light would be mounted within the compound and would be activated by a motion sensor.

Road Access

A staging area would be adjacent to the I-15/Nipton Road interchange at the beginning of the access road. The area is currently used for vehicle parking and vehicle turnaround purposes; therefore, this area is considered already disturbed. Access to the site would begin at the I-15/Nipton Road interchange and would travel northwesterly along an existing graded dirt road for approximately 330 feet. From this point, a new dirt roadway would be graded in a southwesterly direction approximately 8,904 feet to the proposed communication site at the top of the hill. The total elevation gain from the base of the hill to the proposed communication site location is approximately 1,050 feet.

The 330 feet of existing roadway (BLM-designated route) at the beginning of the alignment is of adequate width and condition and will not require improvement. The new 8,904-foot roadway segment to the communication site, however, would require new construction and include a number of switchbacks near the top of the alignment to maintain a suitable grade up the slope. The roadway would be constructed to a standard width of 14 feet to accommodate trucks and other large vehicles required during the construction and operation of the site. Up to 50 feet of upslope and downslope fall-off disturbance could occur on either side of the roadway along the steeper stretches. For purposes of acreage calculations, it has therefore been assumed that the average width of disturbance along the entire roadway would be 25 feet.

The initial portion of the new roadway would travel for approximately 450 feet along the bottom of an ephemeral desert wash before circling around a low hill and passing through a low saddle. The roadway would then cross another ephemeral wash and begin to climb up a ridge to the site. Five pull-off/passing areas measuring 25 feet by 100 feet would be located at appropriate intervals along the route.

The new roadway segment would cross the aforementioned ephemeral desert wash approximately 3,650 feet from the beginning of the alignment. At the location of the proposed crossing, the wash is approximately 16 feet in width. While substantial surface flows within this desert wash are infrequent, improvements at the crossing would need to be made to ensure serviceability of the roadway following major storm water runoff events. This may be accomplished by the placement of ribbed galvanized steel pipes placed directly on the streambed. The pipes would then be overlain with rock riprap and gravel. Alternatively, the road may be graded to drop into and out of this wash area with a slope not to exceed 20 percent into and out of this wash. Inflow and outflow areas may also be hardened with riprap to prevent scouring both upstream and downstream from the crossing. The quantity and size of the pipes at the crossing would be designed to accommodate projected peak flows along the watercourse, but preliminary indications based upon experience with similar projects in similar locations indicate that two pipes would be required. The roadway surface at the crossing would be 14 feet in width, consistent with the rest of the roadway. Construction of the new access road would occur in a biologically inactive season (e.g., winter or summer) and take up to 30 days.

A gate would be constructed across the roadway just before the first passing lane along the alignment. The gate would be positioned in a suitable location to deter vehicles from driving around it.

3.0 SITE LOCATION

The proposed communication site is in San Bernardino County, California, approximately 10 miles south of the California-Nevada state line, 1.25 miles southwest of the junction of I-15 and Nipton Road.

The center of the proposed communication tower would be located at 35°28'03.42"N, 115°28'10.18"W at an elevation of approximately 4,460 feet above mean sea level. The proposed site, the access road, and all ancillary components would be entirely on BLM-managed lands. See Appendix A – Figure 1 for a regional location map; Appendix A – Figure 2 for a local vicinity aerial photo of the area; and Appendix A – Figure 3 for a topographic map.

The access road would begin at an existing cattleguard at the end-of-pavement of Nipton Road at 35°28'28.2"N, 115°27'00.2"W.

4.0 REGULATORY SETTING/TERMINOLOGY

The following section briefly summarizes the federal and state statutes and regulations pertaining to the JD conducted for the Project. A previous AECOM report determined that the potentially federal jurisdictional features within the Study Area are not jurisdictional waters, and although this determination was submitted to the USACE, no official determination was prepared by this agency.[1] Thus, another Approved JD Form has been prepared and attached to this JD report, using the most current Approved JD Form (per the Clean Water Rule) (Appendix B). The preliminary conclusion is that the drainages onsite remain isolated and thus not jurisdictional. Only the USACE can make an official determination. Also included in Appendix B are attachments previously submitted as part of the 2013 JD report, as the information remains relevant to this Project.

Because it is assumed that the watershed is isolated (and thus without federal jurisdiction), this delineation report will focus on code, regulation, and policy for California State agencies: the RWQCB and the CDFW. Waters of the U.S. as regulated by the USACE[2] (per Clean Water Act [CWA] Section 404) and RWQCB[3] (per CWA Section 401) are not specifically discussed in this report. However, the use of the OHWM was a defining criterion for this report.[4]

Federal Regulation of Waters of the United States, Including Wetlands (Clean Water Act Sections 404 and 401) (33 U.S.C. 1251-1376)

The USACE and the U. S. Environmental Protection Agency (EPA) regulate the discharge of dredged or fill material into waters of the U.S., including wetlands, under Section 404 of the CWA. The USACE has defined the term "wetlands" as follows: "Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstance do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas" (40 Code of Federal Regulations 116.3). Some classes of fill activities may be authorized under general permits if specific conditions are met. Projects that would result in the placement of dredged or fill material into Waters of the U.S. require a Section 404 permit from the USACE.

Section 401 of the CWA requires the issuance of a water quality certification or waiver thereof for all Section 404 nationwide or individual permits issued by the USACE. The EPA has deferred water quality certification authority to the State Water Resources Control Board (SWRCB). Most projects are regulated by RWQCBs. The SWRCB directly regulates multi-regional projects and supports and coordinates the program statewide.

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[1] AECOM. 2013. InterConnect Nipton Communications Site Jurisdictional Delineation Letter Report. This report contained an AJD Form (per Rapanos) and associated figures.
[2] Under Section 404 of the CWA, USACE regulates the discharge of dredged or fill material into jurisdictional waters of the U.S. (including adjacent wetlands), which include those waters listed in 33 CFR 328.3 (Definitions).
[3] Section 401 of the CWA requires states to certify that any activity that may result in discharge into waters of the U.S. will comply with state water quality standards. All permits issued by USACE under Section 404 of the CWA require certification pursuant to Section 401. The RWQCB, as delegated by the U.S. EPA and SWRCB, is the state agency responsible for issuing a CWA Section 401 Water Quality Certification or waiver. In general, jurisdiction for the RWQCB will be the same as for the USACE, which includes waters of the U.S., including wetlands.
[4] For the purposes of determining the lateral extent of waters of the U.S. (as administered by the USACE/RWQCB for purposes of compliance with Section 404/401 of the CWA), the term OHWM is defined as "*That line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas*."

4.1 Porter-Cologne Water Quality Control Act

Section 13263 of the 1969 Porter-Cologne Water Quality Control Act (Porter-Cologne) authorizes the RWQCB to regulate discharges of waste and fill material to waters of the State, including isolated waters and wetlands. The California Water Code Section 13050(e) defines the waters of the State separately and uniquely from the federal definition as *"…any surface water or groundwater, including saline waters, within the boundaries of the State."* The state definition places no limitation on the size of stream flow as is implicitly the case for the waters of the U.S. The OHWM concept is indirectly used by RWQCB to determine waters of the State, and it is not used by the CDFW to delineate stream boundaries for the purpose of determining California Fish and Game Code (CFGC) jurisdiction per the MESA protocol.

The term waters of the State applies to all perennial, intermittent, and ephemeral rivers, streams, and lakes within the state of California, including wetland and/or riparian vegetation and fish and wildlife resources. This designation includes isolated, depressional wetlands, and vernal pools. Waters of the State are regulated by the SWRCB and the RWQCBs. A new policy is in the process of being introduced that will provide increased clarification with respect to waters of the State, especially wetlands, and will introduce additional regulatory requirements.[5]

When the USACE does not regulate drainages within an isolated watershed (e.g., Mojave Desert areas), then the RWQCB will authorize the project per Waste Discharge Requirements (WDRs). General WDRs are available if the applicant meets particular requirements; these WDRs represent a much more streamlined process than individual WDRs.

4.2 California Fish and Game Code (Section 1600 et seq.)

CFGC Sections 1600-1617 (Lake and Streambed[6] Alteration Agreement Program) require consultation with CDFW if a proposed activity has the potential to detrimentally affect a stream, and thereby wildlife resources that depend on a stream for continued viability. All streams present on a proposed project site must be identified to characterize the potential for adverse project-related impacts on the stream and associated wildlife. Under CFGC Sections 1600 et seq., CDFW regulates activities that would result in (1) any potential detrimental impacts associated with the substantial diversion or the obstruction of the natural flow of a stream; (2) substantial changes to the bed, channel, or banks of a stream, or the use of any material from the bed, channel, or banks; and (3) the disposal of debris or waste materials that may pass into a stream. CDFW jurisdiction can only be applied once stream presence is identified and a project design is developed to a level of detail adequate to perform impact analysis.

Per informal guidance and current practice, CDFW may assert its jurisdiction under CFGC Sections 1600 et seq. over activities in stream features laterally to the top of the bank, or to the outer edge of the riparian vegetation (also called the "drip line"), whichever is wider. CDFW jurisdiction may also extend to the limits of the 100-year floodplain. Isolated, "non-streambed" wetlands are typically not regulated by CDFW. Riparian habitat and wetlands adjacent to streambeds are additional resources that may be regulated by CDFW.

Riparian habitat refers to areas within and adjacent to rivers, streams, and creeks that support plant species adapted to (or that can tolerate) occasional or permanent flooding and/or saturated soils. Riparian habitat may include areas within the jurisdiction of the USACE and/or CDFW. Typically, USACE

[5] Statewide Wetland and Riparian Area Protection Policy Initiative; http://www.swrcb.ca.gov/water_issues/programs/cwa401/wrapp.shtml

[6] The term streambed refers to the bed, bank, and channel geomorphic features associated with streams (in other words, the land beneath a stream).

jurisdictional areas are much smaller than CDFW jurisdictional areas, and lateral extent may vary according to watershed position, water availability, and other factors (Larsen 2007). Riparian vegetation can occur outside of USACE and/or CDFW jurisdiction; however, unique attributes indicate agency jurisdiction and include hydrologic interaction (both laterally and longitudinally) and distinct geomorphic features (e.g., bankfull channel, floodplain, terrace).

The California Fish and Game Commission defines the term wetland as: "*Wetlands are lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. For purposes of this classification wetlands must have one or more of the following three attributes: (1) at least periodically, the land supports predominantly hydrophytes; (2) the substrate is predominantly undrained hydric soil; and (3) the substrate is nonsoil and is saturated with water or covered by shallow water at some time during the growing season of each year"* (Cowardin et al. 1979).

The approved California Wetland Definition (SWRCB 2019) states: "*An area is wetland if, under normal circumstances, (1) the area has continuous or recurrent saturation of the upper substrate caused by groundwater, or shallow surface water, or both; (2) the duration of such saturation is sufficient to cause anaerobic conditions in the upper substrate; and (3) the area's vegetation is dominated by hydrophytes or the area lacks vegetation.*"

4.3 Glossary of Stream and Terrestrial Landforms

The following definitions (Section 4.3.1) are from the MESA Guidebook as used by CDFW (Vyverberg 2010; Brady and Vyverberg 2014; Vyverberg and Brady 2014), as well as the delineation manual for non-wetland Waters of the US (Section 4.3.2; Lichvar and McColley 2008; Curtis and Lichvar 2010).

4.3.1 CDFW MESA Terminology

Watercourse – The area within and along which water flows perennially or episodically through one or more channels. Or, the course over which water currently flows, or has flowed as defined by the topography that confines the water to this course when the water rises to its highest level. Where present, low flow channels, active channels, banks associated with these channels, floodplains, swales, islands, and stream-associated vegetation, may all occur within the bounds of a single larger channel designated the "watercourse" to discriminate between it and functionally related but subordinate fluvial landforms that lie within its bounds.

4.3.2 Other USACE, RWQCB, and CDFW Terminology

Active Floodplain – The ordinary high water zone in low-gradient, alluvial ephemeral/intermittent channel forms in the Arid West is the active floodplain. The dynamics of arid channel forms and the transitory nature of traditional OHWM indicators in arid environments render the limit of the active floodplain the only reliable and repeatable feature in terms of ordinary high water delineation (Lichvar and McColley 2008).[7] In arid channel systems, the active floodplain functions in the same manner as the bankfull channel within a perennial channel form, in that most of the hydrological and fluvial dynamics produced by repeating effective discharges is confined within its boundaries. Also, the extent of flood model outputs for effective discharges—5- to 10-year events in arid channels—aligns well with the boundaries of the active floodplain, and the characteristic vegetative behavior and sediment texture associated with the active floodplain/low terrace transition are readily observable in aerial photographs and in the field.

[7] https://www.spl.usace.army.mil/Portals/17/docs/regulatory/JD/FinalOHWMManual_2008.pdf

Streambeds – This term refers to the bed, bank, and channel geomorphic features associated with streams (in other words, the land beneath a stream). A streambed may include all or a portion of the riparian zone. The lateral extent of streambeds may reach beyond the OHWM (the extent of USACE jurisdiction), and extend laterally beneath the banks where subsurface hydrologic connectivity exists between the stream and the surrounding land. Jurisdiction extends from top of bank to top of bank. Per internal guidance and accepted practice, jurisdiction may also extend to the outer edge of the riparian corridor, if present (also called the "drip line"), or the limits of the 100-year floodplain. Streambeds are regulated by the CDFW under Section 1600 et seq. of the CFGC.

Waters of the State – Applies to all perennial, intermittent, and ephemeral rivers, streams, and lakes within the state of California, including wetland and/or riparian vegetation and fish and wildlife resources. As defined in Porter-Cologne (revised in 2004; Water Code 13050), Waters of the State refers to any surface water or groundwater, including saline waters, within the boundaries of the State of California. This designation includes isolated, depressional wetlands, and vernal pools. Waters of the State are regulated by the SWRCB (if across multiple regions) and RWQCBs. In the context of CWA permitting, the term Waters of the State typically implies waters that the USACE has not asserted jurisdiction over. A new policy is in the process of being introduced that will provide increased clarification with respect to Waters of the State, especially wetlands, and will introduce additional requirements.[8]

Waters of the U.S. – Refers to federally regulated (per CWA Section 404) rivers, creeks, streams and lakes, delineated by an OHWM, and extending upstream to the headwaters. The OHWM is defined as the "*line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of the soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas*."[9]

[8] Statewide Wetland and Riparian Area Protection Policy Initiative; *http://www.swrcb.ca.gov/ water_issues/ programs/ cwa401/wrapp.shtml*.

[9] The term ordinary high water mark means that line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.

5.0 METHODOLOGY

Prior to conducting field work, AECOM conducted a review of available mapping of watersheds, streams, wetlands, and soils (e.g., National Hydrographic Dataset, NHD [USGS 2018]; National Wetlands Inventory, NWI [USFWS 2018]; Web Soil Survey [USDA-NRCS 2019a, b, c]; CSRL and UC-ANR 2019). AECOM also reviewed accessible aerial photographs of the site from previous years (e.g., Google Earth historical aerials range 1995–2017; Google Earth 2018), in order to observe historical patterns of stream activity. In addition, AECOM reviewed background geological information for the Project site and vicinity, and applicable geological mapping. These pre-field reviews were conducted to obtain contextual information relevant to the site to be surveyed, which may not be evident from the ground during field surveys.

AECOM conducted a field survey to evaluate the presence of CDFW-jurisdictional streambeds and any applicable riparian habitat utilizing the methods as discussed below. AECOM staff visited the Nipton Project site on January 29 and 30, 2019. Conditions were cool, sunny, and dry (approximately 60 degrees Fahrenheit). Bonnie Hendricks (Sr. Plant Ecologist), and John Parent (Biologist) of AECOM performed the jurisdictional delineation and associated vegetation mapping. The field investigation included documenting existing conditions, vegetation communities, jurisdictional resources, and land cover classification and mapping.

The MESA methodology was utilized to the extent practicable to define CDFW-jurisdictional drainages (or washes).[10] A site transect that allowed for a systematic collection of data that would provide a detailed representation of the primary watercourse within the Study Area was chosen (Figure 6, Appendix A). Jurisdictional drainage features may include washes, low-flow channels, active floodplains, and secondary channels; collectively these may be termed the “watercourse.” Notable drainage features that may or may not be jurisdictional, including swales, and erosional features were also mapped.

A MESA transect was walked during the site visit (Figure 6, Appendix A) and a MESA data sheet was filled out for this transect area (Appendix B). The transect (across the main drainage feature) included the entire width across the drainage feature (bed, bank, channel of wash; i.e., width across drainage feature). The presence of geomorphic features was noted according to the distance along the transect.

All drainage features were documented, and photo-location points were noted on field maps (e.g., upland, bank, upper/lower floodplain, low-flow channel). Drainages were also mapped with Global Positioning System (GPS) enabled devices, and photograph locations and directions were noted. Potential drainage features were noted where they intersected the proposed road or occurred within the Study Area. Site photographs (Appendix C) documented transect locations as well as hydrologic indicators and wash vegetation found at each site.

Because USACE has previously stated that waters in this high desert region are isolated and thus non-jurisdictional with respect to the USACE, data sheets specific to the delineation of waters of the U.S.,

[10] The CDFW Lake and Streambed Alteration Program web page states that “*MESA is intended to assist in identification and mapping of episodic streams when water is absent, and has perhaps been so for several years*.” (https://www.wildlife.ca.gov/Conservation/LSA/Resources); MESA References: (a) *Methods to Describe and Delineate Episodic Stream Processes on Arid Landscapes for Permitting Utility-Scale Solar Power Plants, With the MESA Field Guide - Final Project Report*. Publication Number: CEC-500-2014-013. February 2014. (http://www.energy.ca.gov/2014publications/CEC-500-2014-013/CEC-500-2014-013.pdf); (b) *Appendix G - The Mesa Field Guide, Mapping Episodic Stream Activity*. Updated 12/18/2014. (http://www.energy.ca.gov/2014publications/CEC-500-2014-013/CEC-500-2014-013-APG.pdf).

including wetlands, were not completed for this report[11] (Environmental Laboratory 1987; Lichvar and McColley 2008; USACE 2008; Curtis and Lichvar 2010). The following stream and wetland references were used to define and/or characterize potentially jurisdictional features: Cowardin et al. 1979; Lefebvre et al. 2013; CWMW 2014; Wohl et al. 2016; and California Wetlands Portal 2019. Plant species were compiled for the entire site, and scientific names were consistent with standard references (Baldwin et al. 2012; Calflora 2019; Cal-IPC 2018; CNPS 2019a; JFP 2018). Other vegetation-related references consulted included the following: Hanes et al. (1989); Lichvar and Dixon (2007); Buck-Diaz et al. (2011); Menke et al. (2013, 2016).

Vegetation communities were categorized using established systematic classification criteria described in *A Manual of California Vegetation, Second Edition* (Sawyer et al. 2009; CNPS 2019b; CDFW 2018a, b, c; Holland 1986). Alternatively, vegetation communities or land cover types that are not described in *A Manual of California Vegetation, Second Edition* were classified using conventional naming practices (e.g., developed) or were defined by the dominant species. During the field survey, vegetation communities were identified and mapped within the Study Area using field observations and a high-quality aerial photograph. After the field investigation, the hand-mapped boundaries were digitized in conjunction with a high-quality aerial photograph using geographic information system (GIS) software from ArcGIS. A list of plant species was compiled by vegetation community; a list of plant species observed during this survey is also included (Appendix D). Plant nomenclature follows *The Jepson Manual-Vascular Plants of California, Second Edition* (Baldwin et al. 2012; JFP 2018).

AECOM staff scientists recorded all spatial and attribute data using the Environmental Systems Research Institute (ESRI) ArcCollector application running on Android and Apple (iPad, iPhone) devices. Potentially jurisdictional areas were mapped using a Trimble GeoXH submeter receiver connected to the Apple device through a Bluetooth connection. GPS collected spatial data were imported into ArcMap software for post-field processing.

It should be noted that AECOM's use of the MESA mapping for drainage features utilized the top of bank (for small, individual drainages) and watercourse elements (for larger washes) as the lateral extent of jurisdiction. However, application of the MESA methodology resulted in not including some features on the lateral limits of jurisdiction because of the lack of indicators (as described in the MESA protocol).

[11] Applicable datasheets for USACE methodologies, including wetland delineation forms (per the Arid West Supplement, Lichvar and McColley 2008) and/or OHWM Manual (per the OHWM Manual, 2010), were not completed in the field. Nonetheless, the above USACE methodology (OHWM Manual) was utilized to assist in defining and classifying drainage features onsite.

6.0 RESULTS

6.1 Watershed Context and Hydrology

Per current agency requirements, both the United States Geological Survey (USGS) Watershed Boundary Dataset (WBD) and the State of California's CalWater data were accessed to display and describe the watersheds for the Project site (Appendix A, Figures 5 and 6). The NWI Map is shown as Figure 7. In general, the watershed is an isolated, inland, desert system, with flows originating in the Mescal Range, a small mountain range in the eastern Mojave Desert, and flowing down to and across the Mojave Desert floor, where the majority, if not all, of the surface water typically dissipates prior to reaching the dry playa, Ivanpah Lake, the watershed's terminal water body (approximately 4 miles east of the Project site; Figures 5 and 6). The Ivanpah-Pahrump Valleys Watershed is internally drained, with no outlet to coastal areas or navigable waterways. None of the drainages within the Ivanpah-Pahrump Valleys Watershed appear to have any connection to interstate or foreign commerce. Therefore, all tributaries within this watershed are considered isolated.

Specifically, the Project site is located within the following WBD and CalWater watershed units:

<u>WBD HUC 8: 16060015 – Ivanpah-Pahrump Valleys (Figure 5)</u>

- HUC 10: 1606001510 – Devil Canyon – Frontal Ivanpah Lake

<u>9612 – Ivanpah Unit (Figure 6)</u>

Watershed (undefined) 9612.000000 – Per the Lahontan Basin Plan,[12] the following drainage feature and associated beneficial uses are noted:

<u>Drainage Feature (Receiving Water) - Ivanpah Lake</u>

- MUN – municipal/domestic water supply
- AGR – agricultural supply
- GWR – groundwater recharge
- REC-1/REC-2- water contact/non-contact recreation
- WARM – warm freshwater habitat
- COLD – cold freshwater habitat
- WILD – wildlife habitat
- SAL – inland saline water habitat
- WQE – water quality enhancement
- FLD – flood peak attenuation/flood water storage

6.2 Existing Setting and Vegetation Communities

Pre-existing site disturbance conditions were observed within a small portion of the Study Area located at the terminus of Nipton Road and consisted of Nipton Road (both paved and unpaved sections), barbed wire fencing, a cattle guard, and utilities. The remaining portion of the Study Area follows a desert wash for approximately 450 feet, then transitions into the adjacent uplands and proceeds upslope, terminating at the tower site.

[12] https://www.waterboards.ca.gov/lahontan/water_issues/programs/basin_plan/

Observed vegetation communities were mapped within the Study Area and are described below.[13] The field mapping effort complemented the natural communities' literature review. No sensitive vegetation communities with a state rarity rank of S1-3[14] that were identified during the literature review were confirmed present within the Study Area during the reconnaissance survey. Table 6-1 identifies the field-observed vegetation communities and associated acreages within the Study Area, and these communities are illustrated in Figure 4. Figure 4 also displays vegetation mapping completed as part of other Project studies, such as desert tortoise (*Gopherus agassizii*), to provide a greater context of vegetation in the Project vicinity.

Table 6-1. Vegetation Communities within Study Area

Vegetation Community[1]	Area (acres)
Creosote bush – brittle bush scrub	2.9
Cheesebush – sweetbush scrub	0.13
Disturbed/developed	0.1
Total	**3.13**

[1] Source: AECOM 2019

6.2.1 Upland Vegetation Communities (Adjacent to Episodic Drainages)

Creosote bush – brittle bush scrub (*Larrea tridentata – Encelia farinosa* Shrubland Alliance). This community is composed of creosote bush (*Larrea tridentate*) as a dominant or co-dominant in the shrub canopy with brittle bush (*Encelia farinosa*), desert trumpet (*Eriogonum inflatum*), beavertail cactus (*Opuntia basilaris*), buck horn cholla (*Cylindrapuntia acanthocarpa*), and California barrel cactus (*Ferocactus cylindraceus*). Emergent Joshua trees (*Yucca brevi*folia) are present in low cover. It occurs within small washes, rills, alluvial fans, bajadas, colluvium on upland slopes. Soils are typically well drained, are rocky, may have desert pavement surfaces, and are often derived from granitic or volcanic rock. The majority of the Study Area is located within this vegetation community, with the exception of the eastern portion within the desert wash. Observed pre-existing disturbances were the developed section to the east at the terminus of Nipton Road. The state rarity ranking for this community is S4.

6.2.2 Arid Wash Vegetation Communities

Cheesebush – sweetbush scrub (*Ambrosia salsola – Bebbia juncea* Shrubland Alliance). This community is composed of cheesebush (*Ambrosia salsola*) and sweetbush (*Bebbia juncea*) as the dominant shrubs. This community occurs along intermittently flooded channels, arroyos, and washes; valleys; flats; and rarely flooded low-gradient deposits. Soils are alluvial, sandy and gravelly, and disturbed desert pavement. The portion of the ROW that exists within the desert wash occurs within this community. The state rarity ranking for this community is S4.

[13] Communities were described using *A Manual of California Vegetation Online* (http://vegetation.cnps.org/).
[14] California Native Plant Society (CNPS) utilizes a ranking system to assign an imperilment status for plant communities within California. They are as follow: S1 = Critically Imperiled – Critically imperiled in the state because of extreme rarity, 5 or fewer occurrences. S2 = Imperiled – Imperiled in the state because of rarity due to very restricted range, 20 or fewer occurrences. S3 = Vulnerable – Vulnerable in the state due to a restricted range, 80 or fewer occurrences. S4 = Apparently Secure – Uncommon but not rare; some cause for long-term concern due to declines or other factors. S5 = Secure – Common, widespread, and abundant in the state.

6.3 Soils and Geology

6.3.1 Soils

Soil types within the Study Area are shown in Table 6-2 below. None of the mapped soils were hydric soils. Appendix E provides detailed soil information from Web Soil Survey (USDA-NRCS 2019a).

Table 6-2. Soils Data within Study Area

Soil Type Code	Soil Description[1]
3000	**Copperworld association**, 30 to 60 percent slopes - Hydrologic Soil Group D (Slow Infiltration Rate; High Runoff Potential) - Flooding Frequency Class: None[2] - Landform = Mountains and Hills
3520	**Arizo loamy sand**, 2 to 8 percent slopes - Hydrologic Soil Group A (High Infiltration Rate; Low Runoff Potential) - Flooding Frequency Class: Very Rare[2] - Landform = Fan Aprons, Fan Remnants, Drainageways

[1] Web Soil Survey (USDA NRCS 2019a)
[2] Flooding Frequency Class = "None" means that flooding is not probable. The chance of flooding is nearly 0 percent in any year. Flooding occurs less than once in 500 years. "Very rare" means that flooding is very unlikely but possible under extremely unusual weather conditions. The chance of flooding is less than 1 percent in any year.

6.3.2 Geology

The site is within the USGS Mineral Hill quadrangle located in the Mojave Desert on the east slope of the Clark Mountain Range adjacent to the Ivanpah Valley. These mountains are part of the Basin and Range physiographic province, which in the vicinity of the site consists of north-south trending mountain ranges and valleys. The mountains are often associated with normal and strike slip faults that also trend northwest-southeast although no mapped faults occur within the Project area. All rainfall at the site drains into Ivanpah Lake, the lowest point in the Ivanpah Valley. The valley has no natural outlet to the ocean.

Miller (2012) mapped the geology of the site and the surrounding area (Appendix E). The Project site consists of two main geologic units: Qha/mr (hillslope deposits/metamorphic rock) on the steeper slopes of the Clark Mountain Range, and Qya (young alluvial fan deposit; Holocene and latest Pleistocene) + Qaa (active alluvial fan deposit; latest Holocene) at the lower elevation area at the Project northeast end. Most of the site is situated in an erosional landscape, and a smaller proportion is composed of alluvial/debris-flow deposits.

Evaluating the geologic map, starting at the Project site's western end, and moving east to the ultimate drainage terminus of Ivanpah Dry Lake, the geological units described below are present.

Erosional Landscape

Qha (Hillslope deposits) /mr (metamorphic): consists of Proterozoic gneiss and schist of the Ivanpah terrane (Norris and Webb 1990).

Alluvial and Debris-Flow Deposits

Qya (Young alluvial fan deposit; Holocene and latest Pleistocene) + Qaa (Active alluvial fan deposit; latest Holocene) include sediments in active braided stream channels that are characterized by the overall light color of the sediments due to recent reworking by fluvial processes, and relative lack of vegetation.

Qia (Intermediate alluvial fan deposit (late to middle Pleistocene) + Qya (Young alluvial fan deposit; Holocene and latest Pleistocene) include older alluvial fan deposits that are currently undergoing erosion as evidenced by gullies that have cut into the fan surface. They are slightly darker than Qya and Qaa deposits due to the presence of iron and manganese oxide deposits (desert varnish) on the sediments.

Playa Deposits (Ivanpah Dry Lakebed)

Qap (Active playa deposit; Holocene), Qaps (Active playa sandy facies deposit; Holocene), Qypf (Young playa fringe deposit; Holocene and latest Pleistocene): these include fine sand and silt deposited by fluvial processes as well as evaporite minerals and eolian sand.

6.4 Ephemeral Drainage Features within the Study Area

Two ephemeral drainages, both unnamed, and several small, unnamed non-jurisdictional features north of I-15 were observed within the Study Area. Table 6-3 provides a summary of jurisdictional features within the Study Area. The potentially jurisdictional features were classified according to arid stream types and vegetation communities in Table 6-4.

A. Drainage East – The main wash that flows through the eastern portion of the Study Area is mainly a single, trapezoidal-shaped channel, with a sandy unvegetated bottom, that transitions to a large, wide floodplain downstream of the Study Area. Two smaller washes flow into this aquatic feature at the upstream end of the ROW intersection with the wash.

B. Drainage West – A second wash that flows through the middle portion of the Study Area is mainly a single, trapezoidal-shaped channel, with a sandy unvegetated bottom, draining into another unnamed wash to the south of the Study Area.

C. Non-jurisdictional swales – These features are high-gradient, small ephemeral drainages that are single-thread channels, with some either converging downstream, or flowing into a larger drainage feature to the south of the Study Area.

Table 6-3. Ephemeral Drainage Features within Study Area

	Waters of the State – Ordinary High Water Mark (acres)	Streambeds – Top of Bank (acres)	Linear Feet
Map Feature			
A. Drainage East	0.1	0.47	567
B. Drainage West	0.001	0.01	18
Total	**0.10**	**0.48**	**585**

Table 6-4. Classification of Waters of the State and Streambeds

Map Feature	Approximate Width (feet)	Classification (Cowardin)	Vegetation Community or Other Land Cover Type	Jurisdictional Unit
Waters of the State and Streambeds				
Drainage East	12 ft / 120 ft	R6 - Riverine, Ephemeral; HGM - Riverine	Non-vegetated, Low Flow Channel / Vegetated Watercourse	RWQCB – OHWM; CDFW – Watercourse
Drainage West	10 ft	R6 - Riverine, Ephemeral; HGM - Riverine	Non-vegetated Channel	RWQCB – OHWM; CDFW – TOB
Riparian Habitat				
Drainage East	1 ft / 12 ft	Riverine	Cheesebush – sweetbush scrub (*Ambrosia salsola – Bebbia juncea*) Shrubland Alliance.	CDFW – Watercourse
Drainage West	1 ft / 6 ft	Riverine	Cheesebush – sweetbush scrub (*Ambrosia salsola – Bebbia juncea*) Shrubland Alliance.	CDFW – Watercourse

Definitions: USACE = U.S. Army Corps of Engineers; RWQCB = Regional Water Quality Control Board; CDFW = California Department of Fish and Wildlife; TOB = Top of Bank; HGM = Hydrogeomorphic.

7.0 IMPACTS

7.1 Impact Corridors

The impact area for the Project is a 25-foot-wide corridor that follows (for part of the alignment) an existing dirt access road. Use of existing access roads will reduce potential impacts. Table 7-1 shows the acreage of Waters of the State and streambeds associated with the impact corridor.

Table 7-1. Overview of Anticipated Impacts within Study Area

	Waters of the State – Ordinary High Water Mark (acres)	Streambeds – Top of Bank (acres)	Linear Feet
Feature			
A. Drainage East	0.1	0.22	567
B. Drainage West	~0.001	0.01	18
Total	**0.10**	**0.23***	**585**

*Represents total potential impacts to all jurisdictional features.

7.2 Avoidance, Minimization, and Mitigation Measures

Mitigation measures are recommended as precautionary measures relevant to the protection of biological resources, and are required to offset potentially significant adverse Project impacts. A reporting mechanism will be associated with the measures, in order to document mitigation completion and performance. Potential impacts to ephemeral drainages will be avoided, minimized, and/or mitigated by incorporation of Project-specific mitigation measures.

1. *Limits of Disturbance*. All equipment and workers will remain within approved work limits. Work limits will be designated with lathe staking or a similar method. Vegetation outside of the designated 25-foot alignment will not be impacted. Joshua trees and cacti will be avoided when feasible.

2. *Water Quality*. Equipment and materials will be staged within the temporary staging area and away from water drainages. Parked equipment will have secondary containment to prevent any fluid leaks coming into contact with the ground surface. Any hazardous waste spills will be immediately cleaned up and reported to the qualified biologist.

3. *Use of Disturbed Areas*. Wherever possible, construction personnel shall utilize existing access roads or previously disturbed areas to reach the Project area or stage their vehicles and equipment.

4. *Regulatory Permits*. Prior to approval of the Project plans and specifications, the Proponent shall confirm that the plans and specifications stipulate that, prior to commencement of construction activities, the Proponent shall coordinate with the RWCQB to obtain a WDR pursuant to the California Water Code. Additionally, the Proponent shall obtain a Streambed Alteration Agreement from the CDFW pursuant to Section 1602 of California Fish and Game Code. The RWQCB will likely require a letter from USACE regarding the applicability of Section 404 permits, and to verify that the watershed is indeed an "isolated watershed" where the USACE does not require a Section 404 permit.

5. Best Management Practices at Ephemeral Drainage Crossings.

   General Procedures. The General WDR R6T-2003-0004[15] (discussed in Section 8.2 below) contains the requirement for "Attachment E – Best Management Practices Plan." The proposed

[15] https://www.waterboards.ca.gov/lahontan/water_issues/available_documents/misc/genera_permits4lahaontan.pdf

Project shall prepare such a plan if the applicant obtains authorization for impacts to Waters of the State through this General WDR.

Specific Procedure (as applicable; recommended for TR-8, TR-9). Following construction, installation of the following post-construction erosion/sediment control best management practices are suggested: Install fiber rolls on slopes with exposed soil. Align fiber rolls with slope contours and space 10 feet apart; at a minimum a roll should be installed at the top, toe, and at grade breaks of the impacted sloped areas. There should be a minimum of 2 feet of lateral overlap where the fiber roll and contour intersects the new road edge and the next fiber roll to be installed downslope starts, to prevent concentrated flow. Fiber rolls should be composed entirely of biodegradable materials and be trenched in place and secured to the slope with wooden stakes per Caltrans 2015 Standard Plan RSP H51 (Fiber Roll Type 1). Fiber rolls should not be trenched through drainages to allow water to flow freely beneath the fiber rolls but still serve to control sediment transport. Following fiber roll installation, impacted non-sloped areas, not including the access road and associated pull-outs, should be hydroseeded with regionally appropriate species, followed by an application of weed-free straw and covered with plant-based tackifier.

8.0 DISCUSSION

8.1 Summary

The results include description of the two unnamed jurisdictional features: drainage (East) and drainage (West) situated along the foot of the Mescal Mountains, to the northwest of the junction of Nipton Road and I-15, as mapped within the Study Area. Within the Study Area, the JD resulted in 0.10 acre of non-wetland waters of the State and 0.23 acres of CDFW streambeds for a total of 585 linear feet. The JD also presents an impact analysis for a 25-foot corridor.

8.2 Regulatory Requirements

As previously noted, potentially federal jurisdictional features within the Study Area are considered isolated, and thus not under USACE jurisdiction. Because USACE is not expected to regulate Project activities under Section 404 of the CWA, no application (or associated OHWM Data forms, Preliminary Jurisdictional Determination form) for a USACE CWA Section 404 dredge/fill permit is expected to be required. It is recommended to obtain a letter from USACE confirming that the waters in the Study Area are isolated and not subject to USACE regulation.

The Project as proposed would potentially affect Waters of the State/streambeds subject to RWQCB and CDFW jurisdiction.[16] The requirements for these two agencies are provided below.

8.2.1 Regional Water Quality Control Board

A Waste Discharge Application/Report should be prepared and submitted to the Lahontan RWQCB[17] for review and a permit must be issued before Project construction could begin. In some cases where a CWA Section 404 permit will not be issued by the USACE for the Project, coverage under General WDRs may be appropriate. Based on the projected impacts, the Project would likely qualify for coverage under the following General WDRs:

> **WQO-2004-0004-DWQ**
> **General Waste Discharge Requirements for Dredged or Fill Discharges to Waters Deemed by the U.S. Army Corps of Engineers to be Outside of Federal Jurisdiction**
> http://www.waterboards.ca.gov/board_decisions/adopted_orders/water_quality/2004/wqo/wqo2004-0004.pdf
> Regulates minor discharges of dredged or fill material to waters of the State not subject to CWA Section 404. Waters of the state means any surface water or groundwater, including saline waters, within the boundary of the state, including wetlands and riparian areas. Usage for land development, disposal of dredged material, bed and bank modifications, and other similar projects is restricted to size limits in the order (must be less than 0.2 acre).

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[16] Streambeds or watercourses jurisdictional per California Fish and Game Code 1600 *et seq*.

[17] Lahontan Regional Water Quality Control Board – South Lahontan Region, 15095 Amargosa Rd., Bldg. 2-Suite 210, Victorville, CA 92394; http://www.waterboards.ca.gov/lahontan/.

R6T-2003-0004
General Waste Discharge Requirements for Small Construction Projects, including Utility, Public Works, and Minor Streambed/Lakebed Alteration Projects Throughout the Lahontan Region, Excluding Lake Tahoe
http://www.waterboards.ca.gov/lahontan/board_decisions/adopted_orders/2003/docs/r6t-2003-0004_small_const_wdr.pdf
Regulates construction activity in specific high-elevation watersheds with land disturbance between 10,000 square feet (0.20 acre) and 43,560 square feet (1 acre). It also may be used to regulate dredged and fill material discharges in State waters of the Lahontan Region when the federal CWA is not applicable (as determined by the USACE). Projects are typically non-recurring, short-term (completed within two construction seasons), and suitable for utility projects.

Application to the Lahontan Region utilizes the same application as for the 401 Certification:

Lahontan Application for CWA 401 and WDR for Dredge and Fill Projects.
https://www.waterboards.ca.gov/lahontan/water_issues/programs/clean_water_act_401/docs/401application.pdf;
https://www.waterboards.ca.gov/lahontan/water_issues/programs/clean_water_act_401/docs/401instructions2app.pdf

California Department of Fish and Wildlife

A Notification of Lake or Streambed Alteration should be prepared and submitted to CDFW Inland Deserts Region No. 6 [18] for review and an agreement must be issued before Project construction could begin.

Lake or Streambed Alteration Notification Form (PDF Form).
https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=3754;
https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=3773&inline

[18] CDFW Inland Deserts Region (Region 6); 3602 Inland Empire Blvd, Suite C-220, Ontario, CA 91764; (909) 484-0167; AskRegion6@wildlife.ca.gov.

9.0 REFERENCES

Alluvial Fan Task Force (AFTF). 2017. Accessed at http://aftf.csusb.edu/; http://aftf.csusb.edu/documents/FINDINGS_Final_Oct2010_10-29-10_web.pdf.

Baldwin, B. G., D. H. Goldman, D. J. Keil, R. Patterson, T. J. Rosatti, and D. H. Wilken, editors. 2012. *The Jepson manual: Vascular Plants of California, second edition*. University of California Press, Berkeley. 1,600p.

Brady III, R. H., and K. Vyverberg. 2014. *Methods to Describe and Delineate Episodic Stream Processes on Arid Landscapes for Permitting Utility-Scale Solar Power Plants, with the MESA Field Guide - Final Project Report*. Report Prepared for the California Energy Commission. Publication No. CEC-500-2014-013. February. 174p. Accessed at http://www.energy.ca.gov/2014publications/CEC-500-2014-013/index.html; http://www.energy.ca.gov/2014publications/CEC-500-2014-013/CEC-500-2014-013.pdf.

Buck-Diaz, J., J. M. Evens, and A. Montalvo. 2011. *Alluvial Scrub Vegetation of Southern California, A Focus on the Santa Ana River Watershed in Orange, Riverside, and San Bernardino Counties, CA*. CNPS and RCRCD.

Calflora: Information on California plants for education, research and conservation, with data contributed by public and private institutions and individuals, including the Consortium of California Herbaria. [web application]. 2019. Berkeley, California: The Calflora Database [a non-profit organization]. Accessed at http://www.calflora.org/.

California Department of Fish and Wildlife (CDFW). 2018a. *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities*. State of California, The Resources Agency. Accessed at https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=18959&inline.

California Department of Fish and Wildlife (CDFW). 2018b. Natural Communities List Arranged Alphabetically by Life Form. Accessed at https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=153398.

California Department of Fish and Wildlife (CDFW). 2018c. Sensitive Natural Communities Only by Life Form. Accessed at https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=153609.

California Department of Transportation (Caltrans). 2016. Transportation Concept Report Interstate 40, District 8. Accessed at http://www.dot.ca.gov/d9/planning/docs/tcr_sr58_d8.pdf.

California Invasive Plant Council (Cal-IPC). 2018. California Invasive Plant Inventory Database. Accessed at http://www.cal-ipc.org/paf.

California Native Plant Society Rare Plant Program (CNPS). 2019b. *Inventory of Rare and Endangered Plants of California* (online edition, v8-02). California Native Plant Society. Sacramento, CA. Accessed at http://www.rareplants.cnps.org. Accessed through March 2019.

California Native Plant Society (CNPS). 2019a. *A Manual of California Vegetation*, Online Edition. Accessed online at http://www.cnps.org/cnps/vegetation/. Accessed through November 2017. California Native Plant Society, Sacramento, CA.

California Soil Research Lab (CSRL) and Agriculture and Natural Resources (UC-ANR). 2019. SoilWeb: An Online Soil Survey Browser. Soils application developed by CSRL (U.C. Davis) and UC-ANR, and collaboration with USDA NRCS. Accessed at https://casoilresource.lawr.ucdavis.edu/gmap/.

California State Water Resources Control Board (SWRCB). 2019. State Wetland Definition and Procedures for Dischargers of Dredged or Fill Material to Waters of the State. Accessed online at https://www.waterboards.ca.gov/water_issues/programs/cwa401/wrapp.html. Accessed through April 2019. California State Water Resources Control Board, Sacramento, CA.

California Wetland Monitoring Workgroup (CWMW). 2014. California Aquatic Resources Status and Trends Program: Mapping Methodology. Version 1.0. 123p. Accessed at http://www.mywaterquality.ca.gov/monitoring_council/wetland_workgroup/docs/2014/ca_status_trends_mthdlgy_v1_final.pdf.

Cowardin, L. M., V. Carter, F. C. Golet, and E. T. LaRoe, 1979. *Classification of Wetlands and Deepwater Habitats of the United States*, FWS/OBS-79/31. US Fish and Wildlife Service, Washington, 103p.

Curtis, Katherine E., and Robert W. Lichvar. 2010. Updated Datasheet for the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States. Wetland Regulatory Assistance Program, ERDC/CRREL TN-10-1. July. Accessed at https://www.spl.usace.army.mil/Portals/17/docs/regulatory/JD/UpdatedDatasheetforIDOHWM_ERDC_2010.pdf.

Environmental Laboratory. 1987. *Corps of Engineers Wetland Delineation Manual*. Technical Report Y-87-1. U.S. Army Engineer Waterways Experiment Station. Vicksburg, Mississippi.

Google Earth. 2018. Website and Software. Available at http://www.google.com/earth/.

Hanes, T. L., Friesen, R .D., and K. Keane. 1989. *Alluvial Scrub Vegetation in Coastal Southern California*. USDA Forest Service Gen. Tech. Rep. PSW-110.

Holland, R. 1986. *Preliminary Descriptions of the Terrestrial Natural Communities of California* (PDF). Accessed at https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=75893.

Jepson Flora Project (JFP). 2018. Jepson eFlora, v.1.0. Accessed at http://ucjeps.berkeley.edu/IJM.html.

Larsen, E. S. 2007. Regulation, Characterization, and Assessment of Riparian Habitat in Federal and State Jurisdiction, Orange County, CA. Doctoral Dissertation, Environmental Science and Engineering Program, School of Public Health, UCLA. 537p.

Lefebvre, L., R. Lichvar, K. Curtis, and J. Gillrich. 2013. *Channel Classification across Arid West Landscapes in Support of OHW Delineation*. ERDC/CRREL TR-13-3. January. 50p.

Lichvar, R. W. and L. Dixon. 2007. *Wetland Plants of Specialized Habitats in the Arid West*. ERDC/CRREO TR-07-8. 37p.

Lichvar, R. W., and S.,M. McColley. 2008. *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States: A Delineation Manual*. ERDC/CRREL Technical Report 08-12. 84p. Accessed at http://www.crrel.usace.army.mil/library/technicalreports/ERDC-CRREL-TR-08-12.pdf; https://www.spl.usace.army.mil/Portals/17/docs/regulatory/JD/FinalOHWMManual_2008.pdf.

Menke, J., E. Reyes, A. Glass, D. Johnson, and J. Reyes. 2013. 2013 California Vegetation Map in Support of the Desert Renewable Energy Conservation Plan. Final Report. Prepared for the California Department of Fish and Wildlife Renewable Energy Program and the California Energy Commission. Aerial Information Systems, Inc., Redlands, CA. Accessed at http://www.dfg.ca.gov/biogeodata/vegcamp/veg_classification_reports_maps.asp; https://www.wildlife.ca.gov/Data/VegCAMP/Reports-and-Maps; https://map.dfg.ca.gov/bios.

Menke, J., E. Reyes, A. Hepburn, D. Johnson, and J. Reyes. 2016. California Vegetation Map in Support of the Desert Renewable Energy Conservation Plan (2014-2016 Additions). Final Report. Prepared for the California Department of Fish and Wildlife Renewable Energy Program and the California Energy Commission. Aerial Information Systems, Inc., Redlands, CA. Accessed at *http://www.dfg.ca.gov/biogeodata/vegcamp/veg_classification_reports_maps.asp; https://www.wildlife.ca.gov/Data/VegCAMP/Reports-and-Maps; https://map.dfg.ca.gov/bios.*

Miller, D. M. 2012. Surficial geologic map of the Ivanpah 30' x 60' quadrangle, San Bernardino County, California, and Clark County, Nevada. Publishing Organization: U.S. Geological Survey. Series and Number: Scientific Investigations Map SIM-3206. Accessed at https://ngmdb.usgs.gov/Prodesc/proddesc_97038.htm.

Norris, R. M., and R. W. Webb. 1990. *Geology of California*. Wiley, 541p.

Sawyer, J. O., T. Keeler-Wolf, and J. M. Evens. 2009. *A Manual of California Vegetation, Second Edition*. California Native Plant Society, Sacramento. 1300 pp. Web Link: A Manual of California Vegetation, Second Edition. Accessed at http://www.dfg.ca.gov/biogeodata/vegcamp/veg_manual.asp.

Technical Advisory Team (TAT). 2009. Wetland and Riparian Area Protection Policy; Technical Memorandum 2: Wetland Definition. Final 25 June 2009. Accessed at http://www.swrcb.ca.gov/water_issues/programs/cwa401/docs/tatmemo2_062509.pdf.

Technical Advisory Team (TAT). 2010. Wetland and Riparian Area Protection Policy; Technical Memorandum 3: Landscape Framework for Wetlands and Other Aquatic Areas. October 20, 2009; Revised April 9, 2010. Accessed at http://www.swrcb.ca.gov/water_issues/programs/cwa401/docs/wrapp/tatmemo3_061610.pdf.

Technical Advisory Team (TAT). 2011. Wetland and Riparian Area Protection Policy; Technical Memorandum 4: Wetland Identification and Delineation. March 1, 2011. Accessed at http://www.swrcb.ca.gov/water_issues/programs/cwa401/docs/wrapp/techmemo4.pdf.

U.S. Army Corps of Engineers (USACE). 2008. Regional supplement to the *Corps of Engineers Wetland Delineation Manual: Arid West Region* (Version 2.0). ERDC/EL TR-08-28. 133p. September. Accessed at http://www.usace.army.mil/CECW/Documents/cecwo/reg/trel08-28.pdf; http://www.usace.army.mil/Portals/2/docs/civilworks/regulatory/reg_supp/trel08-28.pdf.

U.S Department of Agriculture, Natural Resources Conservation Service (USDA-NRCS). 2019a. Web Soil Survey. Available online at http://websoilsurvey.nrcs.usda.gov/; http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm.

U.S Department of Agriculture, Natural Resources Conservation Service (USDA-NRCS). 2019b. Official Soils Series Descriptions. Accessed at http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/geo/?cid=nrcs142p2_053587;

https://soilseries.sc.egov.usda.gov/osdname.aspx; https://soilseries.sc.egov.usda.gov/OSD_Docs/A/ARIZO.html; https://casoilresource.lawr.ucdavis.edu/see/#ARIZO; https://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx.

U.S Department of Agriculture, Natural Resources Conservation Service (USDA-NRCS). 2019c. National List of Hydric Soils. Accessed at http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/use/hydric/.

U.S. Fish and Wildlife Service (USFWS). 2018. Website. National Wetlands Inventory- Wetlands On-Line Mapper. Accessed at http://wetlandsfws.er.usgs.gov/wtlnds/launch.html; http://wetlandsfws.er.usgs.gov/NWI/codes.html.

U.S. Geological Survey. 2018. National Hydrography Database.

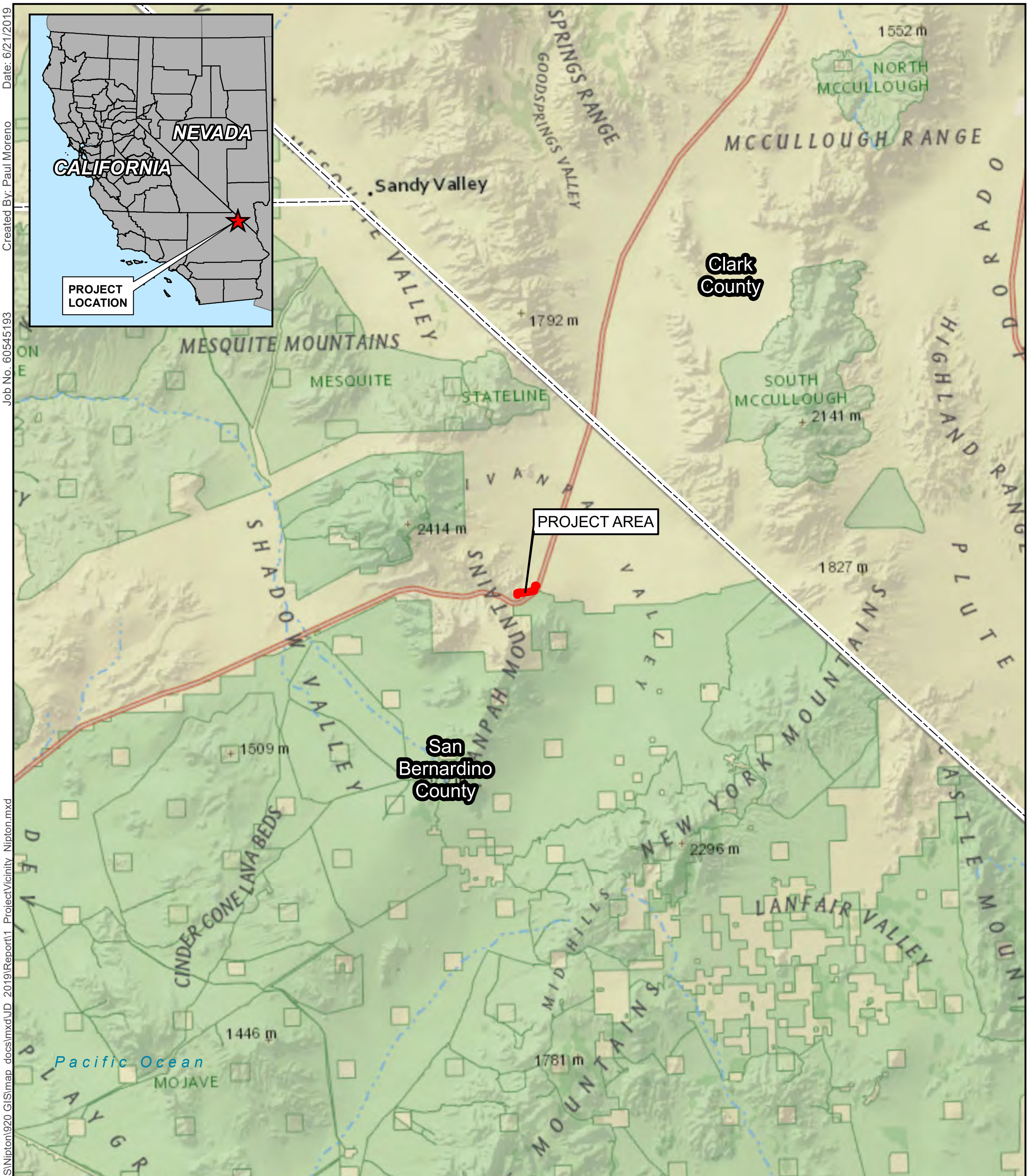
Vyverberg, K. 2010. *A Review of Stream Processes and Forms in Dryland Watersheds*. Report Prepared for: California Department of Fish and Game. December. 36p. Accessed at http://episodic.ced.berkeley.edu/Vyverberg_DrylandStreams.pdf.

Vyverberg, K., and R. H. Brady III. 2014. APPENDIX G: THE MESA FIELD GUIDE, Mapping Episodic Stream Activity. Prepared for: California Energy Commission. Publication Number: CEC-500-2014-013-APG. Report updated December 2014. 110p. Accessed at http://www.energy.ca.gov/2014publications/CEC-500-2014-013/CEC-500-2014-013-APG.pdf.

Wohl, Ellen, Matthew K. Mersel, Aaron O. Allen, Ken M. Fritz, Steven L. Kichefski, Robert W. Lichvar, Tracie-Lynn Nadeau, Brian J. Topping, Patrick H. Trier, and Forrest B. Vanderbilt. 2016. *Synthesizing the Scientific Foundation for Ordinary High Water Mark Delineation in Fluvial Systems*. ERDC/CRREL SR-16-5. 217p. December.

APPENDIX A

Figures 1 through 7



Legend

- Project Area
- County Boundary

0 5 10 Miles

Base Map Source:
ESRI, ArcGIS Online
National Geographic World Map

FIGURE 1
PROJECT VICINITY

Interconnect Towers
Nipton Project

AECOM

P:\ 6053\60534139 ICT Towers\900-CAD-GIS\Nipton\920 GIS\map docs\mxd\JD 2019\Report\1 ProjectVicinity Nipton.mxd Job No. 60545193 Created By: Paul Moreno Date: 6/21/2019

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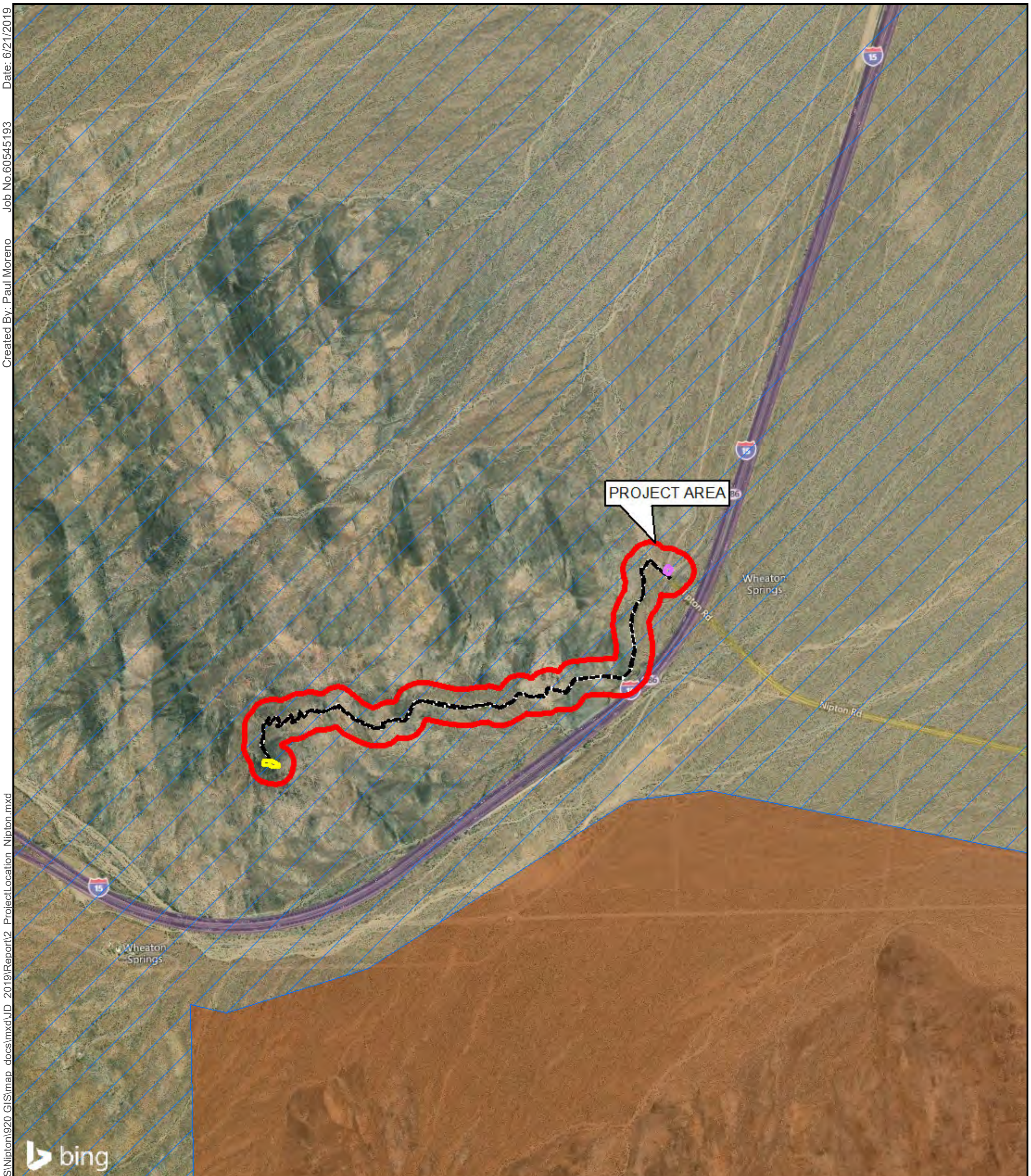
Created By: Paul Moreno   Job No.60545193   Date: 6/21/2019



Legend

- Project Area
- Proposed Access Route
- Lease Area
- Staging Area
- BLM Property
- Mojave National Preserve

0 2,000 4,000 Feet

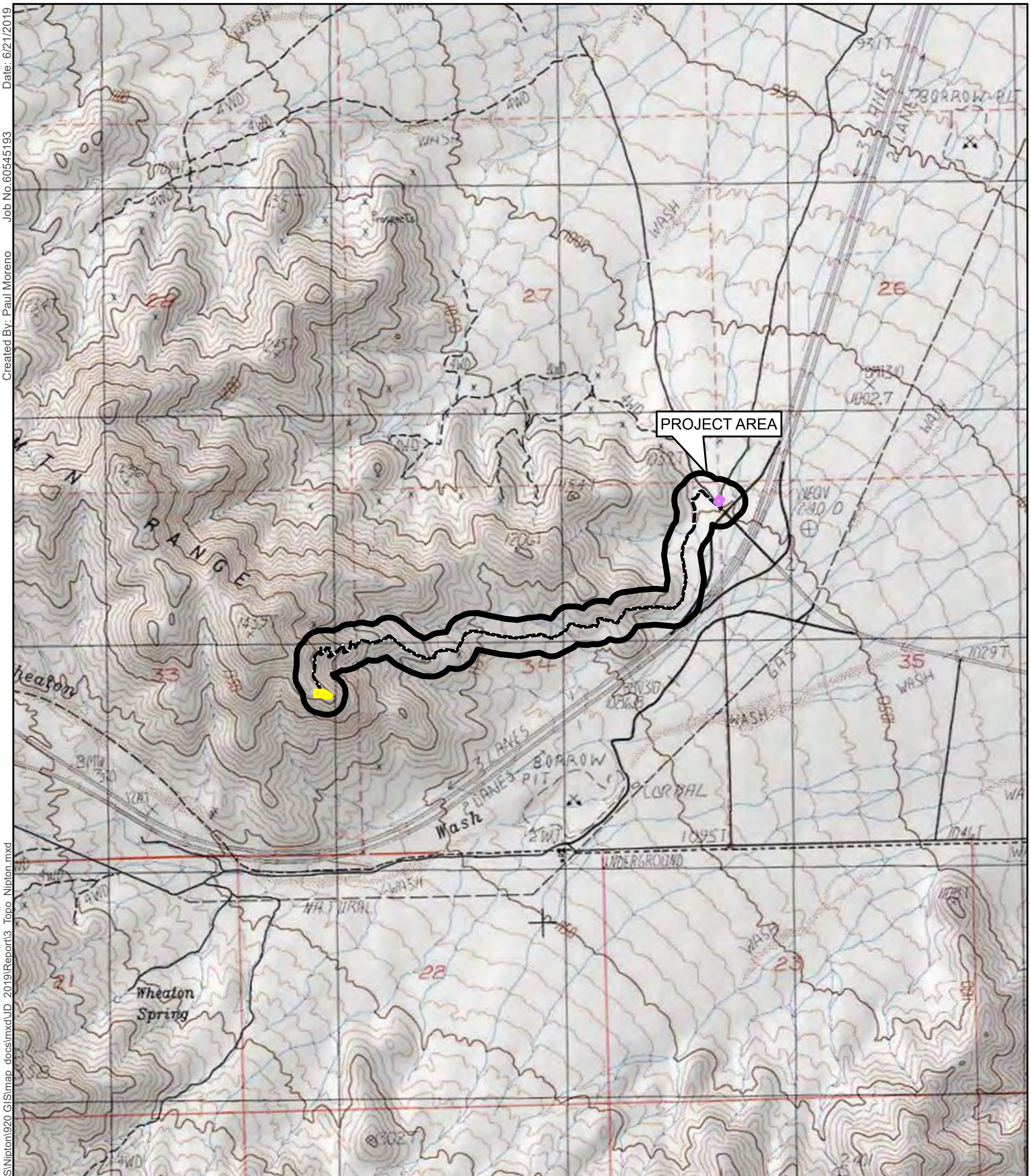
Base Map Source:
ESRI, ArcGIS Online
Bing Maps Hybrid

FIGURE 2
PROJECT LOCATION AND LAND OWNERSHIP

Interconnect Towers
Nipton Project

AECOM

P:_6053\60534139_ICT_Towers\900-CAD-GIS\Nipton\920_GIS\map_docs\mxd\JD_2019\Report\3_Topo_Nipton.mxd Created By: Paul Moreno Job No.60545193 Date: 6/21/2019



Legend

- Project Area
- Proposed Access Route
- Lease Area
- Staging Area

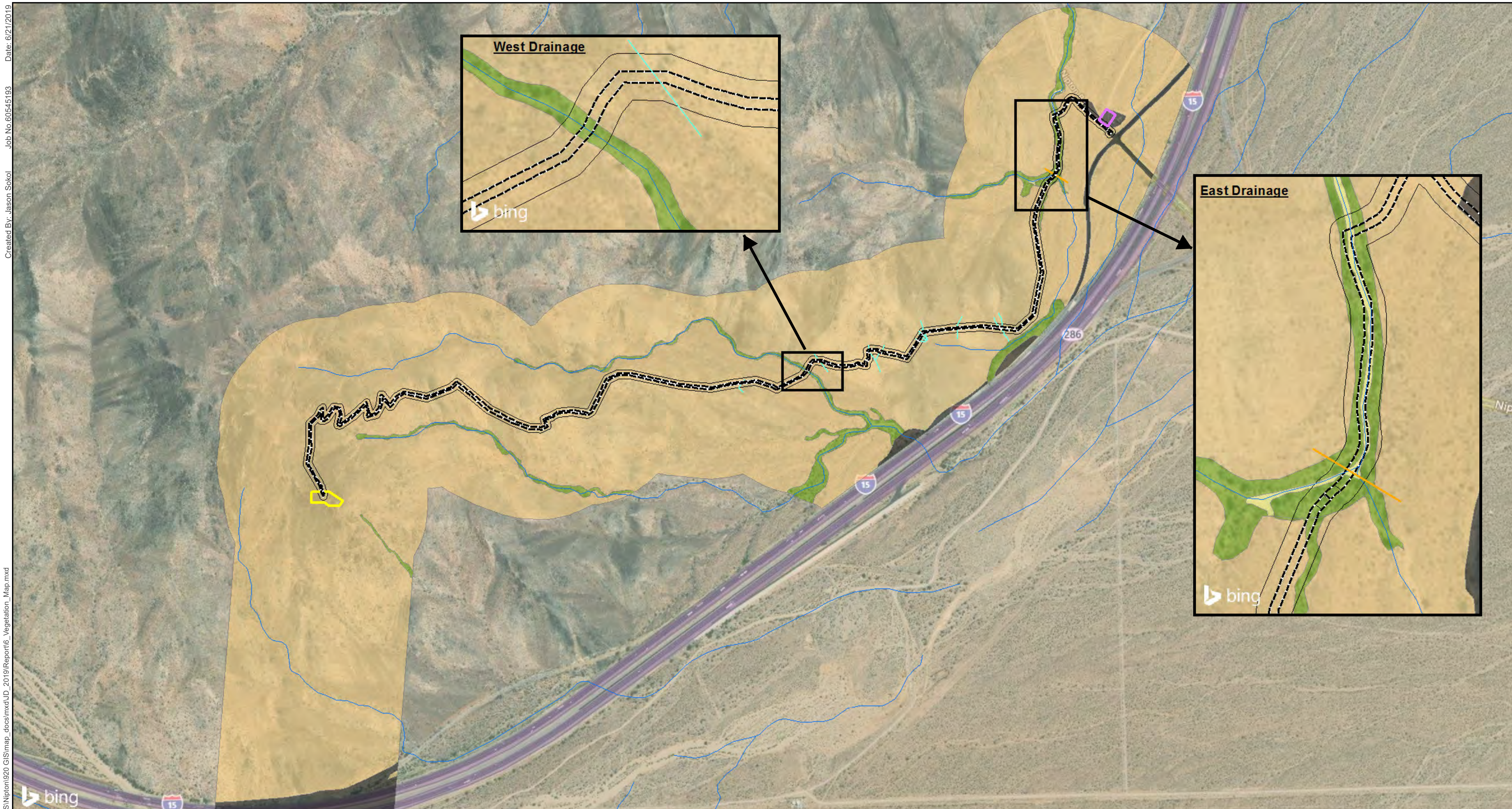
0 2,000 4,000 Feet

Base Map Source:
ESRI, ArcGIS Online - USA Topo Map
USGS 7.5' Quadrangles Mineral Hill, CA

FIGURE 3
USGS TOPOGRAPHIC MAP

Interconnect Towers
Nipton Project

AECOM



Legend

- Proposed Access Route
- Staging Area
- Lease Area
- 25ft. Study Area Buffer
- Mesa Transect
- Non-jurisdictional Feature
- Ephemeral Stream

Vegetation

- Mojave Creosote Bush Scrub
- Mojave Desert Wash Scrub
- OHWM - Unvegetated Wash - CDFW/RWQCB
- Developed/Maintained

0 700 1,400 Feet

Base Map Source:
ESRI, ArcGIS Online
Bing Maps Hybrid

FIGURE 4
VEGETATION &
JURISDICTIONAL FEATURES

Interconnect Towers
Nipton Project

AECOM

P:_60534139_ICT_Towers\900-CAD-GIS\Nipton920 GIS\map_docs\mxd\JD_2019\Report\6_Vegetation_Map.mxd Created By: Jason Sokol Job No.60545193 Date: 6/21/2019

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Legend

- Project Area
- Watershed Boundary HUC 8
- Watershed Boundary HUC 10
- Country Boundary

0 7.5 15 Miles

Base Map Source:
ESRI, ArcGIS Online
Bing Map Hybrid

FIGURE 5
WATERSHED MAPS
(HYDROLOGIC UNIT MAPS:
HUC-8, -10, HUC-10, -12)

Interconnect Towers
Nipton Project

AECOM

Legend

Project Area

CalWatersheds

Country Boundary

0 7.5 15 Miles

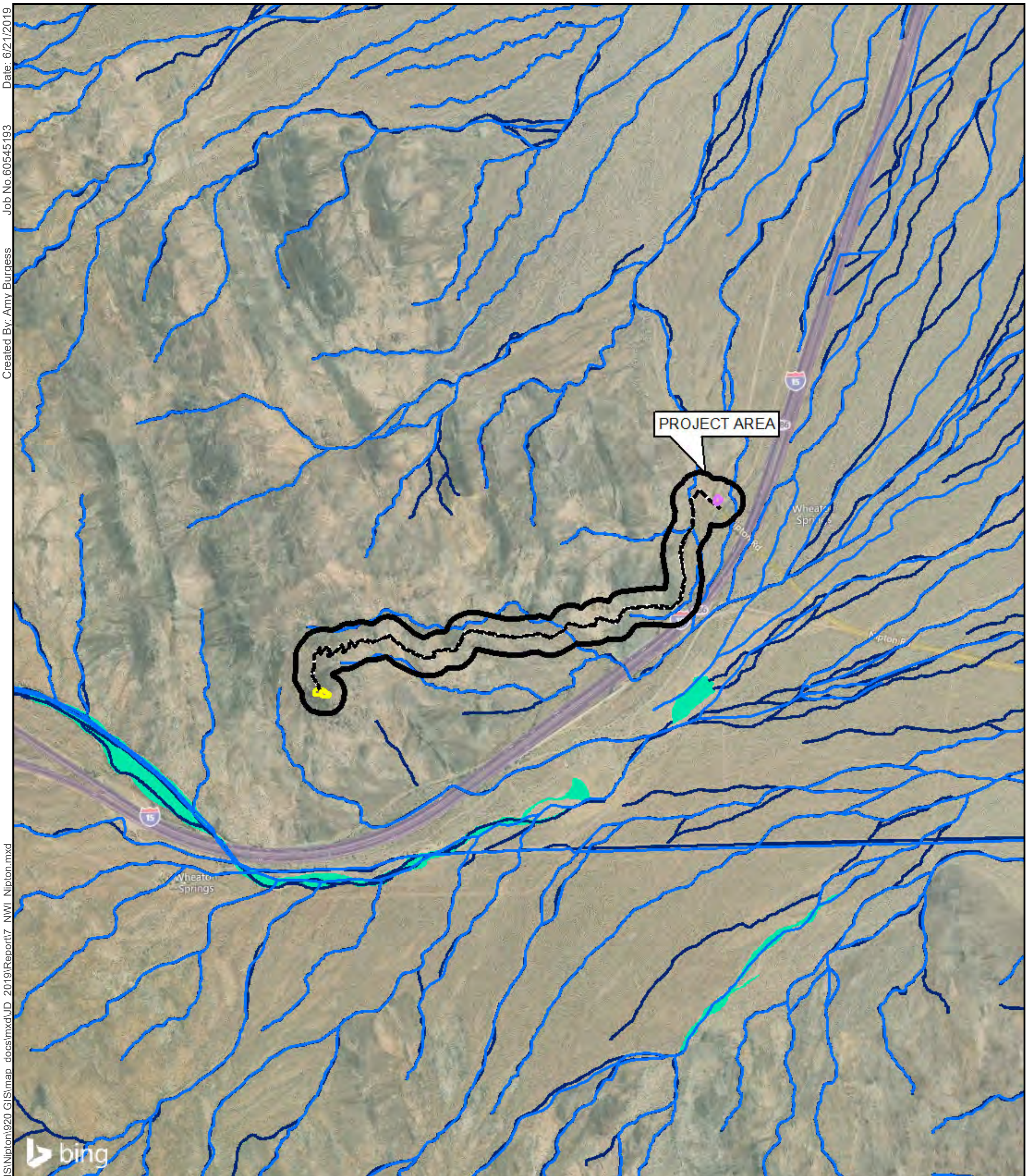
Base Map Source:
ESRI, ArcGIS Online
Bing Map Hybrid

FIGURE 6
CALWATERS WATERSHEDS
(HYDROLOGIC MAPS: HYD UNIT/ HYD AREA; HYD SUB-AREA)

Interconnect Towers
Nipton Project

AECOM

P:_6053\60534139_ICT_Towers\900-CAD-GIS\Nipton\920 GIS\map_docs\mxd\JD_2019\Report\5_Calwaters_Nipton.mxd Job No. 60545193 Created By: Amy Burgess Date: 6/21/2019



Legend

- Project Area
- Proposed Access Route
- Lease Area
- Staging Area
- Freshwater Forested/Shrub Wetland
- Riverine
- National Hydrography Dataset

0 2,000 4,000 Feet

Base Map Source:
ESRI, ArcGIS Online
Bing Maps Hybrid

FIGURE 7
NATIONAL WETLAND INVENTORY AND NATIONAL HYDROGRAPHY DATASET

Interconnect Towers
Nipton Project

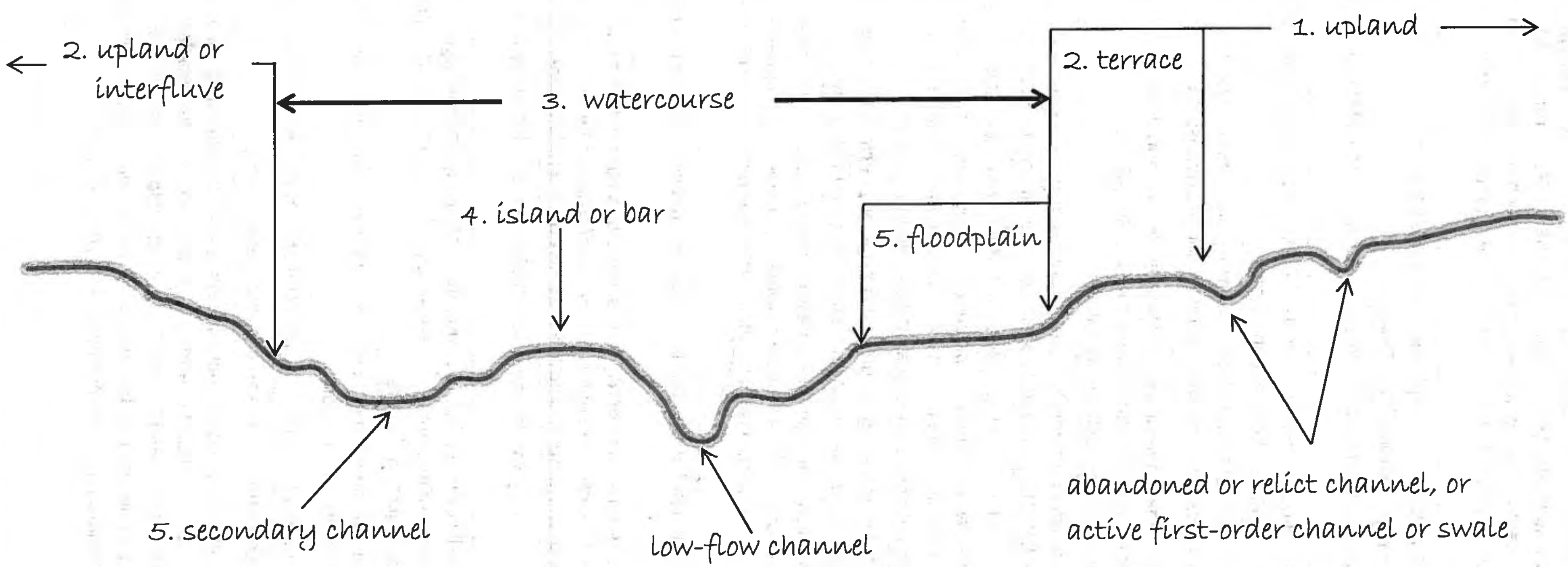
AECOM

P:_6053\60534139_ICT_Towers\900-CAD-GIS\Nipton\920 GIS\map_docs\mxd\JD_2019\Report\7_NWI_Nipton.mxd Created By: Amy Burgess Job No.60545193 Date: 6/21/2019

APPENDIX B

MESA Data Sheets
Approved JD Form (Clean Water Rule)
AECOM (2013) – Attachments B, C, D

Representative Watercourse Cross Section with Associated Geomorphic Units



Guidance on Defining Watercourse Boundaries

1. **Uplands:** although dominated by terrestrial processes, uplands commonly include drainage swales and first- and sometimes higher-order streams. Document the presence and fluvial activity of these with a separate longitudinal survey using both the Watercourse and Upland indicators section of the Data Sheet.
2. **Terraces and interfluves:** are upland landforms. If the differences between terrace or interfluve and upland surface indicators are nominal and terrestrial indicators dominate, include their indicators on the Upland Indicators section of the Data Sheet. If the surfaces of terraces or interfluves have indicators of fluvial activity, reconsider the landform interpretation as floodplain within the watercourse boundaries, and include these indicators on the Watercourse Indicators section of the Data Sheet. If the surfaces or the percent cover and vigor of the vegetation on the terraces or interfluves notably differ from those on the adjacent upland, describe these differences in the notes to the vegetation sections of the Data Sheet.
3. **Watercourse:** includes all functionally related swales, single-thread channels, compound channels, braided channels, discontinuous and distributary channel networks, islands, and floodplains.
4. **Islands:** these bodies of land and the unique habitat they provide are defined and often formed by the water that surrounds and interacts with them. They are part of the watercourse unless their landscapes and ecosystem characteristics differ from those of the watercourse, and there is minimal physical or biological exchange between them and the stream. Document differences in surface indicators or vegetation on the Upland Indicators section of the Data Sheet and in explanatory notes.
5. **Floodplains and secondary channels:** lie within the bounds of a watercourse, and are essential to stream and ecosystem function. Include their indicators with those of the Watercourse Indicators section of the Data Sheet.

Annotated Definitions of Stream and Terrestrial Landforms	
Abandoned channel	a channel along which stream flow no longer occurs; e.g. a channel isolated from its water source through faulting or stream capture, or by human constructs such as levees. With time and the absence of the processes responsible for its formation an abandoned channel will become relict.
Active channel	a channel receiving frequent enough flow to have physical or biological evidence of fluvial activity roughly within the last 200 years before the present.
Alluvial fan	a gently sloping, fan-shaped landform that forms where steep, confined, mountain streams flow out onto a plain or valley.
Bank	the land on the outermost edge of a stream that confines or otherwise defines the stream's boundary when its waters rise to the highest level of confinement.
Bar	a ridge-like accumulation of sand or gravel formed in the channel, along the banks, at the mouth, or within the channel of a stream where a decrease in velocity induces deposition.
Channel	a defined course along which water flows perennially or episodically. Channels may be active during every runoff event or spatially or temporally dormant elements within a larger watercourse that receive water periodically during higher flows.
Dormant channel	a channel isolated from its principal water source by natural causes or human constructs such as roads, but that retains its potential for hydrologic reactivation and stream function.
Floodplain	a relatively flat area of land associated with a stream and over which water and soil from the parent stream flows when the capacity of channel is exceeded. Floodplains parallel stream channels by may also occur at the terminal end of a stream where it joins a larger wash, transitions into a playa, or the channel ends and flow subsides into the ground.
Interfluve	a relatively undissected and fluvially inactive higher ground (or upland) between two adjacent stream channels that flow in the same general direction in the same drainage network.
Island	elevated body of land periodically surrounded by and isolated from the upland landscape by water. Islands are part of a watercourse unless their landscape and ecosystem characteristics differ from those of the watercourse, and there is minimal physical and biological exchange between the two.
Low-flow channel	the topographically lowest stream channel or the dominant subchannel within a compound channel watercourse.
Relict channel	an "old" channel made by processes no longer locally operative; e.g. a stream that once drained a lake that is now permanently dry. Antiquity may be demonstrated by the presence of rock varnish, soil development, rock weathering, and the absence of recent fluvial activity.
Secondary channel	topographically higher channels that carry water only during higher flows. Also known as overflow or high flow channels.
Stream	a body of water that flows perennially or episodically during the historic hydrologic regime (ca. 1800 to present), and where the width of its course can reasonably be identified by resultant landforms or other physical and biological indicators.
Swale	a depression where runoff from the surrounding uplands concentrates to initiate stream flow; source areas considered Integral to stream function.
Terrace	planar surfaces representing infrequently or rarely flooded remnants of former floodplain.
Upland	the higher ground dominated by terrestrial processes above a watercourse.
Watercourse	the area within and along which water flows perennially or episodically through one or more channels. Where present, swales, single-thread channels, compound channels, braided channels, discontinuous and distributary channel networks, and floodplains may all occur within the bounds of a single larger channel designated the "watercourse" to discriminate between it and functionally related but subordinate fluvial landforms that lie within its bounds.

11 S 0640511
3924661

Episodic Stream Indicator Data Sheet			page 1 of 4
Site ID: # Nipton	Stream ID:		Date: 1/29/19
Nearest Town: Primm		County: SAN BERNARDINO COUNTY	
Investigators: John Parent, Bonnie Hendricks			

Base Map

Aerial Photo #:	Date:	Topographic Map Name:	Date:

GPS Data

GPS Name:	Datum:	Transect Elevation:	Zone 10 / 11	GPS Error: ± ft / m

GPS co-ords start of transect: 35.47352783/-115.45110033 GPS co-ords end of transect: 35.47380600, -115.45168850

Geomorphic Province (✓one)		Mojave		Sonoran/Colorado		Great Basin	Other:

Landform (✓ all that apply)

	Headwater		Upper fan		Middle fan		Lower fan		Alluvial plain		Axial valley		Playa

Channel Form (✓ one)

	Single thread		Braided	✓	Compound		Distributary		Discontinuous	Other:

Transect was selected to:

X	Document fluvial activity & boundaries	X	Document channel elevations & boundaries
X	Document habitat associations DESERT WASH SCRUB	X	Document a change in watercourse morphology CONFLUENCE
	Other:		

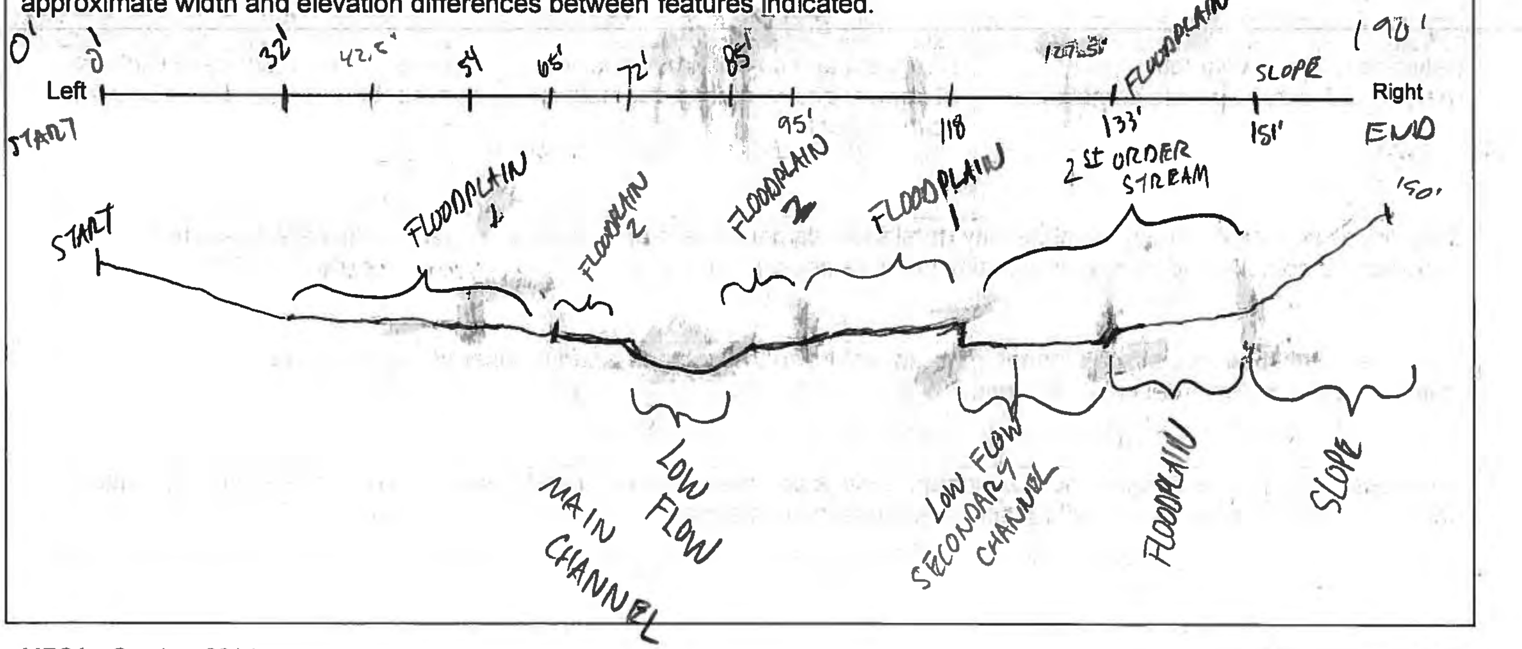
Date of most recent runoff event (if known):

Physical Setting: Briefly describe geomorphic processes and surficial materials and conditions, including the degree of disturbance relative to an intact dryland stream ecosystem, and any anthropogenic influences on the channel form and function:

CONFLUENCE OF 3 DESERT WASHES, 1 LARGER, 2 SMALLER SIDE CHANNELS.

I-15 DUE SOUTH OF SITE (~250'), SUBSTRATE CONSISTS PRIMARILY OF ~~LARGE~~ GRAIN SAND AND PEBBLES, WITH COBBLES INTERSPERSED AND ALONG BOUNDARIES OF FLOOD PLAIN.

Summary Site Description and Cross-section Sketch: View across the channel from watercourse-edge to watercourse-edge. Identify channel(s), banks, islands, interfluves, floodplains, terraces, and uplands where present. Note approximate width and elevation differences between features indicated.



Site ID:	Stream ID:	page 2 of 4

Note presence or absence of each indicator within a minimum distance of 50 feet upstream and 50 feet downstream of the representative channel cross section. Mark each box with a plus (+) for those indicators observed, and a minus (–) for indicators not observed. For examples see the Photo Atlas in MESA ~ Mapping Episodic Stream Indicators.

UPLAND

Terrestrial Indicators				Substrate Particle Size		
+	Av soil horizon	–	Relict bars & swales	Estimated percentages		
–	Biotic soil crusts	+	Rock fractured in place		% Bedrock / Cemented substrate	
+	Bioturbation	+	Rock varnish	5	% Boulder	≥ 256 mm
+	Caliche: coatings / layers / rubble	+	Rock weathering	50	% Cobble	≥ 64 – 256mm
+	Carbonate etching	+	Rubified rock undersides	35	% Pebble	≥ 4 – 64 mm
–	Coppice dunes: active / relict	+	Soil development	8	% Granule	≥ 2 – 4 mm
–	Deflated surface	+	Surface rounding of landform	2	% Sand	≤ 2 mm
+	Pavement	+	Woody debris in place	1	% Silt/Clay	Fines
	Other:					

Fluvial Indicators

+	Bars: sand / gravel	–	Mud: cracks / curls / drapes	–	Sediment tails: sand / gravel
+	Cut banks	–	Organic drift	+	Vegetation-channel alignment
+	Drainage swales	+	Overturned rocks	+	Water-cut benches
–	Exposed roots	–	Scour	–	Wrack
–	First-order streams	–	Sediment ramps: sand / gravel	–	Wrinkle marks
–	Flow lineations	+	Sediment sorting		
	Other:				

Vegetation

Estimated % total vegetative cover (perennial & shrub species combined):	Dominant and co-dominant species (if known) and % of total vegetative cover of each:	Representative height and width of dominant and co-dominant species:
20%	CREOSOTE, JOSHUA TREE, EPHEDRA	CB. 5x4 JT. 3x1 EP 2x2

Differences in total shrub/perennial density (total #shrubs/perennial plants) between upland & fluvially active units or watercourse complex? (describe and qualify the differences): UPLANDS HAVE SIGNIFICANTLY LOWER DENSITIES AS WELL AS OVERALL # OF PLANTS

Are there plant species that are present in (or absent from) the uplands when compared to fluvially active units or the watercourse complex? (describe differences): ALL SPECIES PRESENT IN WASH ARE ABSENT FROM THE UPLANDS WITH THE EXCEPTION OF CREOSOTE.

Are there plant species that are more abundant (or less abundant) in the uplands when compared to the fluvially active units or the watercourse complex? (describe and qualify differences) JOSHUA TREE IS ALMOST ABSENT FROM WATERCOURSE, THOUGH PRESENT IN HIGHER #'S IN UPLANDS.

Site ID:	Stream ID:	page 3 of 4

Note presence or absence of each indicator within a minimum distance of 50 feet upstream and 50 feet downstream of a representative channel cross section. Mark each box with a plus (+) for those indicators observed, and a minus (–) for those not observed. For examples see the Photo Atlas in MESA ~ Mapping Episodic Stream Indicators.

WATERCOURSE or WATERCOURSE COMPLEX

	Transportation, Deposition & Flow Transition Indicators				Substrate Particle Size	
					Estimated percentages	
+	Bar forms: sand / gravel	+	Secondary channels	0	% Bedrock / Cemented substrate	
–	Bifurcated flow	–	Sediment plastering	5	% Boulder	≥ 256 mm
+	Drainage swales	+	Sediment ramps: sand / gravel	10	% Cobble	≥ 64 – 256 mm
+	Flow lineations	–	Sediment sheets: sand / gravel	15	% Pebble	≥ 4 – 64 mm
+	Imbricated gravel	+	Sediment sorting	25	% Granule	≥ 2 – 4 mm
+	Levee ridges: sand / gravel	+	Sediment tails: sand / gravel	45	% Sand	≤ 2 mm
–	Mud: cracks / curls / drapes	+	Vegetation-channel alignments		% Silt/Clay	Fines
–	Organic drift	+	Wrack			
+	Overturned rocks	–	Wrinkle marks			
+	Out-of-channel flow: Lateral floodplain / Terminal floodplain					
+	Ripples					
	Other:					

Erosion Indicators

X	Cut banks	X	Rills	X	Water-cut benches
X	Exposed roots	X	Scour	–	Water level mark
	Headcuts	X	Secondary channels		
	Other:				

UN-VEGETATED LOW FLOW CHANNEL

UN-VEGETATED LOW-FLOW

Vegetation

Estimated % total vegetative cover (perennial & shrub species combined):	Dominant and co-dominant species (if known) and % of total vegetative cover of each:	Representative height and width of dominant and co-dominant species:
25-30%	CAT-CLAW ACACIA - 5% CHEESE BUSH 10% CREOSOTE 5%	C.C.A: 7'x7' CB : 2'x3' CREOSOTE 7'x7'

Differences in total shrub/perennial density (total #shrubs/perennial plants) between the low-flow channel(s) and the adjacent floodplain? (describe and qualify the differences): LOW-FLOW IS ALMOST COMPLETELY UNVEGETATED

LOW-FLOW IS UNVEGETATED, RELATIVELY MODERATE COVER IN FLOODPLAIN AND SPARSELY VEGETATED [illegible]

Are there plant species that are present in (or absent from) the low-flow channel(s) when compared to the adjacent floodplain? (describe differences): ALL WASH SPECIES ABSENT IN LOW-FLOW WITH THE EXCEPTION OF OCCASSIONAL CREOSOTE.

Are there plant species that are more abundant (or less abundant) on the low-flow channel(s) and the adjacent floodplain? (describe and qualify differences) SEE PREVIOUS

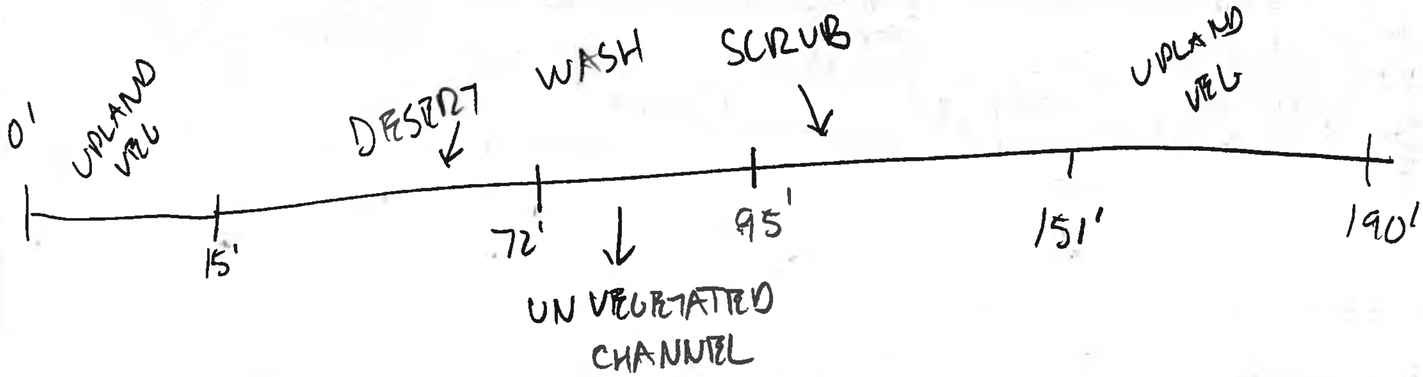
Site ID	Stream ID	page 4 of 4

INDICATORS of PONDING & EVAPORATION and EOLIAN TRANSPORT & DEPOSITION

—	Algal crusts	—	Sand-filled channels		
—	Beach ridges	—	Springs		
—	Coppice dunes: active / relict	—	Substrate staining		
—	Crusts: carbonate / salt / soda	+	Vegetation-landscape alignments		
—	Mud: cracks / curls / polygons				
	Other:				

Additional Diagrams and Notes

Vegetation cross-section diagram: Draw a cross-section that identifies the approximate locations along the transect or diagram of geomorphic units (see page 1 of data sheet) where there are changes in vegetation characteristics, as summarized in the vegetation subsections under "Upland" and "Watercourse Complex".



Photographs

Photographs should document the representative landscape units, vegetation, and the presence or absence of representative stream indicators.

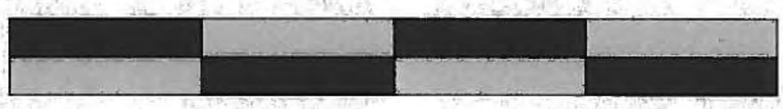
Photo ID #	Description	GPS location	

Particle Size Gradations

Description of particle size			millimeters
Boulder	mammoth		4096
	very large		2048
	large		1024
	medium		512
	small		**256**
Cobble	large		128
	small		**64**
Gravel	very coarse	Pebble	32
	coarse		16
	medium		8
	fine		4
	very fine	Granule	**2**
Sand	very coarse		1
	coarse		0.500
	medium		0.250
	fine		0.125
	very fine		**0.063**
Silt			**0.004**
Clay			

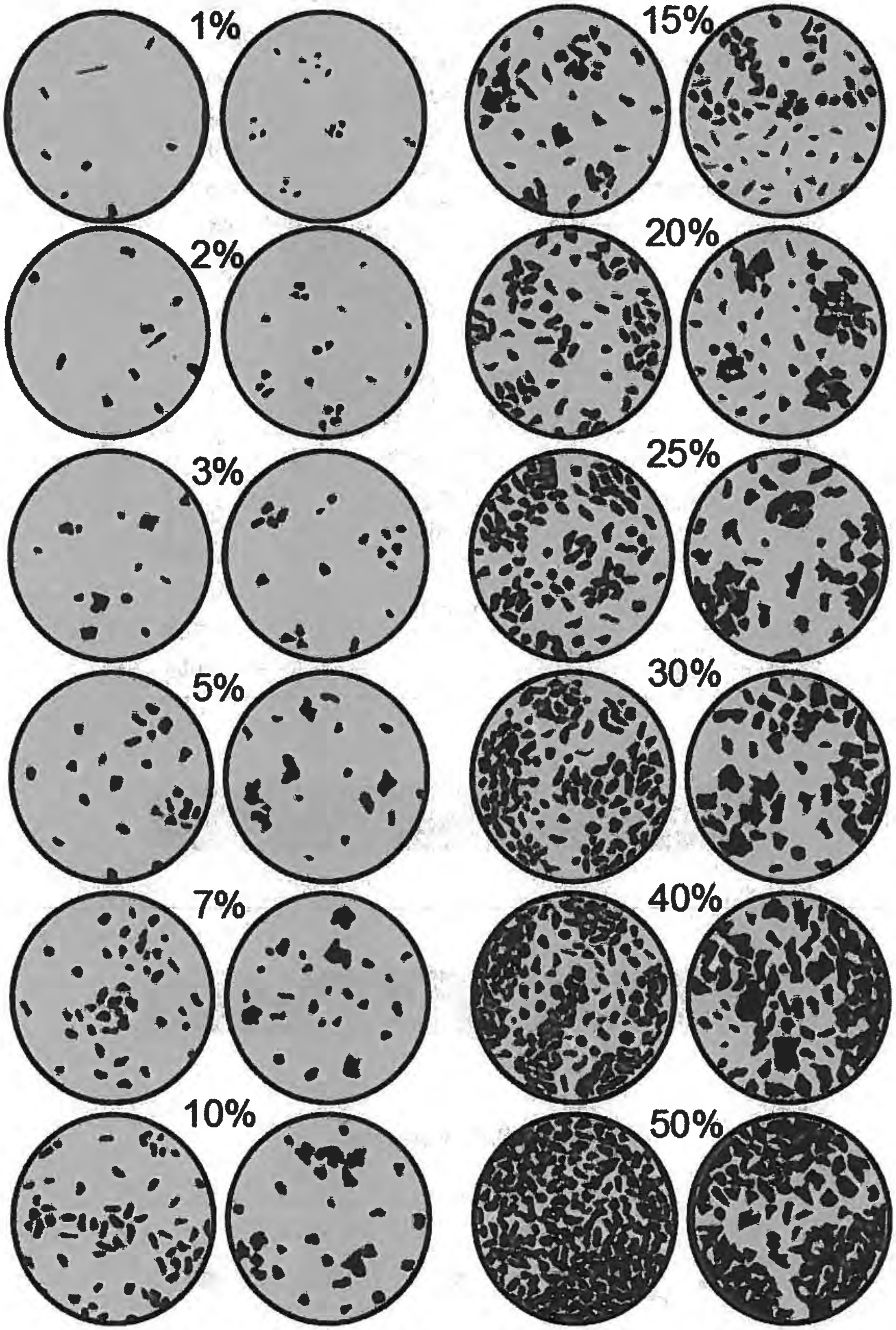
Centimeters

Inches



Grain Size Scale (mm)

Percent Landscape Cover Diagram



Appendix 1 - REQUEST FOR CORPS JURISDICTIONAL DETERMINATION (JD)

To: District Name Here

- I am requesting a JD on property located at: Nipton Project Area
  (Street Address)
  City/Township/Parish: Primm, NV (nearest) County: San Bernardino State: CA
  Acreage of Parcel/Review Area for JD: 6.0 acres
  Section: 27 Township: 16N Range: 14E
  Latitude (decimal degrees): 35.47830 Longitude (decimal degrees): -115.451757
  (For linear projects, please include the center point of the proposed alignment.)
- Please attach a survey/plat map and vicinity map identifying location and review area for the JD.
- ☐ I currently own this property. ___ I plan to purchase this property.
  ☑ I am an agent/consultant acting on behalf of the requestor.
  ☐ Other (please explain): ______.
- Reason for request: (check as many as applicable)
  ☐ I intend to construct/develop a project or perform activities on this parcel which would be designed to avoid all aquatic resources.
  ☐ I intend to construct/develop a project or perform activities on this parcel which would be designed to avoid all jurisdictional aquatic resources under Corps authority.
  ☐ I intend to construct/develop a project or perform activities on this parcel which may require authorization from the Corps, and the JD would be used to avoid and minimize impacts to jurisdictional aquatic resources and as an initial step in a future permitting process.
  ☐ I intend to construct/develop a project or perform activities on this parcel which may require authorization from the Corps; this request is accompanied by my permit application and the JD is to be used in the permitting process.
  ☐ I intend to construct/develop a project or perform activities in a navigable water of the U.S. which is included on the district Section 10 list and/or is subject to the ebb and flow of the tide.
  ☐ A Corps JD is required in order to obtain my local/state authorization.
  ☑ I intend to contest jurisdiction over a particular aquatic resource and request the Corps confirm that jurisdiction does/does not exist over the aquatic resource on the parcel.
  ☐ I believe that the site may be comprised entirely of dry land.
  ☐ Other: ______
- Type of determination being requested:
  ☑ I am requesting an approved JD.
  ☐ I am requesting a preliminary JD.
  ☐ I am requesting a "no permit required" letter as I believe my proposed activity is not regulated.
  ☐ I am unclear as to which JD I would like to request and require additional information to inform my decision.

By signing below, you are indicating that you have the authority, or are acting as the duly authorized agent of a person or entity with such authority, to and do hereby grant Corps personnel right of entry to legally access the site if needed to perform the JD. Your signature shall be an affirmation that you possess the requisite property rights to request a JD on the subject property.

*Signature: Larsen, Erik Digitally signed by Larsen, Erik DN: cn=Larsen, Erik, ou=USORA1 Reason: I attest to the accuracy and integrity of this document Date: 2019.02.28 15:57:46 -08'00' Date: 28Feb2019

- Typed or printed name: Erik Larsen, D.Env.
  Company name: AECOM Environment
  Address: 999 Town & Country Road, 2nd Floor
  Orange, CA 92868
  Daytime phone no.: 714.648.2043
  Email address: erik.larsen@aecom.com

***Authorities:** Rivers and Harbors Act, Section 10, 33 USC 403; Clean Water Act, Section 404, 33 USC 1344; Marine Protection, Research, and Sanctuaries Act, Section 103, 33 USC 1413; Regulatory Program of the U.S. Army Corps of Engineers; Final Rule for 33 CFR Parts 320-332.
Principal Purpose: The information that you provide will be used in evaluating your request to determine whether there are any aquatic resources within the project area subject to federal jurisdiction under the regulatory authorities referenced above.
Routine Uses: This information may be shared with the Department of Justice and other federal, state, and local government agencies, and the public, and may be made available as part of a public notice as required by federal law. Your name and property location where federal jurisdiction is to be determined will be included in the approved jurisdictional determination (AJD), which will be made available to the public on the District's website and on the Headquarters USACE website.
Disclosure: Submission of requested information is voluntary; however, if information is not provided, the request for an AJD cannot be evaluated nor can an AJD be issued.

® **Regulatory Program** ®

INTERIM APPROVED JURISDICTIONAL DETERMINATION FORM
U.S. Army Corps of Engineers
This form should be completed by following the instructions provided
in the Interim Approved Jurisdictional Determination Form User Manual.

SECTION I: BACKGROUND INFORMATION

A. COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (AJD): TBD

B. ORM NUMBER IN APPROPRIATE FORMAT (e.g., HQ-2015-00001-SMJ): TBD

C. PROJECT LOCATION AND BACKGROUND INFORMATION:
State:CA County/parish/borough: San Bernardino City: Primm
Center coordinates of site (lat/long in degree decimal format): Lat. 35.47830, Long. -115.451757.
Map(s)/diagram(s) of review area (including map identifying single point of entry (SPOE) watershed and/or potential jurisdictional areas where applicable) is/are: ☒attached ☐ in report/map titled .
☐ Other sites (e.g., offsite mitigation sites, disposal sites, etc.) are associated with this action and are recorded on a different jurisdictional determination (JD) form. List JD form ID numbers (e.g., HQ-2015-00001-SMJ-1): .

D. REVIEW PERFORMED FOR SITE EVALUATION:
☒ Office (Desk) Determination Only. Date: TBD.
☐ Office (Desk) and Field Determination. Office/Desk Dates: TBD Field Date(s): TBD.

SECTION II: DATA SOURCES

Check all that were used to aid in the determination and attach data/maps to this AJD form and/or references/citations in the administrative record, as appropriate.
☒ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant. Title/Date: JD Report, Feb 2019.
☒ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
  ☒ Data sheets/delineation report are sufficient for purposes of AJD form. Title/Date: JD Report, Feb 2019.
  ☐ Data sheets/delineation report are not sufficient for purposes of AJD form. Summarize rationale and include information on revised data sheets/delineation report that this AJD form has relied upon: .
  Revised Title/Date: .
☐ Data sheets prepared by the Corps. Title/Date: .
☐ Corps navigable waters study. Title/Date: .
☐ CorpsMap ORM map layers. Title/Date: .
☐ USGS Hydrologic Atlas. Title/Date: .
☒ USGS, NHD, or WBD data/maps. Title/Date: JD Report, Feb 2019.
☒ USGS 8, 10 and/or 12 digit HUC maps. HUC number: HUC 10 - 1606001510 Devil Canyon-Frontal Ivanpah Lake.
☒ USGS maps. Scale & quad name and date: USGS 7.5' Quad; Mineral Hill, CA.
☒ USDA NRCS Soil Survey. Citation: Web Soil Survey.
☒ USFWS National Wetlands Inventory maps. Citation: JD Report, Feb 2019.
☐ State/Local wetland inventory maps. Citation: .
☐ FEMA/FIRM maps. Citation: .
☒ Photographs: ☒ Aerial. Citation: JD Report, Feb 2019. or ☐ Other. Citation: .
☐ LiDAR data/maps. Citation: .
☒ Previous JDs. File no. and date of JD letter: SPL-2011-01051-SLP (Stateline Solar Farm Project) and SPK-2004-50472 (Ivanpah Airport Site); Appendix B, JD Report, Feb 2019.
☐ Applicable/supporting case law: .
☐ Applicable/supporting scientific literature: .
☐ Other information (please specify): .

SECTION III: SUMMARY OF FINDINGS

Complete ORM "Aquatic Resource Upload Sheet" or Export and Print the Aquatic Resource Water Droplet Screen from ORM for All Waters and Features, Regardless of Jurisdictional Status – Required

A. RIVERS AND HARBORS ACT (RHA) SECTION 10 DETERMINATION OF JURISDICTION:

☐ "*navigable waters of the U.S.*" within RHA jurisdiction (as defined by 33 CFR part 329) in the review area.

- **Complete Table 1 - Required**

NOTE: If the navigable water is not subject to the ebb and flow of the tide or included on the District's list of Section 10 navigable waters list, DO NOT USE THIS FORM TO MAKE THE DETERMINATION. The District must continue to follow the procedure outlined in 33 CFR part 329.14 to make a Section 10 RHA navigability determination.

B. CLEAN WATER ACT (CWA) SECTION 404 DETERMINATION OF JURISDICTION: "*waters of the U.S.*" within CWA jurisdiction (as defined by 33 CFR part 328.3) in the review area. **Check all that apply.**

☐ (a)(1): All waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide. (Traditional Navigable Waters (TNWs))

- **Complete Table 1 - Required**

☐ This AJD includes a case-specific (a)(1) TNW (Section 404 navigable-in-fact) determination on a water that has not previously been designated as such. Documentation required for this case-specific (a)(1) TNW determination is attached.

☐ (a)(2): All interstate waters, including interstate wetlands.

- **Complete Table 2 - Required**

☐ (a)(3): The territorial seas.

- **Complete Table 3 - Required**

☐ (a)(4): All impoundments of waters otherwise identified as waters of the U.S. under 33 CFR part 328.3.

- **Complete Table 4 - Required**

☐ (a)(5): All tributaries, as defined in 33 CFR part 328.3, of waters identified in paragraphs (a)(1)-(a)(3) of 33 CFR part 328.3.

- **Complete Table 5 - Required**

☐ (a)(6): All waters adjacent to a water identified in paragraphs (a)(1)-(a)(5) of 33 CFR part 328.3, including wetlands, ponds, lakes, oxbows, impoundments, and similar waters.

- **Complete Table 6 - Required**

☐ Bordering/Contiguous.

Neighboring:

☐ (c)(2)(i): All waters located within 100 feet of the ordinary high water mark (OHWM) of a water identified in paragraphs (a)(1)-(a)(5) of 33 CFR part 328.3.

☐ (c)(2)(ii): All waters located within the 100-year floodplain of a water identified in paragraphs (a)(1)-(a)(5) of 33 CFR part 328.3 and not more than 1,500 feet of the OHWM of such water.

☐ (c)(2)(iii): All waters located within 1,500 feet of the high tide line of a water identified in paragraphs (a)(1) or (a)(3) of 33 CFR part 328.3, and all waters within 1,500 feet of the OHWM of the Great Lakes.

☐ (a)(7): All waters identified in 33 CFR 328.3(a)(7)(i)-(v) where they are determined, on a case-specific basis, to have a significant nexus to a water identified in paragraphs (a)(1)-(a)(3) of 33 CFR part 328.3.

- **Complete Table 7 for the significant nexus determination. Attach a map delineating the SPOE watershed boundary with (a)(7) waters identified in the similarly situated analysis. - Required**

☐ Includes water(s) that are geographically and physically adjacent per (a)(6), but are being used for established, normal farming, silviculture, and ranching activities (33 USC Section 1344(f)(1)) and therefore are not adjacent and require a case-specific significant nexus determination.

☐ (a)(8): All waters located within the 100-year floodplain of a water identified in paragraphs (a)(1)-(a)(3) of 33 CFR part 328.3 not covered by (c)(2)(ii) above and all waters located within 4,000 feet of the high tide line or OHWM of a water identified in paragraphs (a)(1)-(a)(5) of 33 CFR part 328.3 where they are determined on a case-specific basis to have a significant nexus to a water identified in paragraphs (a)(1)-(a)(3) of 33 CFR part 328.3.

- **Complete Table 8 for the significant nexus determination. Attach a map delineating the SPOE watershed boundary with (a)(8) waters identified in the similarly situated analysis. - Required**

☐ Includes water(s) that are geographically and physically adjacent per (a)(6), but are being used for established, normal farming, silviculture, and ranching activities (33 USC Section 1344(f)(1)) and therefore are not adjacent and require a case-specific significant nexus determination.

C. NON-WATERS OF THE U.S. FINDINGS:

Check all that apply.

☐ The review area is comprised entirely of dry land.

☐ Potential-(a)(7) Waters: Waters that DO NOT have a significant nexus to a water identified in paragraphs (a)(1)-(a)(3) of 33 CFR part 328.3.

- **Complete Table 9 and attach a map delineating the SPOE watershed boundary with potential (a)(7) waters identified in the similarly situated analysis. - Required**

☐ Includes water(s) that are geographically and physically adjacent per (a)(6), but are being used for established, normal farming, silviculture, and ranching activities (33 USC Section 1344(f)(1)) and therefore are not adjacent and require a case-specific significant nexus determination.

☐ Potential-(a)(8) Waters: Waters that DO NOT have a significant nexus to a water identified in paragraphs (a)(1)-(a)(3) of 33 CFR part 328.3.

- **Complete Table 9 and attach a map delineating the SPOE watershed boundary with potential (a)(8) waters identified in the similarly situated analysis. - Required**

☐ Includes water(s) that are geographically and physically adjacent per (a)(6), but are being used for established, normal farming, silviculture, and ranching activities (33 USC Section 1344(f)(1)) and therefore are not adjacent and require a case-specific significant nexus determination.

☐ Excluded Waters (Non-Waters of U.S.), even where they otherwise meet the terms of paragraphs (a)(4)-(a)(8):

- **Complete Table 10 - Required**

☐ (b)(1): Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of the CWA.

☐ (b)(2): Prior converted cropland.

☐ (b)(3)(i): Ditches with ephemeral flow that are not a relocated tributary or excavated in a tributary.

☐ (b)(3)(ii): Ditches with intermittent flow that are not a relocated tributary, excavated in a tributary, or drain wetlands.

☐ (b)(3)(iii): Ditches that do not flow, either directly or through another water, into a water identified in paragraphs (a)(1)-(a)(3).

☐ (b)(4)(i): Artificially irrigated areas that would revert to dry land should application of water to that area cease.

☐ (b)(4)(ii): Artificial, constructed lakes and ponds created in dry land such as farm and stock watering ponds, irrigation ponds, settling basins, fields flooded for rice growing, log cleaning ponds, or cooling ponds.

☐ (b)(4)(iii): Artificial reflecting pools or swimming pools created in dry land.[1]

☐ (b)(4)(iv): Small ornamental waters created in dry land.[1]

☐ (b)(4)(v): Water-filled depressions created in dry land incidental to mining or construction activity, including pits excavated for obtaining fill, sand, or gravel that fill with water.

☐ (b)(4)(vi): Erosional features, including gullies, rills, and other ephemeral features that do not meet the definition of tributary, non-wetland swales, and lawfully constructed grassed waterways.[1]

☐ (b)(4)(vii): Puddles.[1]

☐ (b)(5): Groundwater, including groundwater drained through subsurface drainage systems.[1]

☐ (b)(6): Stormwater control features constructed to convey, treat, or store stormwater that are created in dry land.[1]

☐ (b)(7): Wastewater recycling structures created in dry land; detention and retention basins built for wastewater recycling; groundwater recharge basins; percolation ponds built for wastewater recycling; and water distributary structures built for wastewater recycling.

☒ Other non-jurisdictional waters/features within review area that do not meet the definitions in 33 CFR 328.3 of (a)(1)-(a)(8) waters and are not excluded waters identified in (b)(1)-(b)(7).

- **Complete Table 11 - Required.**

D. ADDITIONAL COMMENTS TO SUPPORT AJD: See Table 11 below.

[1] In many cases these excluded features will not be specifically identified on the AJD form, unless specifically requested. Corps Districts may, in case-by-case instances, choose to identify some or all of these features within the review area.

Jurisdictional Waters of the U.S.

Table 1. (a)(1) Traditional Navigable Waters n/a

(a)(1) Waters Name	(a)(1) Criteria	Rationale to Support (a)(1) Designation Include High Tide Line or Ordinary High Water Mark indicators, when applicable.
N/A	Choose an item.	N/A

Table 2. (a)(2) Interstate Waters n/a

(a)(2) Waters Name	Rationale to Support (a)(2) Designation
N/A	N/A

Table 3. (a)(3) Territorial Seas n/a

(a)(3) Waters Name	Rationale to Support (a)(3) Designation
N/A	N/A

Table 4. (a)(4) Impoundments n/a

(a)(4) Waters Name	Rationale to Support (a)(4) Designation
N/A	N/A
N/A	N/A

Table 5. (a)(5)Tributaries n/a

(a)(5) Waters Name	Flow Regime	(a)(1)-(a)(3) Water Name to which this (a)(5) Tributary Flows	Tributary Breaks	Rationale for (a)(5) Designation and Additional Discussion. Identify flowpath to (a)(1)-(a)(3) water or attach map identifying the flowpath; explain any breaks or flow through excluded/non-jurisdictional features, etc.
N/A	Choose an item.	N/A	Choose an item.	N/A
N/A	Choose an item.	N/A	Choose an item.	N/A
N/A	Choose an item.	N/A	Choose an item.	N/A
N/A	Choose an item.	N/A	Choose an item.	N/A

Table 6. (a)(6) Adjacent Waters n/a

(a)(6) Waters Name	(a)(1)-(a)(5) Water Name to which this Water is Adjacent	Rationale for (a)(6) Designation and Additional Discussion. Identify the type of water and how the limits of jurisdiction were established (e.g., wetland, 87 Manual/Regional Supplement); explain how the 100-year floodplain and/or the distance threshold was determined; whether this water extends beyond a threshold; explain if the water is part of a mosaic, etc.
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A

Table 7. (a)(7) Waters n/a

SPOE Name	(a)(7) Waters Name	(a)(1)-(a)(3) Water Name to which this Water has a Significant Nexus	Significant Nexus Determination Identify SPOE watershed; discuss whether any similarly situated waters were present and aggregated for SND; discuss data, provide analysis, and summarize how the waters have more than speculative or insubstantial effect on the physical, chemical, or biological integrity of the (a)(1)-(a)(3) water, etc.
N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A

Table 8. (a)(8) Waters n/a

SPOE Name	(a)(8) Waters Name	(a)(1)-(a)(3) Water Name to which this Water has a Significant Nexus	Significant Nexus Determination Identify SPOE watershed; explain how 100-yr floodplain and/or the distance threshold was determined; discuss whether waters were determined to be similarly situated to subject water and aggregated for SND; discuss data, provide analysis, and then summarize how the waters have more than speculative or insubstantial effect the on the physical, chemical, or biological integrity of the (a)(1)-(a)(3) water, etc.
N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A

Non-Jurisdictional Waters

Table 9. Non-Waters/No Significant Nexus n/a

SPOE Name	Non-(a)(7)/(a)(8) Waters Name	(a)(1)-(a)(3) Water Name to which this Water DOES NOT have a Significant Nexus	Basis for Determination that the Functions DO NOT Contribute Significantly to the Chemical, Physical, or Biological Integrity of the (a)(1)-(a)(3) Water. Identify SPOE watershed; explain how 100-yr floodplain and/or the distance threshold was determined; discuss whether waters were determined to be similarly situated to the subject water; discuss data, provide analysis, and summarize how the waters did not have more than a speculative or insubstantial effect on the physical, chemical, or biological integrity of the (a)(1)-(a)(3) water.
N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A

Table 10. Non-Waters/Excluded Waters and Features n/a

Paragraph (b) Excluded Feature/Water Name	Rationale for Paragraph (b) Excluded Feature/Water and Additional Discussion.
N/A	N/A
N/A	N/A

Table 11. Non-Waters/Other

Other Non-Waters of U.S. Feature/Water Name	Rationale for Non-Waters of U.S. Feature/Water and Additional Discussion.
NIPTON PROJECT AREA **(a) Drainage East;** **(b) Drainage West**	See text below, as well as JD Report (AECOM 2019) and AECOM (2013) – Attachments B – D (Rapanos AJD Submittal from 2013). **SUMMARY:** Based on the information presnted in the JD Report (AECOM 2019), the Corps concludes Drainage East and Drainage West are NON-WATERS of the United States, since the waters are NOT tributary to (a)(1), (a) 3, and (a)(4) waters and are not (a)(1)-(a)(8) waters themselves. The Corps makes such a conclusion since the intrastate, ephemeral waters are ultimately tributary to a geographically isolated, dry lake, with both waters lacking any associated surface water based commerce. *Continued below*.

	Based on the results of the JD Report (AECOM 2019), this AJD was prepared to provide support to USACE in making a formal determination of all waters delineated within the project survey area that are geographically isolated waters (and/or not meeting the federal definition of waters [e.g., swales]) and, thus, not regulated by USACE for the following reasons 1 – 11, below. 1. There are two previous Approved JDs issued by USACE for geographic isolation of Ivanpah Dry Lake (e.g., a nonfederal jurisdictional water [that were delineated using federal protocol, manuals, and guidance]) for a renewable energy project and an aviation-related project. This Approved JD is based, in part, on these previous two Approve JDs that were conducted for USACE file Nos. SPL-2011-01051-SLP (Stateline Solar Farm Project) (Los Angeles District, North Coast Branch, Los Angeles and San Bernardino Counties Section) and SPK-2004-50472 (Ivanpah Airport Site). 2. Abatement into the landscape and the lack of hydrological connectivity of the ephemeral wash(es) (non-Relatively Permanent Waterway [non-RPW]) into an RPW that flows directly or indirectly into a TNW, and the lack of hydrological connectivity of the ephemeral washes into an RPW connected by storm drains or culverts. The ephemeral washes and swales within the project survey area originating within the Clark Mountain Range flow in a southwest-to-northeast orientation and create a confluence with other ephemeral washes, which eventually drain into Ivanpah Dry Lake (an isolated playa lake) approximately 6 miles northeast of the project survey area (JD Report, Appendix B [AECOM 2013, Attachment B]). 3. Ivanpah Dry Lake, as the terminus for all ephemeral waters within the project survey area, is not a TNW. Ivanpah Dry Lake is not an “(a)(3) water” as defined by 33 CFR 328.3. Ivanpah Dry Lake does not meet criteria (a)(3)(i–iii), as it does not have use for surface water recreation or other purposes by foreign or interstate travelers, does not have harvesting activities of fish or shellfish that may be sold in interstate or foreign commerce, and does not have surface water industrial usage by industries in interstate commerce. 4. Ivanpah Dry Lake *was* considered an interstate isolated water (33 CFR 328.3 [a][2]), with the majority of its area falling within California. Roughly 5% of the total area of Ivanpah Dry Lake was situated within Nevada. Published recreational uses of Ivanpah Dry Lake are limited to a few non-water-related (no recreational navigation) activities, including camping, archery, kite buggying, and land sailing (BLM 2013). See Figures 1 and 2 below. 5. All tributaries to Ivanpah Dry Lake as part of the overall watershed system are also isolated and additionally have no nexus to commerce. Thus, the Ivanpah-Pahrump Valleys Watershed (HUC: 16060015) is an isolated watershed system that has no surface water connection to commerce. Based on the information above, USACE concludes that all tributaries to Ivanpah Lake are nonjurisdictional waters of the U.S., since the waters are NOT tributary to either a TNW or an (a)(3) water, and are not (a)(3) waters themselves.

6. Lack of an ecological connection to TNWs. The ephemeral washes occurring within the project survey area present low to no potential or capacity to transfer nutrients and organic carbon (vital to support downstream foodwebs [e.g., macroinvertebrates] present in headwater streams or to convert carbon in leaf litter, making it available to species downstream), nor does this ephemeral wash present habitat services such as providing spawning areas for recreationally or commercially important species in downstream waters.

7. The lack of hydrological connectivity (presenting an SNX to any TNW) for the ephemeral wash occurring within the project survey area.

8. The evaluation of the ephemeral wash not presenting an SNX to a TNW includes the volume, duration, and frequency of the flow of water to a TNW.

9. Examination of the flow characteristics and functions of the ephemeral wash (which do not support adjacent wetlands) has been determined not to present a significant effect on the chemical, physical, or biological integrity of downstream TNWs.

10. Selected ephemeral washes delineated within the project survey area become both continuous and discontinuous swale features and abate into the landscape and prior to a confluence with a non-RPW.

11. All swales occurring within the project survey area, while unvegetated, occur within the larger Mojave creosote bush scrub habitat. The swales are generally poorly defined surface aquatic features characterized by low volume, infrequent or short-duration flow, and are usually shallow topographical features in the landscape that may convey water across upland areas during and following uncommon large storm events. Swales are generally not considered potential waters of the U.S. by USACE based on the 2007 Guidebook (USACE 2007b) and the USACE Joint Guidance Memorandum. Swales are generally not considered waters of the U.S. because they are not tributaries to receiving waters, do not exhibit an identifiable OHWM (as defined by 33 CFR Part 328.3[e] and identified in RGL 05-05), are not tributaries themselves, or do not have an SNX to TNWs (e.g., the Pacific Ocean). Swales are also characterized by the conveyance of a low volume of surface water and infrequent and short duration flow without an SNX to a TNW (or a USACE-designated jurisdictional water of the U.S.). Considering these conditions, it is anticipated that the swales within the project survey area would not be considered waters of the U.S. by USACE. Swales occurring within the project area either abate into upland or create a confluence with established wash features that also eventually abate into upland. Additionally, swales are generally not considered jurisdictional waters of the U.S. because they lack an identifiable OHWM, are not tributaries themselves, or do not have an SNX to TNWs (e.g., the Pacific Ocean).

*Continued below, with **Figures 1 and 2**.*

Figure 1. Nipton Site, Ivanpah Dry Lake, and lack of Interstate water jurisdictional Status due to development within the Nevada town of Primm.

Figure 2. View of Primm, NV, and extent of Ivanpah Dry Lake (does not extent across NV border any longer).

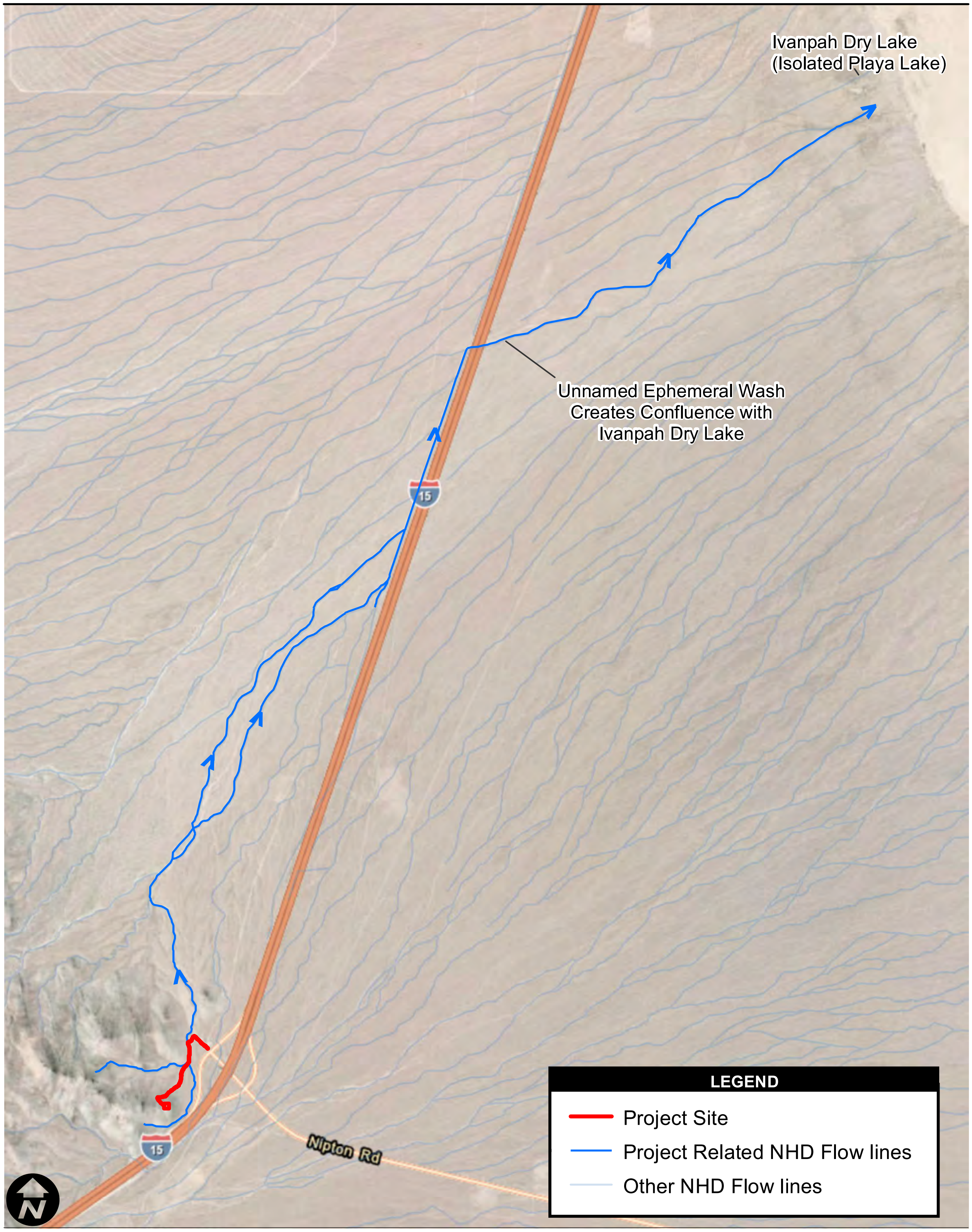
USACE ORM AQUATIC RESOURCES FORM

Waters_Name	State	Cowardin_Code	HGM_Code	Meas_Type	Amount	Units	Waters_Type	Latitude	Longitude	Local_Waterway
Drainage East	CALIFORNIA	R6	RIVERINE	Area	0.47	ACRE	ISOLATE	35.47429700	-115.45134700	Ivanpah Isolated Lake
Drainage West	CALIFORNIA	R6	RIVERINE	Area	0.01	ACRE	ISOLATE	35.46995900	-115.45782500	Ivanpah Isolated Lake

AECOM (2013)

ATTACHMENT B

GEOGRAPHIC ISOLATION DOCUMENTATION
(DRAINING INTO IVANPAH DRY LAKE)



Source: ESRI 2013; Microsoft 2011; National Hydrologic Dataset 2013

3,000 1,500 0 3,000 Feet

Scale: 1:36,000; 1 inch = 3,000 feet

Figure 1
Geographic Isolation Documentation

Nipton JDLR

Path: M:\PROPOSALS\2013\Interconnect Towers\GIS\MXD\JDLR\Nipton\AttachmentC_GeographicIsolation.mxd, 8/26/2013, sorensenj

AECOM (2013)

ATTACHMENT C

APPROVED JD FORM (FOR GEOGRAPHIC ISOLATION)

APPROVED JURISDICTIONAL DETERMINATION FORM
U.S. Army Corps of Engineers

This form should be completed by following the instructions provided in Section IV of the JD Form Instructional Guidebook.

SECTION I: BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD):

B. DISTRICT OFFICE, FILE NAME, AND NUMBER: Los Angeles District Regulatory Division, Los Angeles Section, North Coast Branch Los Angeles and San Bernardino Counties Section

C. PROJECT LOCATION AND BACKGROUND INFORMATION: InterConnect Nipton Communications Site. Please refer to Introduction, Summary, Project Location, and Project Description located in the Jurisdictional Delineation Letter Report (JDLR).
State: CA County/parish/borough: San Bernardino (unincorporated area [BLM managed land])
Center coordinates of site (lat/long in degree decimal format): Lat: 35.473548 Long: -115.451568
Universal Transverse Mercator: 11n 640482.69 mE 3926659.31 mN
Name of nearest waterbody: Cadiz Dry Lake (Playa Lake)
Name of nearest Traditional Navigable Water (TNW) into which the aquatic resource flows: N/A
Name of watershed or Hydrologic Unit Code (HUC): Ivanpah-Pahrump Valleys Watershed (HUC:16060015)

☒ Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request (Please refer to Figures 7 and 8 of Attachment A and Attachment B of the JDLR. Please see the attached Waters Upload Sheet (page 9 of this form and Attachment E of the JDLR [electronic Waters Upload Sheet])

☐ Check if other sites (e.g., offsite mitigation sites, disposal sites, etc.) are associated with this action and are recorded on a different JD form.

D. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):

☐ Office (Desk) Determination. Date:

☒ Field Determination. Date(s): June 27, 2013

SECTION II: SUMMARY OF FINDINGS

A. RHA SECTION 10 DETERMINATION OF JURISDICTION.

There are no "*navigable waters of the U.S.*" within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area. [*Required*]

☐ Waters subject to the ebb and flow of the tide.

☐ Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. Explain:

B. CWA SECTION 404 DETERMINATION OF JURISDICTION.

There are no "*waters of the U.S.*" within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area. [*Required*]

1. **Waters of the U.S.**
   a. **Indicate presence of waters of U.S. in review area (check all that apply):**[1]
      - ☐ TNWs, including territorial seas
      - ☐ Wetlands adjacent to TNWs
      - ☐ Relatively permanent waters[2] (RPWs) that flow directly or indirectly into TNWs
      - ☐ Non-RPWs that flow directly or indirectly into TNWs
      - ☐ Wetlands directly abutting RPWs that flow directly or indirectly into TNWs
      - ☐ Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs
      - ☐ Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
      - ☐ Impoundments of jurisdictional waters
      - ☐ Isolated (interstate or intrastate) waters, including isolated wetlands

   b. **Identify (estimate) size of waters of the U.S. in the review area:**
      Non-wetland waters: linear feet: width (ft) and/or acres.
      Wetlands: acres.

   c. **Limits (boundaries) of jurisdiction** based on:
      Elevation of established OHWM (if known): N/A

2. **Non-regulated waters/wetlands (check if applicable):**[3]
   ☒ Potentially jurisdictional waters of the U.S. were assessed and delineated within the project survey area (please see Figures 1 through 8 in the JDLR) and determined not to be federally jurisdictional waters under the regulatory purview of the USACE.
   Explain: Ephemeral streams present geographic isolation with no hydrological or ecological surface connection to an RPW or TNW. Ephemeral streams occurring within the project survey area abate into the upland landscape (prior to confluence with Ivanpah Dry Lake) or empty into Ivanpah Dry Lake (which is an interstate geographically isolated playa lake). Using the criteria outlined in 33 CFR 328.3 the USACE has previously determined that all aquatic features within the Southern Mojave Watershed [HUC 18100100]), (which includes the project area) exhibit insufficient evidence of interstate commerce to meet the requirements of 33 CFR 328.3(a)(3)(iii) and does not meet

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[1] Boxes checked below shall be supported by completing the appropriate sections in Section III below.
[2] For purposes of this form, an RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).
[3] Supporting documentation is presented in Section III.F.

the requirements for navigability at 33 CFR 328.3(a)(1). Therefore, the delineated aquatic features occurring within InterConnect Nipton Communications Site project area are not subject to USACE jurisdiction under Section 404 of the Clean Water Act.

Based on the results of the delineation and federal guidance outlined above, this JDLR was prepared to provide support to USACE in making a formal determination of all waters delineated within the project survey area that are determined to be isolated waters and thus not regulated by USACE for the following reasons:

1. There are two previous Approved JDs issued by USACE for geographic isolation of Ivanpah Dry Lake (e.g., a nonfederal jurisdictional water [that were delineated using federal protocol, manuals, and guidance]) for a renewable energy project and an aviation-related project. This Approved JD is based, in part, on these previous two Approve JDs that were conducted for USACE file Nos. SPL-2011-01051-SLP (Stateline Solar Farm Project) (Los Angeles District, North Coast Branch, Los Angeles and San Bernardino Counties Section) and SPK-2004-50472 (Ivanpah Airport Site) (Sacramento District) (please see Attachment D of the JDLR).

2. Abatement into the landscape and the lack of hydrological connectivity of the ephemeral wash(es) (non-Relatively Permanent Waterway [non-RPW]) into an RPW that flows directly or indirectly into a TNW, and the lack of hydrological connectivity of the ephemeral washes into an RPW connected by storm drains or culverts. The ephemeral washes and swales within the project survey area originating within the Clark Mountain Range flow in a southwest-to-northeast orientation and create a confluence with other ephemeral washes, which eventually drain into Ivanpah Dry Lake (an isolated playa lake) approximately 6 miles norththeast of the project survey area (please see Attachment B of the JDLR).

3. Ivanpah Dry Lake, as the terminus for all ephemeral waters within the project survey area, is not a TNW. Ivanpah Dry Lake is not an "(a)(3) water" as defined by 33 CFR 328.3. Ivanpah Dry Lake does not meet criteria (a)(3)(i–iii), as it does not have use for surface water recreation or other purposes by foreign or interstate travelers, does not have harvesting activities of fish or shellfish that may be sold in interstate or foreign commerce, and does not have surface water industrial usage by industries in interstate commerce.

4. Ivanpah Dry Lake is considered an interstate isolated water (33 CFR 328.3 [a][2]), with the majority of its area falling within California. Roughly 5% of the total area of Ivanpah Dry Lake is situated within Nevada. Published recreational uses of Ivanpah Dry Lake are limited to a few non-water-related (no recreational navigation) activities, including camping, archery, kite buggying, and land sailing.

5. All tributaries to Ivanpah Dry Lake as part of the overall watershed system are also isolated and additionally have no nexus to commerce. Thus, the Ivanpah-Pahrump Valleys Watershed (HUC: 16060015) is an isolated watershed system that has no surface water connection to commerce. Based on the information above, USACE concludes that all tributaries to Ivanpah Lake are nonjurisdicitonal waters of the U.S., since the waters are NOT tributary to either a TNW or an (a)(3) water, and are not (a)(3) waters themselves.

6. Lack of an ecological connection to TNWs. The ephemeral washes occurring within the project survey area present low to no potential or capacity to transfer nutrients and organic carbon (vital to support downstream foodwebs [e.g., macroinvertebrates] present in headwater streams or to convert carbon in leaf litter, making it available to species downstream), nor does this ephemeral wash present habitat services such as providing spawning areas for recreationally or commercially important species in downstream waters.

7. The lack of hydrological connectivity (presenting an SNX to any TNW) for the ephemeral wash occurring within the project survey area and the evaluation of the ephemeral wash not presenting an SNX to a TNW includes the volume, duration, and frequency of the flow of water to a TNW.

8. Examination of the flow characteristics and functions of the ephemeral wash (which do not support adjacent wetlands) has been determined not to present a significant effect on the chemical, physical, or biological integrity of downstream TNWs.

9. Selected ephemeral washes delineated within the project survey area become both continuous and discontinuous swale features and abate into the landscape and prior to a confluence with a non-RPW.

SECTION III: CWA ANALYSIS

A. TNWs AND WETLANDS ADJACENT TO TNWs

The agencies will assert jurisdiction over TNWs and wetlands adjacent to TNWs. If the aquatic resource is a TNW, complete Section III.A.1 and Section III.D.1. only; if the aquatic resource is a wetland adjacent to a TNW, complete Sections III.A.1 and 2 and Section III.D.1.; otherwise, see Section III.B below.

1. **TNW**
   Identify TNW: .

   Summarize rationale supporting determination: .

2. **Wetland adjacent to TNW**
   Summarize rationale supporting conclusion that wetland is "adjacent": .

B. CHARACTERISTICS OF TRIBUTARY (THAT IS NOT A TNW) AND ITS ADJACENT WETLANDS (IF ANY):

This section summarizes information regarding characteristics of the tributary and its adjacent wetlands, if any, and it helps determine whether or not the standards for jurisdiction established under *Rapanos* have been met.

The agencies will assert jurisdiction over non-navigable tributaries of TNWs where the tributaries are "relatively permanent waters" (RPWs), i.e. tributaries that typically flow year-round or have continuous flow at least seasonally (e.g., typically 3 months). A wetland that directly abuts an RPW is also jurisdictional. If the aquatic resource is not a TNW, but has year-round (perennial) flow, skip to Section III.D.2. If the aquatic resource is a wetland directly abutting a tributary with perennial flow, skip to Section III.D.4.

A wetland that is adjacent to but that does not directly abut an RPW requires a significant nexus evaluation. Corps districts and EPA regions will include in the record any available information that documents the existence of a significant nexus between a relatively permanent tributary that is not perennial (and its adjacent wetlands if any) and a traditional navigable water, even though a significant nexus finding is not required as a matter of law.

If the waterbody[4] is not an RPW, or a wetland directly abutting an RPW, a JD will require additional data to determine if the waterbody has a significant nexus with a TNW. If the tributary has adjacent wetlands, the significant nexus evaluation must consider the tributary in combination with all of its adjacent wetlands. This significant nexus evaluation that combines, for analytical purposes, the tributary and all of its adjacent wetlands is used whether the review area identified in the JD request is the tributary, or its adjacent wetlands, or both. If the JD covers a tributary with adjacent wetlands, complete Section III.B.1 for the tributary, Section III.B.2 for any onsite wetlands, and Section III.B.3 for all wetlands adjacent to that tributary, both onsite and offsite. The determination whether a significant nexus exists is determined in Section III.C below.

1. Characteristics of non-TNWs that flow directly or indirectly into TNW

(i) **General Area Conditions:**
Watershed size: **pick list**
Drainage area: **pick list**
Average annual rainfall: inches
Average annual snowfall: inches

(ii) **Physical Characteristics:**
(a) Relationship with TNW:
☐ Tributary flows directly into TNW.
☐ Tributary flows through **pick list** tributaries before entering TNW.

Project waters are **pick list** river miles from TNW.
Project waters are **pick list** river miles from RPW.
Project waters are **pick list** aerial (straight) miles from TNW.
Project waters are **pick list** aerial (straight) miles from RPW.
Project waters cross or serve as state boundaries. Explain:

Identify flow route to TNW[5]:
Tributary stream order, if known:

(b) General Tributary Characteristics (check all that apply):
Tributary is: ☐ Natural
☐ Artificial (man-made). Explain: .
☐ Manipulated (man-altered). Explain: .

Tributary properties with respect to top of bank (estimate):
Average width: feet
Average depth: feet
Average side slopes: **pick list**

Primary tributary substrate composition (check all that apply):

☐ Silts	☐ Sands	☐ Concrete
☐ Cobbles	☐ Gravel	☐ Muck
☐ Bedrock	☐ Vegetation. Type/% cover:	
☐ Other. Explain: .		

Tributary condition/stability [e.g., highly eroding, sloughing banks]. Explain: Stable. An established vegetated drainage feature.
Presence of run/riffle/pool complexes. Explain: .
Tributary geometry: **pick list**
Tributary gradient (approximate average slope):

(c) Flow:
Tributary provides for: **Seasonal flow**

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4 Note that the Instructional Guidebook contains additional information regarding swales, ditches, washes, and erosional features generally and in the arid West.
5 Flow route can be described by identifying, e.g., tributary a, which flows through the review area, to flow into tributary b, which then flows into TNW.

Estimate average number of flow events in review area/year: **pick list**
Describe flow regime:
Other information on duration and volume: .

Surface flow is: **pick list** Characteristics: .

Subsurface flow: **pick list**. Explain findings:
☐ Dye (or other) test performed: .

Tributary has (check all that apply):
☐ Bed and banks
☐ OHWM[6] (check all indicators that apply):
☐ clear, natural line impressed on the bank
☐ changes in the character of soil
☐ shelving
☐ vegetation matted down, bent, or absent
☐ leaf litter disturbed or washed away
☐ sediment deposition
☐ water staining
☐ other (list): .
☐ the presence of litter and debris
☐ destruction of terrestrial vegetation
☐ the presence of wrack line
☐ sediment sorting
☐ scour
☐ multiple observed or predicted flow events
☐ abrupt change in plant community
☐ Discontinuous OHWM.[7] Explain: .

If factors other than the OHWM were used to determine lateral extent of CWA jurisdiction (check all that apply):
☐ High Tide Line indicated by:
☐ oil or scum line along shore objects
☐ fine shell or debris deposits (foreshore)
☐ physical markings/characteristics
☐ tidal gauges
☐ other (list): .
☐ Mean High Water Mark indicated by:
☐ survey to available datum;
☐ physical markings;
☐ vegetation lines/changes in vegetation types.

(iii) Chemical Characteristics:
Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.).
Explain:
Identify specific pollutants, if known: .

(iv) Biological Characteristics. Channel supports (check all that apply):
☐ Riparian corridor. Characteristics (type, average width): .
☐ Wetland fringe. Characteristics: .
☐ Habitat for:
☐ Federally Listed species. Explain findings: .
☐ Fish/spawn areas. Explain findings: .
☐ Other environmentally-sensitive species. Explain findings: .
☐ Aquatic/wildlife diversity. Explain findings:

2. Characteristics of wetlands adjacent to non-TNW that flow directly or indirectly into TNW

(i) Physical Characteristics:
(a) General Wetland Characteristics:
Properties:
Wetland size: acres
Wetland type. Explain: Wetland quality. Explain: .
Project wetlands cross or serve as state boundaries. Explain: .

(b) General Flow Relationship with Non-TNW:
Flow is: **Intermittent Flow**. Explain: .

Surface flow is: **Pick List**. Characteristics: .

Subsurface flow: **Pick List**. Explain findings: .
☐ Dye (or other) test performed: .

(c) Wetland Adjacency Determination with Non-TNW:
☐ Directly abutting
☐ Not directly abutting
☐ Discrete wetland hydrologic connection. Explain: .
☐ Ecological connection. Explain: .
☐ Separated by berm/barrier. Explain: .

[6] A natural or man-made discontinuity in the OHWM does not necessarily sever jurisdiction (e.g., where the stream temporarily flows underground, or where the OHWM has been removed by development or agricultural practices). Where there is a break in the OHWM that is unrelated to the waterbody's flow regime (e.g., flow over a rock outcrop or through a culvert), the agencies will look for indicators of flow above and below the break.
[7] Ibid.

(d) Proximity (Relationship) to TNW
Project wetlands are **pick list** river miles from TNW.
Project waters are **pick list** aerial (straight) miles from TNW.
Flow is from: **pick list**.
Estimate approximate location of wetland as within the **pick list** floodplain.

(ii) **Chemical Characteristics:**
Characterize wetland system (e.g., water color is clear, brown, oil film on surface; water quality; general watershed characteristics; etc.). Explain: Clear with some turbidity from sediment.
Identify specific pollutants, if known: .

(iii) **Biological Characteristics. Wetland supports (check all that apply):**
- ☐ Riparian buffer. Characteristics (type, average width): .
- ☐ Vegetation type/percent cover. Explain: .
- ☐ Habitat for:
  - ☐ Federally Listed species. Explain findings: .
  - ☐ Fish/spawn areas. Explain findings: .
  - ☐ Other environmentally-sensitive species. Explain findings: .
  - ☐ Aquatic/wildlife diversity. Explain findings: .

3. **Characteristics of all wetlands adjacent to the tributary (if any)**
All wetland(s) being considered in the cumulative analysis:
Approximately acres in total are being considered in the cumulative analysis.

For each wetland, specify the following:

Directly abuts? (Y/N)	Size (in acres)	Directly abuts? (Y/N)	Size (in acres)

Summarize overall biological, chemical and physical functions being performed: .

C. SIGNIFICANT NEXUS DETERMINATION

A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of a TNW. For each of the following situations, a significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW. Considerations when evaluating significant nexus include, but are not limited to the volume, duration, and frequency of the flow of water in the tributary and its proximity to a TNW, and the functions performed by the tributary and all its adjacent wetlands. It is not appropriate to determine significant nexus based solely on any specific threshold of distance (e.g. between a tributary and its adjacent wetland or between a tributary and the TNW). Similarly, the fact an adjacent wetland lies within or outside of a floodplain is not solely determinative of significant nexus.

Draw connections between the features documented and the effects on the TNW, as identified in the *Rapanos* Guidance and discussed in the Instructional Guidebook. Factors to consider include, for example:
- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to carry pollutants or flood waters to TNWs, or to reduce the amount of pollutants or flood waters reaching a TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), provide habitat and lifecycle support functions for fish and other species, such as feeding, nesting, spawning, or rearing young for species that are present in the TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to transfer nutrients and organic carbon that support downstream foodwebs?
- Does the tributary, in combination with its adjacent wetlands (if any), have other relationships to the physical, chemical, or biological integrity of the TNW?

Note: the above list of considerations is not inclusive and other functions observed or known to occur should be documented below:

1. **Significant nexus findings for non-RPW that has no adjacent wetlands and flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary itself, then go to Section III.D: .

2. **Significant nexus findings for non-RPW and its adjacent wetlands, where the non-RPW flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: .

3. **Significant nexus findings for wetlands adjacent to an RPW but that do not directly abut the RPW.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: .

D. DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE (CHECK ALL THAT APPLY):

1. **TNWs and Adjacent Wetlands.** Check all that apply and provide size estimates in review area:
   - ☐ TNWs: linear feet, width (ft) Or, acres.
   - ☐ Wetlands adjacent to TNWs: acres.

2. **RPWs that flow directly or indirectly into TNWs.**
   - ☐ Tributaries of TNWs where tributaries typically flow year-round are jurisdictional. Provide data and rationale indicating that tributary is perennial: .
   - ☐ Tributaries of TNW where tributaries have continuous flow "seasonally" (e.g., typically three months each year) are jurisdictional. Data supporting this conclusion is provided at Section III.B. Provide rationale indicating that tributary flows seasonally:

   Provide estimates for jurisdictional waters in the review area (check all that apply):
   - ☐ Tributary waters: linear feet, width (ft).
   - ☐ Other non-wetland waters: acres.
     Identify type(s) of waters: .

3. **Non-RPWs[8] that flow directly or indirectly into TNWs.**
   - ☐ Waterbody that is not a TNW or an RPW, but flows directly or indirectly into a TNW, and it has a significant nexus with a TNW is jurisdictional. Data supporting this conclusion is provided at Section III.C.

   Provide estimates for jurisdictional waters in the review area (check all that apply):
   - ☐ Tributary waters: linear feet, width (ft).
   - ☐ Other non-wetland waters: acres.
     Identify type(s) of waters: .

4. **Wetlands directly abutting an RPW that flow directly or indirectly into TNWs.**
   - ☐ Wetlands directly abut RPW and thus are jurisdictional as adjacent wetlands.
     - ☐ Wetlands directly abutting an RPW where tributaries typically flow year-round. Provide data and rationale indicating that tributary is perennial in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .

     - ☐ Wetlands directly abutting an RPW where tributaries typically flow "seasonally." Provide data indicating that tributary is seasonal in Section III.B and rationale in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW

   Provide acreage estimates for jurisdictional wetlands in the review area: acres.

5. **Wetlands adjacent to but not directly abutting an RPW that flow directly or indirectly into TNWs.**
   - ☐ Wetlands that do not directly abut an RPW, but when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisidictional. Data supporting this conclusion is provided at Section III.C.

   Provide acreage estimates for jurisdictional wetlands in the review area: acres. :

6. **Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs.**
   - ☐ Wetlands adjacent to such waters, and have when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

   Provide estimates for jurisdictional wetlands in the review area: acres.

7. **Impoundments of jurisdictional waters.[9]**
   As a general rule, the impoundment of a jurisdictional tributary remains jurisdictional.
   - ☐ Demonstrate that impoundment was created from "waters of the U.S.," or
   - ☐ Demonstrate that water meets the criteria for one of the categories presented above (1-6), or
   - ☐ Demonstrate that water is isolated with a nexus to commerce (see E below).

E. ISOLATED [INTERSTATE OR INTRA-STATE] WATERS, INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS (CHECK ALL THAT APPLY):[10]
- ☐ which are or could be used by interstate or foreign travelers for recreational or other purposes.
- ☐ from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.
- ☐ which are or could be used for industrial purposes by industries in interstate commerce.

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[8] See Footnote #3.
[9] To complete the analysis refer to the key in Section III.D.6 of the Instructional Guidebook.
[10] Prior to asserting or declining CWA jurisdiction based solely on this category, Corps Districts will elevate the action to Corps and EPA HQ for review consistent with the process described in the Corps/EPA *Memorandum Regarding CWA Act Jurisdiction Following Rapanos.*

☐ Interstate isolated waters. Explain: .
☐ Other factors. Explain: .

Identify water body and summarize rationale supporting determination:
Provide estimates for jurisdictional waters in the review area (check all that apply):

- ☐ Tributary waters: linear feet, width (ft).
- ☐ Other non-wetland waters: acres.
  Identify type(s) of waters: .
- ☐ Wetlands: acres.

F. NON-JURISDICTIONAL WATERS, INCLUDING WETLANDS (CHECK ALL THAT APPLY):

☒ If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements.
☒ Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce.
- ☒ Prior to the Jan 2001 Supreme Court decision in "*SWANCC*," the review area would have been regulated based solely on the "Migratory Bird Rule" (MBR).

☒ Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction. Explain:

Potentially jurisdictional waters of the U.S. were assessed and delineated within the project survey area (please see Figures 1 through 8 in the JDLR) and determined not to be federally jurisdictional waters under the regulatory purview of the USACE.
Explain: Ephemeral streams present geographic isolation with no hydrological or ecological surface connection to an RPW or TNW. Ephemeral streams occurring within the project survey area abate into the upland landscape (prior to confluence with Ivanpah Dry Lake) or empty into Ivanpah Dry Lake (which is an interstate geographically isolated playa lake). Using the criteria outlined in 33 CFR 328.3 the USACE has previously determined that all aquatic features within the Southern Mojave Watershed [HUC 18100100]), (which includes the project area) exhibit insufficient evidence of interstate commerce to meet the requirements of 33 CFR 328.3(a)(3)(iii) and does not meet the requirements for navigability at 33 CFR 328.3(a)(1). Therefore, the delineated aquatic features occurring within InterConnect Nipton Communications Site project area are not subject to USACE jurisdiction under Section 404 of the Clean Water Act.

Based on the results of the delineation and federal guidance outlined above, this JDLR was prepared to provide support to USACE in making a formal determination of all waters delineated within the project survey area that are determined to be isolated waters and thus not regulated by USACE for the following reasons:

a. There are two previous Approved JDs issued by USACE for geographic isolation of Ivanpah Dry Lake (e.g., a nonfederal jurisdictional water [that were delineated using federal protocol, manuals, and guidance]) for a renewable energy project and an aviation-related project. This Approved JD is based, in part, on these previous two Approve JDs that were conducted for USACE file Nos. SPL-2011-01051-SLP (Stateline Solar Farm Project) (Los Angeles District, North Coast Branch, Los Angeles and San Bernardino Counties Section) and SPK-2004-50472 (Ivanpah Airport Site) (Sacramento District) (please see Attachment D of the JDLR).

b. Abatement into the landscape and the lack of hydrological connectivity of the ephemeral wash(es) (non-Relatively Permanent Waterway [non-RPW]) into an RPW that flows directly or indirectly into a TNW, and the lack of hydrological connectivity of the ephemeral washes into an RPW connected by storm drains or culverts. The ephemeral washes and swales within the project survey area originating within the Clark Mountain Range flow in a southwest-to-northeast orientation and create a confluence with other ephemeral washes, which eventually drain into Ivanpah Dry Lake (an isolated playa lake) approximately 6 miles norththeast of the project survey area (please see Attachment B of the JDLR).

c. Ivanpah Dry Lake, as the terminus for all ephemeral waters within the project survey area, is not a TNW. Ivanpah Dry Lake is not an "(a)(3) water" as defined by 33 CFR 328.3. Ivanpah Dry Lake does not meet criteria (a)(3)(i–iii), as it does not have use for surface water recreation or other purposes by foreign or interstate travelers, does not have harvesting activities of fish or shellfish that may be sold in interstate or foreign commerce, and does not have surface water industrial usage by industries in interstate commerce.

d. Ivanpah Dry Lake is considered an interstate isolated water (33 CFR 328.3 [a][2]), with the majority of its area falling within California. Roughly 5% of the total area of Ivanpah Dry Lake is situated within Nevada. Published recreational uses of Ivanpah Dry Lake are limited to a few non-water-related (no recreational navigation) activities, including camping, archery, kite buggying, and land sailing.

e. All tributaries to Ivanpah Dry Lake as part of the overall watershed system are also isolated and additionally have no nexus to commerce. Thus, the Ivanpah-Pahrump Valleys Watershed (HUC: 16060015) is an isolated watershed system that has no surface water connection to commerce. Based on the information above, USACE concludes that all tributaries to Ivanpah Lake are nonjurisdicitonal waters of the U.S., since the waters are NOT tributary to either a TNW or an (a)(3) water, and are not (a)(3) waters themselves.

f. Lack of an ecological connection to TNWs. The ephemeral washes occurring within the project survey area present low to no potential or capacity to transfer nutrients and organic carbon (vital to support downstream foodwebs [e.g., macroinvertebrates] present in headwater streams or to convert carbon in leaf litter, making it available to species downstream), nor does this ephemeral wash present habitat services such as providing spawning areas for recreationally or commercially important species in downstream waters.

g. The lack of hydrological connectivity (presenting an SNX to any TNW) for the ephemeral wash occurring within the project survey area and the evaluation of the ephemeral wash not presenting an SNX to a TNW includes the volume, duration, and frequency of the flow of water to a TNW.

h. Examination of the flow characteristics and functions of the ephemeral wash (which do not support adjacent wetlands) has been determined not to present a significant effect on the chemical, physical, or biological integrity of downstream TNWs.

i. Selected ephemeral washes delineated within the project survey area become both continuous and discontinuous swale features and abate into the landscape and prior to a confluence with a non-RPW.

☐ Other: (explain, if not covered above):

Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (i.e., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment (check all that apply):

☒ Non-wetland waters (i.e., rivers, streams: 0.1 acre (466 linear feet [8-14 feet wide])
☐ Lakes/ponds: acres.
☐ Other non-wetland waters: acres. List type of aquatic resource: .
☐ Wetlands:

Provide acreage estimates for non-jurisdictional waters in the review area that do not meet the “Significant Nexus” standard, where such a finding is required for jurisdiction (check all that apply):

☒ Non-wetland waters (i.e., rivers, streams): 0.1 acre (466 linear feet [8-14 feet wide])
☐ Lakes/ponds: acres.
☐Other non-wetland waters:
List type of aquatic resource:

SECTION IV: DATA SOURCES

A. SUPPORTING DATA. Data reviewed for JD (check all that apply - checked items shall be included in case file and, where checked and requested, appropriately reference sources below):

☒ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant: Refer to the Jurisdictional Delineation Letter Report (JDLR).
☐ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
  ☐ Office concurs with data sheets/delineation report.
  ☐ Office does not concur with data sheets/delineation report.
☐ Data sheets prepared by the Corps: .
☐ Corps navigable waters’ study: .
☐ U.S. Geological Survey Hydrologic Atlas: .
  ☒ USGS NHD data.
  ☒ USGS 8 and 12 digit HUC maps.
☒ U.S. Geological Survey map(s). Cite scale & quad name: Mineral Hill (1983) and Ivanpah Lake (1985) USGS 7.5-Minute Quadrangles.

☐ USDA Natural Resources Conservation Service Soil Survey. Citation: Not complete survey (utilized SSURGO/STATSGO)
☒ National wetlands inventory map(s). Cite name: N/A.
☐ State/Local wetland inventory map(s): .
☐ FEMA/FIRM maps:
☐ 100-year Floodplain Elevation is: (National Geodectic Vertical Datum of 1929)
☒ Photographs: ☒ Aerial (Name & Date): USDA NAIP 2011.
  or ☒ Other (Name & Date): Please see Figure 8 and Attachment B of the JDLR (field photographs and path of abatement/isolation into Cadiz Dry Lake)

☒ Previous determination(s). Please see Attachment D in the JDLR (File no. and date of response letters: Corps File Nos:

1. SPL-2011-01051-SLP October 30, 2012 (Stateline Solar Farm Project) (Los Angeles District, North Coast Branch, Los Angeles and San Bernardino Counties Section)
2. SPK-2004-50472 August 11, 2011 (Ivanpah Airport Site) (Sacramento District)

☐ Applicable/supporting case law: .
☐ Applicable/supporting scientific literature: .
  ☒ Other information (please specify): Refer to ‘Waters Upload Sheet’ provided on page 9 of this form and Attachment E (electronic Waters Upload Sheet).

B. ADDITIONAL COMMENTS TO SUPPORT JD: Please see the JDLR and Attachments A, B, and D of the JDLR.

WATERS UPLOAD SHEET FOR ISOLATED EPHEMERAL WASHES OCCURRING AT THE INTERCONNECT NIPTON COMMUNICATIONS SITE PROJECT

Waters Name (numbered from south to north (see figure 7 in JDLR)	Cowardin Code	HGM Code	Measurement Type (acres)	Measurement Type (linear feet)	Waters Types	Latitude	Longitude	Local Waterway
1	R6	Riverine	0.1	448	Isolated	35.4742927	-115.4513563	Ivanpah Dry Lake
2	R6	Riverine	T[a]	18	Isolated	35.47364772	-115.4513344	Ivanpah Dry Lake
TOTAL			0.1	466				

[a]T=≤ 25 square feet.

AECOM (2013)

ATTACHMENT D

USACE-ISSUED APPROVED JD FORMS FOR GEOGRAPHIC ISOLATION OF IVANPAH DRY LAKE

APPROVED JURISDICTIONAL DETERMINATION FORM
U.S. Army Corps of Engineers

This form should be completed by following the instructions provided in Section IV of the JD Form Instructional Guidebook.

SECTION I: BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD): August 11, 2009

B. DISTRICT OFFICE, FILE NAME, AND NUMBER: Sacramento District, IVANPAH AIRPORT SITE Ivanpah Lake Playa, SPK-2004-50472

C. PROJECT LOCATION AND BACKGROUND INFORMATION:

State: **Nevada** County/parish/borough: **Clark** City: **Primm**
Center coordinates of site (lat/long in degree decimal format): Lat. **35.67°** N, Long. **-115.35° W**
Universal Transverse Mercator: **11 649155.01 3948632.11**
Name of nearest waterbody: **Ivanpah Lake**
Name of nearest Traditional Navigable Water (TNW) into which the aquatic resource flows: **Ivanpah Lake**
Name of watershed or Hydrologic Unit Code (HUC): **Ivanpah-Pahrump Valleys. California, Nevada, 16060015**

X Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.
X Check if other sites (e.g., offsite mitigation sites, disposal sites, etc…) are associated with this action and are recorded on a different JD form. **Those sites that are located entirely in the state of Nevada and flow into Roach Lake are recorded on a separate JD Form.**

D. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):

X Office (Desk) Determination. Date: August 11, 2009
X Field Determination. Date(s): June 17, 2009

SECTION II: SUMMARY OF FINDINGS

A. RHA SECTION 10 DETERMINATION OF JURISDICTION.

There **no** "*navigable waters of the U.S.*" within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area. [*Required*]

☐ Waters subject to the ebb and flow of the tide.
☐ Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. Explain:

B. CWA SECTION 404 DETERMINATION OF JURISDICTION.

There **are** "*waters of the U.S.*" within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area. [*Required*]

1. **Waters of the U.S.**
   a. **Indicate presence of waters of U.S. in review area (check all that apply):** [1]
      ☐ TNWs, including territorial seas
      ☐ Wetlands adjacent to TNWs
      ☐ Relatively permanent waters[2] (RPWs) that flow directly or indirectly into TNWs
      ☐ Non-RPWs that flow directly or indirectly into TNWs
      ☐ Wetlands directly abutting RPWs that flow directly or indirectly into TNWs
      ☐ Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs
      ☐ Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
      ☐ Impoundments of jurisdictional waters
      X Isolated (interstate or intrastate) waters, including isolated wetlands

   b. **Identify (estimate) size of waters of the U.S. in the review area:**
      Non-wetland waters: linear feet: width (ft) and/or **3.63** acres.
      Wetlands: acres.

   c. **Limits (boundaries) of jurisdiction** based on: **OHWM**
      Elevation of established OHWM (if known): .

2. **Non-regulated waters/wetlands (check if applicable):**[3]
   ☐ Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional. Explain: .

SECTION III: CWA ANALYSIS

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[1] Boxes checked below shall be supported by completing the appropriate sections in Section III below.
[2] For purposes of this form, an RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).
[3] Supporting documentation is presented in Section III.F.

E. ISOLATED [INTERSTATE OR INTRA-STATE] WATERS, INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS (CHECK ALL THAT APPLY):[4]

☐ which are or could be used by interstate or foreign travelers for recreational or other purposes.
☐ from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.
☐ which are or could be used for industrial purposes by industries in interstate commerce.
X Interstate isolated waters. Explain: **The aquatic resources associated with this Jurisdictional Determination cross the Nevada/California border and flow into Ivanpah Lake. Ivanpah Lake is an interstate isolated water (33 CFR 328.3 (a)(2)), with the majority of its area falling within the State of California. Roughly 5% of the total area of Ivanpah dry lake is situated within Nevada. Published recreational uses of Ivanpah dry lake are limited to a few non-water (no recreational navigation) related activities, including camping, archery, kite buggying and land sailing.**

Based on 33 CFR 328.3 (a)(2), which includes definitions of jurisdictional waters, the drainages associated with Ivanpah Lake that cross from Nevada into California would be regulated as interstate waters.

☐ Other factors. Explain: .

Identify water body and summarize rationale supporting determination: These drainages are ephemeral waterways that drain from Nevada into California and ultimately create Ivanpah Lake, an isolated interstate Playa Lake.

Provide estimates for jurisdictional waters in the review area (check all that apply):
X Tributary waters: linear feet width (ft).
X Other non-wetland waters:**3.63** acres.
Identify type(s) of waters: **.**
☐ Wetlands: acres.

F. NON-JURISDICTIONAL WATERS, INCLUDING WETLANDS (CHECK ALL THAT APPLY):

☐ If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements.
☐ Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce.
☐ Prior to the Jan 2001 Supreme Court decision in "*SWANCC*," the review area would have been regulated based solely on the "Migratory Bird Rule" (MBR).
☐ Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction. Explain: **.**
☐ Other: (explain, if not covered above): **.**

Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (i.e., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment (check all that apply):
☐ Non-wetland waters (i.e., rivers, streams): linear feet width (ft).
☐ Lakes/ponds: acres.
☐ Other non-wetland waters: acres. List type of aquatic resource: .
☐ Wetlands: acres.

Provide acreage estimates for non-jurisdictional waters in the review area that do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction (check all that apply):
☐ Non-wetland waters (i.e., rivers, streams): linear feet, width (ft).
☐ Lakes/ponds: acres.
☐ Other non-wetland waters: acres. List type of aquatic resource: .
☐ Wetlands: acres.

SECTION IV: DATA SOURCES.

A. SUPPORTING DATA. Data reviewed for JD (check all that apply - checked items shall be included in case file and, where checked and requested, appropriately reference sources below):
X Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant: .
X Data sheets prepared/submitted by or on behalf of the applicant/consultant.
X Office concurs with data sheets/delineation report.
☐ Office does not concur with data sheets/delineation report.
☐ Data sheets prepared by the Corps: .
☐ Corps navigable waters' study: .
☐ U.S. Geological Survey Hydrologic Atlas: .

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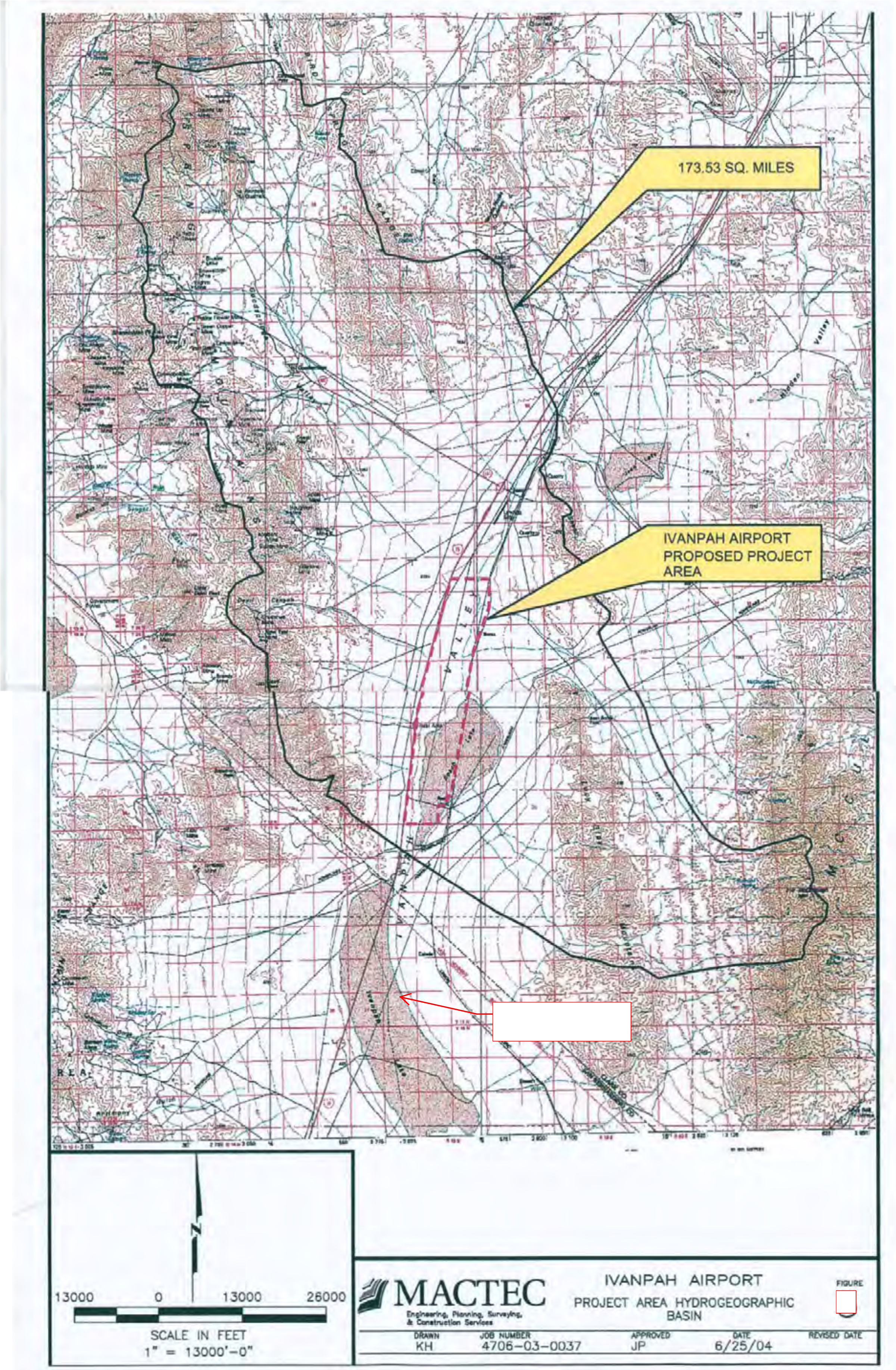
[4] Prior to asserting or declining CWA jurisdiction based solely on this category, Corps Districts will elevate the action to Corps and EPA HQ for review consistent with the process described in the Corps/EPA *Memorandum Regarding CWA Act Jurisdiction Following Rapanos.*

☐ USGS NHD data.
☐ USGS 8 and 12 digit HUC maps.
X U.S. Geological Survey map(s). Cite scale & quad name: **1:24K; NV-ROACH**
☐ USDA Natural Resources Conservation Service Soil Survey. Citation: .
☐ National wetlands inventory map(s). Cite name: .
☐ State/Local wetland inventory map(s): .
☐ FEMA/FIRM maps: .
☐ 100-year Floodplain Elevation is: (National Geodectic Vertical Datum of 1929)
X Photographs: X Aerial (Name & Date): .
or ☐ Other (Name & Date): .
X Previous determination(s). File no. and date of response letter: **SPL-2006-00921** (April 4, 2006), SPL-2007-00415 (Ivanpah Valley Solar Energy Project – May 15, 2009).
☐ Applicable/supporting case law: .
☐ Applicable/supporting scientific literature: .
☐ Other information (please specify): .

B. ADDITIONAL COMMENTS TO SUPPORT JD:
Ivanpah dry lake is NOT a TNW or an (a)(3) water. Ivanpah lake is an interstate ((a)(2)) water, with the majority of its area falling within the California state border. Roughly 5% of the total area of Ivanpah dry lake is situated within Nevada. Currently, there are no known or published recreational uses. Published recreational uses of Ivanpah dry lake are limited to a few non-water (no recreational navigation) related activities, including camping, archery, kite buggying and land sailing.

Based on 33 CFR 328.3 (a)(2), which includes definitions of jurisdictional waters, the drainages associated with Ivanpah Lake that cross from Nevada into California would be regulated as interstate waters.

Regulatory Action Type		Size	Cowardin	HGM	Local Waterway
Wetland #		Acres			
SPK-2004-50472(52)	(ISOLATE)	0.29	R4SB2	RIVERINE	Ivanpah Lake
SPK-2004-50472(53)	(ISOLATE)	0.34	R4SB3	RIVERINE	Ivanpah Lake
SPK-2004-50472(54)	(ISOLATE)	1.36	R4SB4	RIVERINE	Ivanpah Lake
SPK-2004-50472(55)	(ISOLATE)	0.46	R4SB5	RIVERINE	Ivanpah Lake
SPK-2004-50472(56)	(ISOLATE)	0.83	R4SB6	RIVERINE	Ivanpah Lake
SPK-2004-50472(57)	(ISOLATE)	0.24	R4SB7	RIVERINE	Ivanpah Lake
SPK-2004-50472(58)	(ISOLATE)	0.1	R4SB8	RIVERINE	Ivanpah Lake
SPK-2004-50472(59)	(ISOLATE)	0.008	R4SB9	RIVERINE	Ivanpah Lake
	Total	3.628			



173.53 SQ. MILES
IVANPAH AIRPORT
PROPOSED PROJECT
AREA
13000
0
13000
26000
SCALE IN FEET
1" = 13000'-0"
MACTEC
Engineering, Planning, Surveying, & Construction Services
IVANPAH AIRPORT
PROJECT AREA HYDROGEOGRAPHIC
BASIN
FIGURE
DRAWN
KH
JOB NUMBER
4706-03-0037
APPROVED
JP
DATE
6/25/04
REVISED DATE

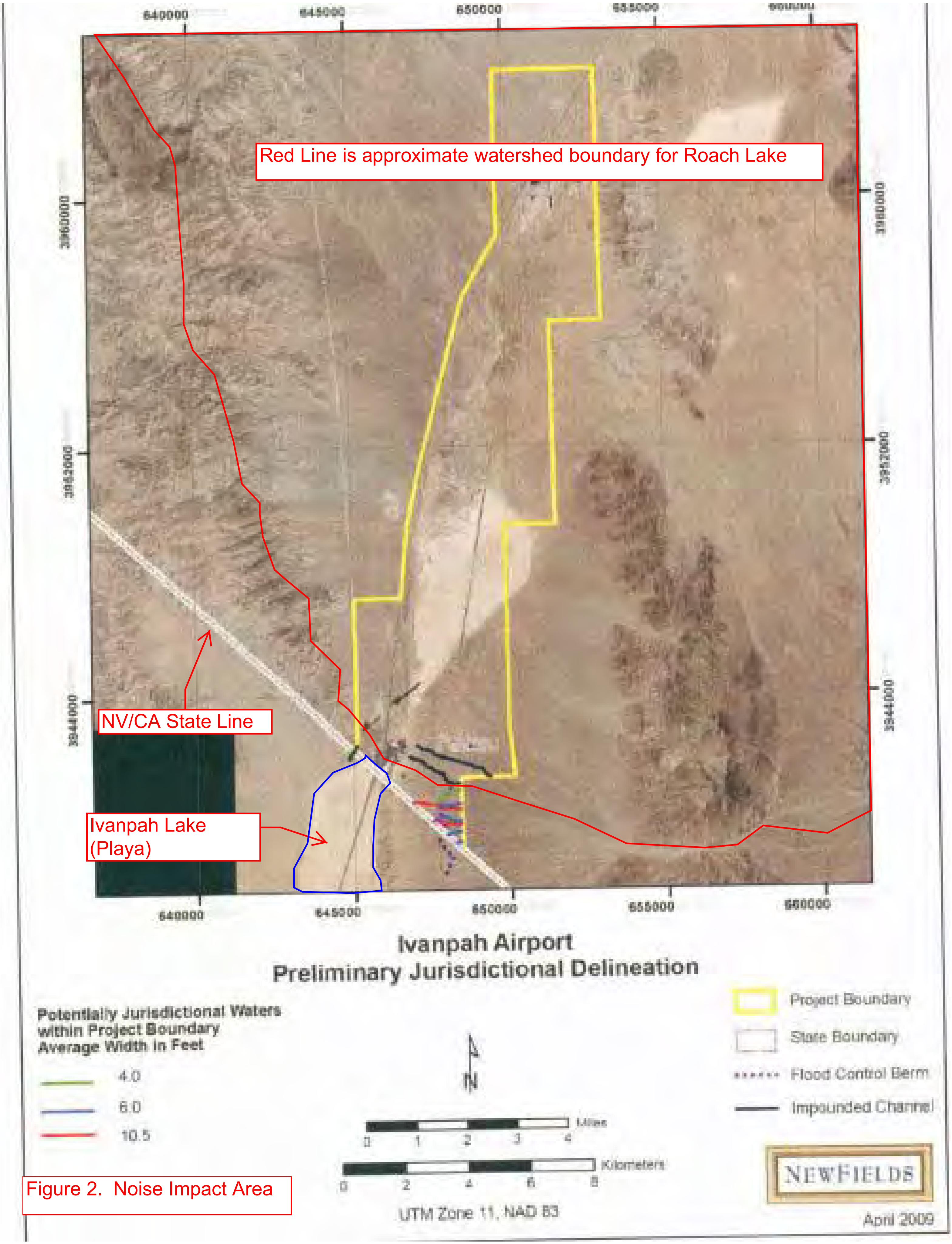


Figure 2. Noise Impact Area

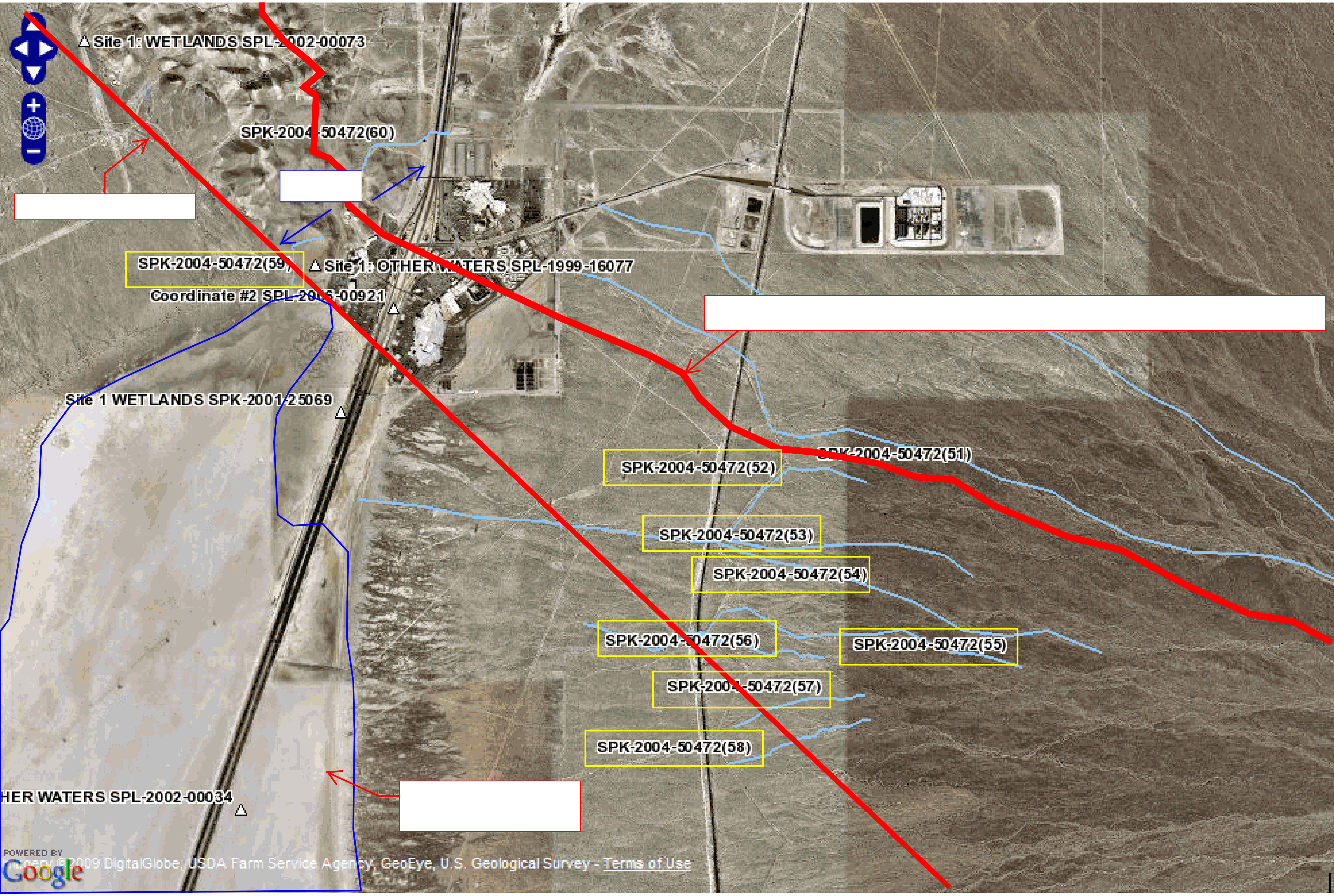


Figure 3: Drainages in NCA - closeup

APPROVED JURISDICTIONAL DETERMINATION FORM
U.S. Army Corps of Engineers

This form should be completed by following the instructions provided in Section IV of the JD Form Instructional Guidebook.

SECTION I: BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD): October 30, 2012

B. DISTRICT OFFICE, FILE NAME, AND NUMBER: Los Angeles District, Stateline Solar Farm Project, SPL-2011-01051-SLP, JD-1

C. PROJECT LOCATION AND BACKGROUND INFORMATION:

State: California County/parish/borough: San Bernardino County City: unincorpoated area southwest of Primm, NV
Center coordinates of site (lat/long in degree decimal format): Lat. 35.589058° N, Long. -115.438892° W.
Universal Transverse Mercator:
Name of nearest waterbody: Ivanpah Lake
Name of nearest Traditional Navigable Water (TNW) into which the aquatic resource flows: N/A
Name of watershed or Hydrologic Unit Code (HUC): South Lahontan watershed, Ivanpah Hydrologic Unit

☒ Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.
☐ Check if other sites (e.g., offsite mitigation sites, disposal sites, etc…) are associated with this action and are recorded on a different JD form.

D. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):

☒ Office (Desk) Determination. Date: June 7, 2012
☐ Field Determination. Date(s):

SECTION II: SUMMARY OF FINDINGS

A. RHA SECTION 10 DETERMINATION OF JURISDICTION.

There **Are no** "*navigable waters of the U.S.*" within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area. [*Required*]

☐ Waters subject to the ebb and flow of the tide.
☐ Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. Explain: .

B. CWA SECTION 404 DETERMINATION OF JURISDICTION.

There **Are no** "*waters of the U.S.*" within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area. [*Required*]

1. **Waters of the U.S.**
   a. **Indicate presence of waters of U.S. in review area (check all that apply):** [1]
      ☐ TNWs, including territorial seas
      ☐ Wetlands adjacent to TNWs
      ☐ Relatively permanent waters[2] (RPWs) that flow directly or indirectly into TNWs
      ☐ Non-RPWs that flow directly or indirectly into TNWs
      ☐ Wetlands directly abutting RPWs that flow directly or indirectly into TNWs
      ☐ Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs
      ☐ Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
      ☐ Impoundments of jurisdictional waters
      ☐ Isolated (interstate or intrastate) waters, including isolated wetlands

   b. **Identify (estimate) size of waters of the U.S. in the review area:**
      Non-wetland waters: linear feet: width (ft) and/or acres.
      Wetlands: acres.

   c. **Limits (boundaries) of jurisdiction** based on: **Pick List**
      Elevation of established OHWM (if known): .

2. **Non-regulated waters/wetlands (check if applicable):**[3]
   ☒ Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional. Explain: **These roughly 434 acres of non-RPW waters have been defined as ephemeral washes, situated within the 5,886-acre project area. Based on the number and acreage of non-RPWs previously delineated in the adjacent Ivanpah Solar Energy Project area footprint, the acreage of non-RPW waters within the Stateline Solar Farm Project may approximately equate to a dense network of 10,188 discontinuous ephemeral drainage segments. The Clark Mountains**

[1] Boxes checked below shall be supported by completing the appropriate sections in Section III below.
[2] For purposes of this form, an RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).
[3] Supporting documentation is presented in Section III.F.

and the Ivanpah Range are situated northwest and west, respectively, of both the non-RPWs and Ivanpah dry lake. The project footprint of this solar project is also situated immediately east of the existing Ivanpah Solar Energy Project, as well as immediately west of Ivanpah dry lake. These non-RPWs are situated within a large alluvial fan, where any surface flows within the area would travel west to east, for an approximate distance of 0.11 to 2.07-miles from the project area extents to reach Ivanpah dry lake. The predominant soil type is Arizona loamy sand, which is characterized by high rates of permeability with resultant surface runoff ranging from negligible to medium flows. These non-RPWs generally dissipate into smaller braided channels as they progress toward Ivanpah dry lake. Nonetheless, based on examination of aerial photographs, there is a high likelihood that these non-RPWs generally have both physical surface channel connectivity and hydrologic connectivity with Ivanpah lake.

The area on average receives 4.5-inches of precipitation, with a majority of the rainfall occurring October through April. Ivanpah dry lake is the terminus for these designated non-RPW waters, as well as for all other non-RPWs within the Ivanpah Valley groundwater basin. Ivanpah dry lake is NOT a TNW or an (a)(3) water. Ivanpah lake is an interstate ((a)(2)) water, with the majority of its area falling within the California state border. Roughly 5% of the total area of Ivanpah dry lake is situated within Nevada.

Currently, there are no known or published recreational uses of these designated non-RPW waters. Published recreational uses of Ivanpah dry lake are limited to a few non-water (no recreational navigation) related activities, including camping, archery, kite buggying and land sailing..

SECTION III: CWA ANALYSIS

A. TNWs AND WETLANDS ADJACENT TO TNWs

The agencies will assert jurisdiction over TNWs and wetlands adjacent to TNWs. If the aquatic resource is a TNW, complete Section III.A.1 and Section III.D.1. only; if the aquatic resource is a wetland adjacent to a TNW, complete Sections III.A.1 and 2 and Section III.D.1.; otherwise, see Section III.B below.

1. TNW
Identify TNW: .

Summarize rationale supporting determination: .

2. Wetland adjacent to TNW
Summarize rationale supporting conclusion that wetland is "adjacent": .

B. CHARACTERISTICS OF TRIBUTARY (THAT IS NOT A TNW) AND ITS ADJACENT WETLANDS (IF ANY):

This section summarizes information regarding characteristics of the tributary and its adjacent wetlands, if any, and it helps determine whether or not the standards for jurisdiction established under *Rapanos* have been met.

The agencies will assert jurisdiction over non-navigable tributaries of TNWs where the tributaries are "relatively permanent waters" (RPWs), i.e. tributaries that typically flow year-round or have continuous flow at least seasonally (e.g., typically 3 months). A wetland that directly abuts an RPW is also jurisdictional. If the aquatic resource is not a TNW, but has year-round (perennial) flow, skip to Section III.D.2. If the aquatic resource is a wetland directly abutting a tributary with perennial flow, skip to Section III.D.4.

A wetland that is adjacent to but that does not directly abut an RPW requires a significant nexus evaluation. Corps districts and EPA regions will include in the record any available information that documents the existence of a significant nexus between a relatively permanent tributary that is not perennial (and its adjacent wetlands if any) and a traditional navigable water, even though a significant nexus finding is not required as a matter of law.

If the waterbody[4] is not an RPW, or a wetland directly abutting an RPW, a JD will require additional data to determine if the waterbody has a significant nexus with a TNW. If the tributary has adjacent wetlands, the significant nexus evaluation must consider the tributary in combination with all of its adjacent wetlands. This significant nexus evaluation that combines, for analytical purposes, the tributary and all of its adjacent wetlands is used whether the review area identified in the JD request is the tributary, or its adjacent wetlands, or both. If the JD covers a tributary with adjacent wetlands, complete Section III.B.1 for the tributary, Section III.B.2 for any onsite wetlands, and Section III.B.3 for all wetlands adjacent to that tributary, both onsite and offsite. The determination whether a significant nexus exists is determined in Section III.C below.

1. Characteristics of non-TNWs that flow directly or indirectly into TNW

(i) General Area Conditions:
Watershed size: **Pick List**
Drainage area: **Pick List**
Average annual rainfall: inches
Average annual snowfall: inches

(ii) Physical Characteristics:
(a) Relationship with TNW:
☐ Tributary flows directly into TNW.
☐ Tributary flows through **Pick List** tributaries before entering TNW.

Project waters are **Pick List** river miles from TNW.
Project waters are **Pick List** river miles from RPW.
Project waters are **Pick List** aerial (straight) miles from TNW.
Project waters are **Pick List** aerial (straight) miles from RPW.
Project waters cross or serve as state boundaries. Explain: .

Identify flow route to TNW[5]: .
Tributary stream order, if known: .

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[4] Note that the Instructional Guidebook contains additional information regarding swales, ditches, washes, and erosional features generally and in the arid West.
[5] Flow route can be described by identifying, e.g., tributary a, which flows through the review area, to flow into tributary b, which then flows into TNW.

(b) General Tributary Characteristics (check all that apply):

Tributary is: ☐ Natural
☐ Artificial (man-made). Explain: .
☐ Manipulated (man-altered). Explain: .

Tributary properties with respect to top of bank (estimate):
Average width: feet
Average depth: feet
Average side slopes: **Pick List.**

Primary tributary substrate composition (check all that apply):
☐ Silts ☐ Sands ☐ Concrete
☐ Cobbles ☐ Gravel ☐ Muck
☐ Bedrock ☐ Vegetation. Type/% cover:
☐ Other. Explain: .

Tributary condition/stability [e.g., highly eroding, sloughing banks]. Explain: .
Presence of run/riffle/pool complexes. Explain: .
Tributary geometry: **Pick List**
Tributary gradient (approximate average slope): %

(c) Flow:
Tributary provides for: **Pick List**
Estimate average number of flow events in review area/year: **Pick List**
Describe flow regime: .
Other information on duration and volume: .

Surface flow is: **Pick List.** Characteristics: .

Subsurface flow: **Pick List**. Explain findings: .
☐ Dye (or other) test performed: .

Tributary has (check all that apply):
☐ Bed and banks
☐ OHWM[6] (check all indicators that apply):
☐ clear, natural line impressed on the bank ☐ the presence of litter and debris
☐ changes in the character of soil ☐ destruction of terrestrial vegetation
☐ shelving ☐ the presence of wrack line
☐ vegetation matted down, bent, or absent ☐ sediment sorting
☐ leaf litter disturbed or washed away ☐ scour
☐ sediment deposition ☐ multiple observed or predicted flow events
☐ water staining ☐ abrupt change in plant community
☐ other (list):
☐ Discontinuous OHWM.[7] Explain: .

If factors other than the OHWM were used to determine lateral extent of CWA jurisdiction (check all that apply):
☐ High Tide Line indicated by: ☐ Mean High Water Mark indicated by:
☐ oil or scum line along shore objects ☐ survey to available datum;
☐ fine shell or debris deposits (foreshore) ☐ physical markings;
☐ physical markings/characteristics ☐ vegetation lines/changes in vegetation types.
☐ tidal gauges
☐ other (list):

(iii) Chemical Characteristics:
Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.).
Explain: .
Identify specific pollutants, if known: .

[6]A natural or man-made discontinuity in the OHWM does not necessarily sever jurisdiction (e.g., where the stream temporarily flows underground, or where the OHWM has been removed by development or agricultural practices). Where there is a break in the OHWM that is unrelated to the waterbody's flow regime (e.g., flow over a rock outcrop or through a culvert), the agencies will look for indicators of flow above and below the break.
[7]Ibid.

(iv) Biological Characteristics. Channel supports (check all that apply):

- ☐ Riparian corridor. Characteristics (type, average width): .
- ☐ Wetland fringe. Characteristics: .
- ☐ Habitat for:
  - ☐ Federally Listed species. Explain findings: .
  - ☐ Fish/spawn areas. Explain findings: .
  - ☐ Other environmentally-sensitive species. Explain findings: .
  - ☐ Aquatic/wildlife diversity. Explain findings: .

2. Characteristics of wetlands adjacent to non-TNW that flow directly or indirectly into TNW

(i) Physical Characteristics:

(a) General Wetland Characteristics:

Properties:

Wetland size: acres

Wetland type. Explain: .

Wetland quality. Explain: .

Project wetlands cross or serve as state boundaries. Explain: .

(b) General Flow Relationship with Non-TNW:

Flow is: **Pick List**. Explain: .

Surface flow is**: Pick List**

Characteristics: .

Subsurface flow: **Pick List**. Explain findings: .

☐ Dye (or other) test performed: .

(c) Wetland Adjacency Determination with Non-TNW:

- ☐ Directly abutting
- ☐ Not directly abutting
  - ☐ Discrete wetland hydrologic connection. Explain: .
  - ☐ Ecological connection. Explain: .
  - ☐ Separated by berm/barrier. Explain: .

(d) Proximity (Relationship) to TNW

Project wetlands are **Pick List** river miles from TNW.

Project waters are **Pick List** aerial (straight) miles from TNW.

Flow is from: **Pick List.**

Estimate approximate location of wetland as within the **Pick List** floodplain.

(ii) Chemical Characteristics:

Characterize wetland system (e.g., water color is clear, brown, oil film on surface; water quality; general watershed characteristics; etc.). Explain: .

Identify specific pollutants, if known: .

(iii) Biological Characteristics. Wetland supports (check all that apply):

- ☐ Riparian buffer. Characteristics (type, average width): .
- ☐ Vegetation type/percent cover. Explain: .
- ☐ Habitat for:
  - ☐ Federally Listed species. Explain findings: .
  - ☐ Fish/spawn areas. Explain findings: .
  - ☐ Other environmentally-sensitive species. Explain findings: .
  - ☐ Aquatic/wildlife diversity. Explain findings: .

3. Characteristics of all wetlands adjacent to the tributary (if any)

All wetland(s) being considered in the cumulative analysis: **Pick List**

Approximately ( ) acres in total are being considered in the cumulative analysis.

For each wetland, specify the following:

Directly abuts? (Y/N)	Size (in acres)	Directly abuts? (Y/N)	Size (in acres)

Summarize overall biological, chemical and physical functions being performed: .

C. SIGNIFICANT NEXUS DETERMINATION

A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of a TNW. For each of the following situations, a significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW. Considerations when evaluating significant nexus include, but are not limited to the volume, duration, and frequency of the flow of water in the tributary and its proximity to a TNW, and the functions performed by the tributary and all its adjacent wetlands. It is not appropriate to determine significant nexus based solely on any specific threshold of distance (e.g. between a tributary and its adjacent wetland or between a tributary and the TNW). Similarly, the fact an adjacent wetland lies within or outside of a floodplain is not solely determinative of significant nexus.

Draw connections between the features documented and the effects on the TNW, as identified in the *Rapanos* Guidance and discussed in the Instructional Guidebook. Factors to consider include, for example:

- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to carry pollutants or flood waters to TNWs, or to reduce the amount of pollutants or flood waters reaching a TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), provide habitat and lifecycle support functions for fish and other species, such as feeding, nesting, spawning, or rearing young for species that are present in the TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to transfer nutrients and organic carbon that support downstream foodwebs?
- Does the tributary, in combination with its adjacent wetlands (if any), have other relationships to the physical, chemical, or biological integrity of the TNW?

Note: the above list of considerations is not inclusive and other functions observed or known to occur should be documented below:

1. **Significant nexus findings for non-RPW that has no adjacent wetlands and flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary itself, then go to Section III.D: .

2. **Significant nexus findings for non-RPW and its adjacent wetlands, where the non-RPW flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: .

3. **Significant nexus findings for wetlands adjacent to an RPW but that do not directly abut the RPW.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: .

D. DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE (CHECK ALL THAT APPLY):

1. **TNWs and Adjacent Wetlands.** Check all that apply and provide size estimates in review area:
   - ☐ TNWs: linear feet width (ft), Or, acres.
   - ☐ Wetlands adjacent to TNWs: acres.

2. **RPWs that flow directly or indirectly into TNWs.**
   - ☐ Tributaries of TNWs where tributaries typically flow year-round are jurisdictional. Provide data and rationale indicating that tributary is perennial: .
   - ☐ Tributaries of TNW where tributaries have continuous flow "seasonally" (e.g., typically three months each year) are jurisdictional. Data supporting this conclusion is provided at Section III.B. Provide rationale indicating that tributary flows seasonally: .

Provide estimates for jurisdictional waters in the review area (check all that apply):
☐ Tributary waters: linear feet width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: .

3. **Non-RPWs[8] that flow directly or indirectly into TNWs.**
☐ Waterbody that is not a TNW or an RPW, but flows directly or indirectly into a TNW, and it has a significant nexus with a TNW is jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional waters within the review area (check all that apply):
☐ Tributary waters: linear feet width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: **.**

4. **Wetlands directly abutting an RPW that flow directly or indirectly into TNWs.**
☐ Wetlands directly abut RPW and thus are jurisdictional as adjacent wetlands.
☐ Wetlands directly abutting an RPW where tributaries typically flow year-round. Provide data and rationale indicating that tributary is perennial in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: **.**

☐ Wetlands directly abutting an RPW where tributaries typically flow "seasonally." Provide data indicating that tributary is seasonal in Section III.B and rationale in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .

Provide acreage estimates for jurisdictional wetlands in the review area: acres.

5. **Wetlands adjacent to but not directly abutting an RPW that flow directly or indirectly into TNWs.**
☐ Wetlands that do not directly abut an RPW, but when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisidictional. Data supporting this conclusion is provided at Section III.C.

Provide acreage estimates for jurisdictional wetlands in the review area: acres.

6. **Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs.**
☐ Wetlands adjacent to such waters, and have when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional wetlands in the review area: acres.

7. **Impoundments of jurisdictional waters.[9]**
As a general rule, the impoundment of a jurisdictional tributary remains jurisdictional.
☐ Demonstrate that impoundment was created from "waters of the U.S.," or
☐ Demonstrate that water meets the criteria for one of the categories presented above (1-6), or
☐ Demonstrate that water is isolated with a nexus to commerce (see E below).

E. ISOLATED [INTERSTATE OR INTRA-STATE] WATERS, INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS (CHECK ALL THAT APPLY):[10]
☐ which are or could be used by interstate or foreign travelers for recreational or other purposes.
☐ from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.
☐ which are or could be used for industrial purposes by industries in interstate commerce.
☐ Interstate isolated waters. Explain: .
☐ Other factors. Explain: .

Identify water body and summarize rationale supporting determination: .

---

[8]See Footnote # 3.
[9] To complete the analysis refer to the key in Section III.D.6 of the Instructional Guidebook.
[10] Prior to asserting or declining CWA jurisdiction based solely on this category, Corps Districts will elevate the action to Corps and EPA HQ for review consistent with the process described in the Corps/EPA *Memorandum Regarding CWA Act Jurisdiction Following Rapanos.*

Provide estimates for jurisdictional waters in the review area (check all that apply):
☐ Tributary waters: linear feet width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: .
☐ Wetlands: acres.

F. NON-JURISDICTIONAL WATERS, INCLUDING WETLANDS (CHECK ALL THAT APPLY):
☐ If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements.
☒ Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce.
☐ Prior to the Jan 2001 Supreme Court decision in "*SWANCC*," the review area would have been regulated based solely on the "Migratory Bird Rule" (MBR).
☐ Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction. Explain: .
☐ Other: (explain, if not covered above): .

Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (i.e., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment (check all that apply):
☐ Non-wetland waters (i.e., rivers, streams): linear feet width (ft).
Lakes/ponds: acres.
Other non-wetland waters: acres. List type of aquatic resource: .
Wetlands: acres.

Provide acreage estimates for non-jurisdictional waters in the review area that do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction (check all that apply):
☐ Non-wetland waters (i.e., rivers, streams): linear feet, width (ft).
☐ Lakes/ponds: acres.
☐ Other non-wetland waters: acres. List type of aquatic resource: .
☐ Wetlands: acres.

SECTION IV: DATA SOURCES.

A. SUPPORTING DATA. Data reviewed for JD (check all that apply - checked items shall be included in case file and, where checked and requested, appropriately reference sources below):
☒ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant:"Jurisdictional Delineatino of U.S. Army Coprs of Engineers and California Department of Fish and Game Jurisdiction: First Solar, Stateline Solar Farm Project", dated October 2011, prepared by LSA Associates, Inc..
☐ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
☐ Office concurs with data sheets/delineation report.
☐ Office does not concur with data sheets/delineation report.
☐ Data sheets prepared by the Corps: .
☐ Corps navigable waters' study: .
☐ U.S. Geological Survey Hydrologic Atlas: .
☐ USGS NHD data.
☐ USGS 8 and 12 digit HUC maps.
☐ U.S. Geological Survey map(s). Cite scale & quad name: .
☐ USDA Natural Resources Conservation Service Soil Survey. Citation: .
☐ National wetlands inventory map(s). Cite name: .
☐ State/Local wetland inventory map(s): .
☐ FEMA/FIRM maps: .
☐ 100-year Floodplain Elevation is: (National Geodectic Vertical Datum of 1929)
☒ Photographs: ☒ Aerial (Name & Date): .
or ☒ Other (Name & Date): .
☒ Previous determination(s). File no. and date of response letter:SPL-2007-415-SLP, March 27, 2009; SPL-2009-00776-SLP, November 30, 2009.
☐ Applicable/supporting case law: .
☐ Applicable/supporting scientific literature: .
☒ Other information (please specify):CA Groundwater Bulletin #118: Ivanpah Valley Groundwater Basin; BLM Ivanpah Dry Lake information (http://www.blm.gov/ca/st/en/fo/needles/ivanpah.html); BLM Stipulations for Ivanpah Dry Lake FY 2008; National Parks Conservation Association, "Variety and Adventure in the California Desert: A Guide to Responsible Recreation"; CH2M HILL 2007 Wetland Delineation (Revised 2008); LSA Associates additional information letter dated April 20, 2012.

B. ADDITIONAL COMMENTS TO SUPPORT JD: These project non-RPWs convey flows only in response to major storm events. The predominant soil type is Arizona loamy sand, which is characterized by high rates of permeability with resultant surface runoff ranging from negligible to medium flows. These non-RPWs generally dissipate into smaller braided channels as they progress toward Ivanpah dry lake. Nonetheless, based on examination of aerial photographs, there is a high likelihood that these non-RPWs generally have both physical surface channel connectivity and hydrologic connectivity with Ivanpah lake.

The Clark Mountains and the Ivanpah Range are situated northwest and west, respectively, of both the non-RPWs and Ivanpah dry lake. These non-RPWs are situated within a large alluvial fan, where any surface flows within the area would travel west to east, for an approximate distance of 0.11 to 2.07-miles from the project area extents to reach Ivanpah dry lake. This alluvial fan contains a complex and dynamic network of interconnected active and non-active non-RPW channels of various widths. The area on average receives 4.5-inches of precipitation, with a majority of the rainfall occurring October through April. Ivanpah dry lake is the terminus for these designated non-RPW waters, as well as for other non-RPWs within the Ivanpah Valley groundwater basin.

Currently, there are no known or published recreational uses of these designated non-RPW waters. Published recreational uses of Ivanpah dry lake are limited to a few non-water (no recreational navigation) related activities, including camping, archery, kite buggying and land sailing. Ivanpah dry lake is NOT a TNW or an (a)(3) water. Ivanpah lake is an interstate ((a)(2)) water, with the majority of its area falling within the California state border. Roughly 5% of the total area of Ivanpah dry lake is situated within Nevada.

These non-RPWs have no downstream connectivity to a TNW and they have no nexus to interstate or foreign commerce. The non-RPWs are not (a)(3) waters as defined by 33 CFR 328.3, and the non-RPWs do not meet any of the i-iii criteria (no recreation or interstate commerce related to fisheries or industry).

Based on the above information, the Corps concludes that these 434 acres of non-RPWs are NOT jurisdictional waters of the United States, since the non-RPWs have no commerce connection, are NOT (a)(3) waters as defined by 33 CFR 328.3, and are isolated with no connection to a downstream TNW.

APPENDIX C

Site Photographs

APPENDIX C – JANUARY 2019 PHOTOGRAPHS

Client Name: InterConnect	**Site Location:** Nipton Project

Photo No.	**Date:**
1	01/29/19

Direction Photo Taken:

Southeast

Description:

Start of MESA transect, looking southeast across Desert Wash (East).

Photo No.	**Date:**
2	01/29/19

Direction Photo Taken:

North

Description:

Looking north and downstream along the low flow of Desert Wash (East) within the MESA transect.

Client Name: InterConnect	Site Location: Nipton Project

Photo No.	Date:
3	01/29/19

Direction Photo Taken:

North

Description:

Looking north and downstream along a secondary channel where it converges with Desert Wash (East), within the MESA transect.

Photo No.	Date:
4	01/29/19

Direction Photo Taken:

North

Description:

Looking north and downstream along the uplands that are adjacent to the secondary channel, along the MESA transect.

Client Name: InterConnect	Site Location: Nipton Project

Photo No. 5	Date: 01/29/19	
Direction Photo Taken: Northwest		
Description: Looking northwest from the end of the MESA transect, across Desert Wash (East).		

Photo No. 6	Date: 01/30/19	
Direction Photo Taken: South		
Description: Three types of Native cacti.		

APPENDIX C – JANUARY 2019 PHOTOGRAPHS	
Client Name: InterConnect	**Site Location:** Nipton Project

Photo No. 7	**Date:** 01/30/19
Direction Photo Taken: South	
Description: Looking south and downslope along a non-jurisdictional swale. The swale is located on a high gradient slope.	

Photo No. 8	**Date:** 01/30/19
Direction Photo Taken: North	
Description: Looking north and upslope along a non-jurisdictional swale. The swale is located on a high gradient slope.	

Client Name: InterConnect	Site Location: Nipton Project

Photo No.	Date:
9	01/30/19

Direction Photo Taken:

Northwest

Description:

Looking northwest and upstream along Desert Wash (West). Active burro sign was observed within the wash.

Photo No.	Date:
10	01/30/19

Direction Photo Taken:

Southeast

Description:

Looking southeast and downstream along Desert Wash (West). Active burro sign was observed within the wash.

Client Name: InterConnect	Site Location: Nipton Project

Photo No.	Date:
11	01/30/19

Direction Photo Taken:

Southeast

Description:

Looking southeast along the Study Area towards the intersection of Nipton and I-15, located behind the hills in the foreground.

APPENDIX D

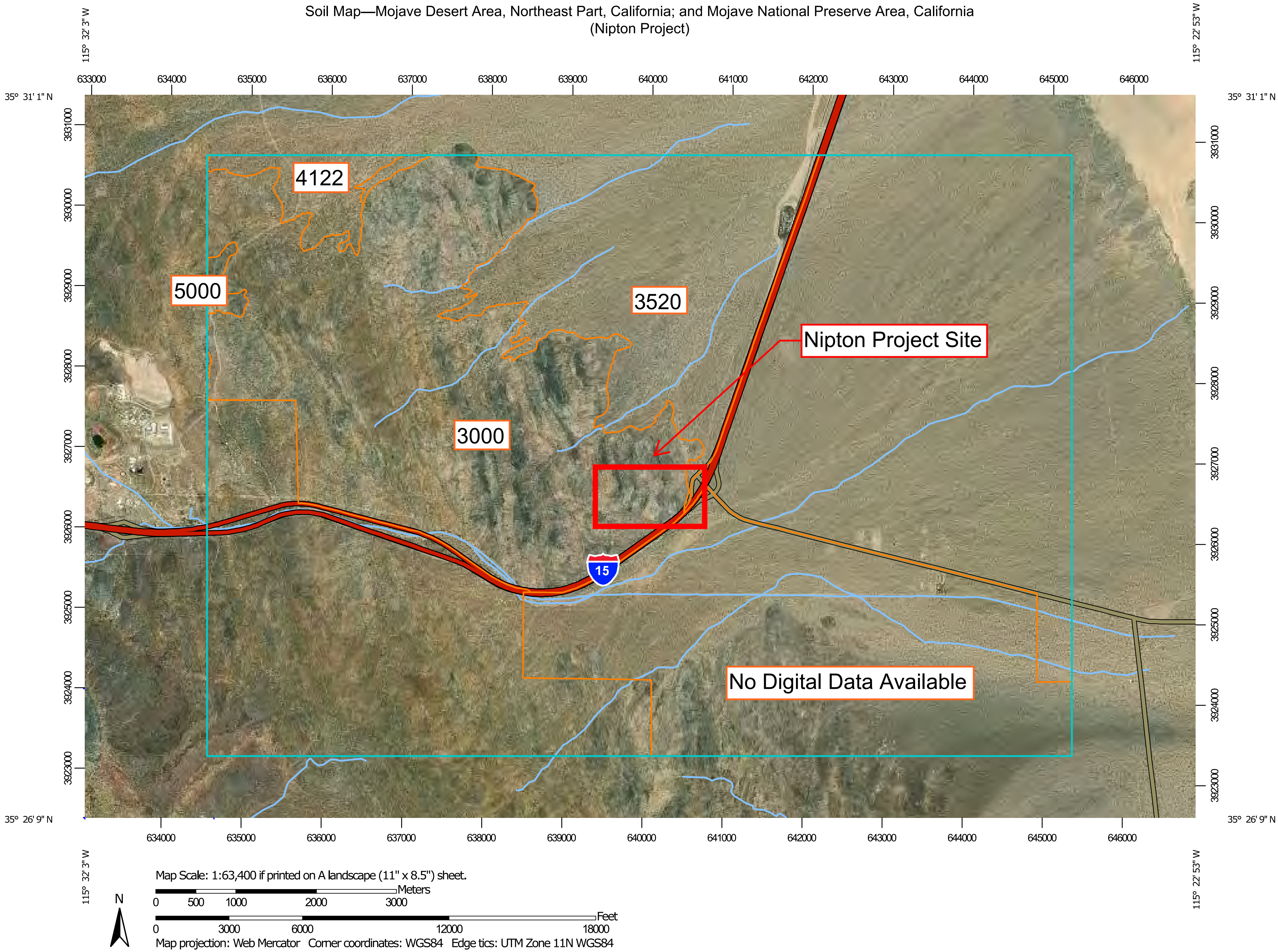
Observed Plant List

Family Scientific Name	Common Name	Native/ Non-native	Life Form	Wetland Indicator Rating
Agavaceae				
Yucca brevifolia	Joshua tree	Native	Tree	NL
Asteraceae				
Ambrosia dumosa	Burro weed	Native	Shrub	NL
Ambrosia salsola	Cheesebrush	Native	Shrub	NL
Bahiopsis parishii	Parish viguiera	Native	Shrub	NL
Encelia farinosa	Acton encelia	Native	Shrub	NL
Cactaceae				
Cylindropuntia acanthocarpa	Buck horn cholla	Native	Perennial herb (stem succulent)	NL
Ferrocactus cylindraceus	California barrel cactus	Native	Shrub (stem succulent)	NL
Opuntia basilaris	Beavertail	Native	Shrub (stem succulent)	NL
Ephedraceae				
Ephedra sp.	Ephedra	Native	Shrub	NL
Fabaceae				
Senegalia greggii	Catclaw acacia	Native	Shrub	FACU
Lamiaceae				
Condea emoryi	Desert lavender	Native	Shrub	NL
Scutellaria Mexicana	Paperbag bush	Native	Shrub	NL
Polygonaceae				
Eriogonum fasciculatum	California buckwheat	Native	Shrub	NL
Eriogonum inflatum	Desert trumpet	Native	Perennial herb	NL
Poaceae				
Hilaria rigida	Big galleta grass	Native	Perennial grass	NL
Aristida purpurea	Purple threeawn	Native	Perennial grass	NL
Zygophyllaceae				
Larrea tridentata	South american creosote bush	Native	Shrub	NL

APPENDIX E

Web Soil Survey Reports and Geologic Map

Soil Map—Mojave Desert Area, Northeast Part, California; and Mojave National Preserve Area, California
(Nipton Project)



Map Scale: 1:63,400 if printed on A landscape (11" x 8.5") sheet.

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Mojave Desert Area, Northeast Part, California
Survey Area Data: Version 8, Sep 14, 2018

Soil Survey Area: Mojave National Preserve Area, California
Survey Area Data: Version 6, Oct 27, 2017

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Feb 12, 2015—Sep 6, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
3000	Copperworld association, 30 to 60 percent slopes	4,798.9	24.0%
3520	Arizo loamy sand, 2 to 8 percent slopes	2,521.6	12.6%
4122	Popups sandy loam, 4 to 30 percent slopes	323.3	1.6%
5000	Copperworld-Lithic Ustic Haplargids association, 30 to 60 percent slopes	61.3	0.3%
NOTCOM	No Digital Data Available	8,573.9	42.8%
Subtotals for Soil Survey Area		**16,278.9**	**81.4%**
Totals for Area of Interest		**20,009.6**	**100.0%**

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
NOTCOM	No Digital Data Available	3,730.7	18.6%
Subtotals for Soil Survey Area		**3,730.7**	**18.6%**
Totals for Area of Interest		**20,009.6**	**100.0%**

Hydric Soil List - All Components

This table lists the map unit components and their hydric status in the survey area. This list can help in planning land uses; however, onsite investigation is recommended to determine the hydric soils on a specific site (National Research Council, 1995; Hurt and others, 2002).

The three essential characteristics of wetlands are hydrophytic vegetation, hydric soils, and wetland hydrology (Cowardin and others, 1979; U.S. Army Corps of Engineers, 1987; National Research Council, 1995; Tiner, 1985). Criteria for all of the characteristics must be met for areas to be identified as wetlands. Undrained hydric soils that have natural vegetation should support a dominant population of ecological wetland plant species. Hydric soils that have been converted to other uses should be capable of being restored to wetlands.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). These soils, under natural conditions, are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 2002). These criteria are used to identify map unit components that normally are associated with wetlands. The criteria used are selected estimated soil properties that are described in "Soil Taxonomy" (Soil Survey Staff, 1999) and "Keys to Soil Taxonomy" (Soil Survey Staff, 2006) and in the "Soil Survey Manual" (Soil Survey Division Staff, 1993).

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils are specified in "Field Indicators of Hydric Soils in the United States" (Hurt and Vasilas, 2006).

Hydric soils are identified by examining and describing the soil to a depth of about 20 inches. This depth may be greater if determination of an appropriate indicator so requires. It is always recommended that soils be excavated and described to the depth necessary for an understanding of the redoximorphic processes. Then, using the completed soil descriptions, soil scientists can compare the soil features required by each indicator and specify which indicators have been matched with the conditions observed in the soil. The soil can be identified as a hydric soil if at least one of the approved indicators is present.

Map units that are dominantly made up of hydric soils may have small areas, or inclusions, of nonhydric soils in the higher positions on the landform, and map units dominantly made up of nonhydric soils may have inclusions of hydric soils in the lower positions on the landform.

The criteria for hydric soils are represented by codes in the table (for example, 2). Definitions for the codes are as follows:

1. All Histels except for Folistels, and Histosols except for Folists.
2. Soils in Aquic suborders, great groups, or subgroups, Albolls suborder, Historthels great group, Histoturbels great group, Pachic subgroups, or Cumulic subgroups that:
   - A. Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or
   - B. Show evidence that the soil meets the definition of a hydric soil;
3. Soils that are frequently ponded for long or very long duration during the growing season.
   - A. Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or
   - B. Show evidence that the soil meets the definition of a hydric soil;
4. Map unit components that are frequently flooded for long duration or very long duration during the growing season that:
   - A. Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or
   - B. Show evidence that the soil meets the definition of a hydric soil;

Hydric Condition: Food Security Act information regarding the ability to grow a commodity crop without removing woody vegetation or manipulating hydrology.

References:

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. Doc. 2012-4733 Filed 2-28-12. February, 28, 2012. Hydric soils of the United States.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18.

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service. U.S. Department of Agriculture Handbook 436.

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service.

Vasilas, L.M., G.W. Hurt, and C.V. Noble, editors. Version 7.0, 2010. Field indicators of hydric soils in the United States.

Report—Hydric Soil List - All Components

Hydric Soil List - All Components–CA805-Mojave Desert Area, Northeast Part, California					
Map symbol and map unit name	**Component/Local Phase**	**Comp. pct.**	**Landform**	**Hydric status**	**Hydric criteria met (code)**
3000: Copperworld association, 30 to 60 percent slopes	Copperworld	65	Mountains	—	—
	Copperworld-Cool	15	Mountains	—	—
	Rock outcrop	10	Mountains	—	—
	Lithic Torriorthents	7	Hills	—	—
	Typic Torriorthents	2	Hills	—	—
	Arizo-Frequently flooded	1	Drainageways	—	—
3520: Arizo loamy sand, 2 to 8 percent slopes	Arizo-Loamy sand	85	Fan aprons	—	—
	Arizo-Dry	5	Fan aprons	—	—
	Arizo-Frequently flooded	3	Drainageways	—	—
	Daisy	3	Fan aprons on fan remnants	—	—
	Durinodic Calciargids	2	Fan remnants	—	—
	Typic Argidurids	2	Fan remnants	—	—
4122: Popups sandy loam, 4 to 30 percent slopes	Popups	75	Fan remnants	—	—
	Arizo	10	Inset fans	—	—
	Typic Haplargids	10	Fan remnants	—	—
	Arizo-Occasionaly flooded	3	Drainageways	—	—
	Durinodic Haplargids	2	Fan remnants	—	—
5000: Copperworld-Lithic Ustic Haplargids association, 30 to 60 percent slopes	Copperworld	70	Mountains	—	—
	Lithic Ustic Haplargids-Cool	25	Mountains	—	—
	Rock outcrop	5	Mountains	—	—
NOTCOM: No Digital Data Available	NOTCOM	100	—	—	—

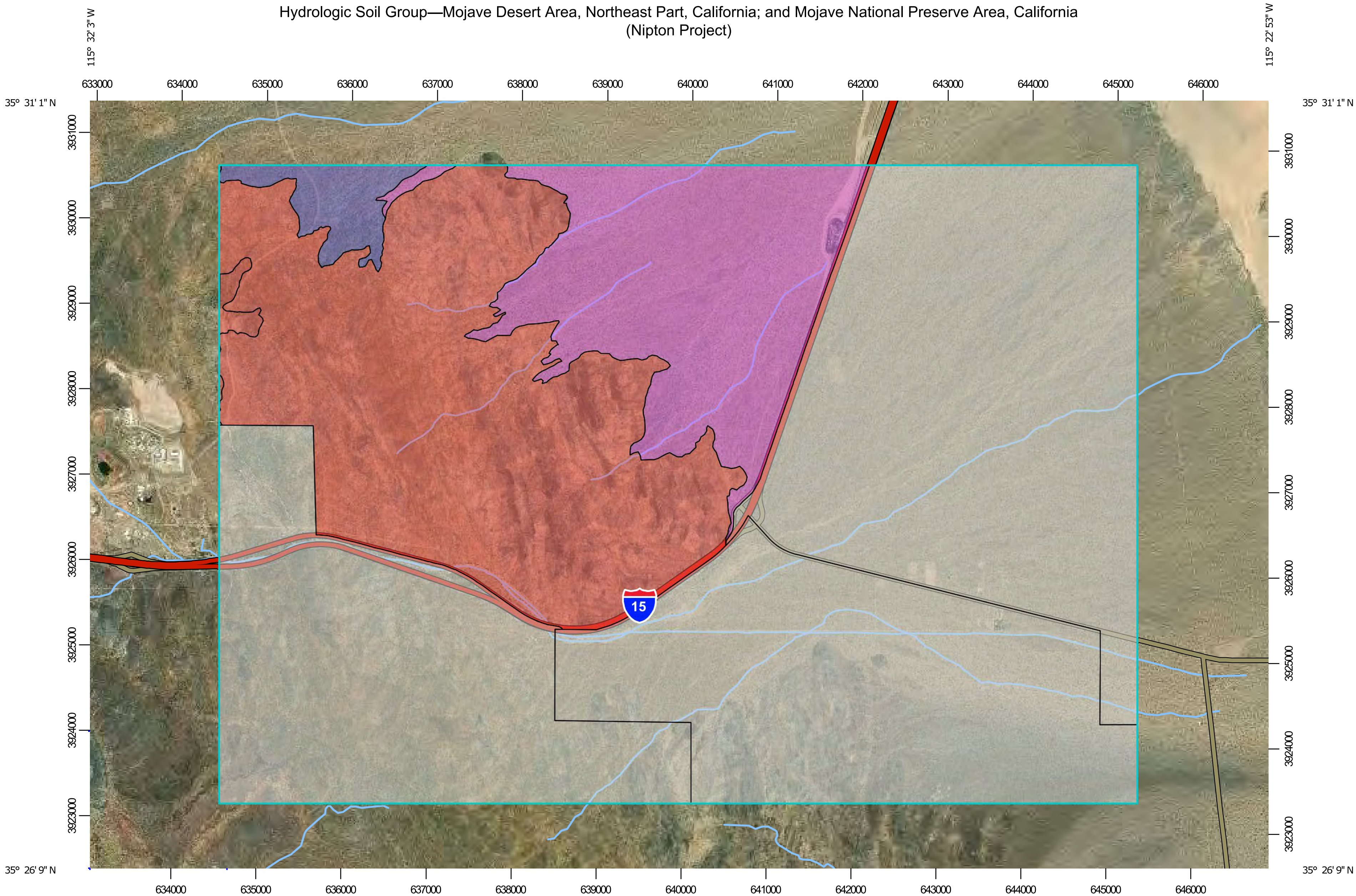
Hydric Soil List - All Components–CA795-Mojave National Preserve Area, California					
Map symbol and map unit name	**Component/Local Phase**	**Comp. pct.**	**Landform**	**Hydric status**	**Hydric criteria met (code)**
	NOTCOM	100	—	—	—

Data Source Information

Soil Survey Area: Mojave Desert Area, Northeast Part, California
Survey Area Data: Version 8, Sep 14, 2018

Soil Survey Area: Mojave National Preserve Area, California
Survey Area Data: Version 6, Oct 27, 2017

Hydrologic Soil Group—Mojave Desert Area, Northeast Part, California; and Mojave National Preserve Area, California
(Nipton Project)



Map Scale: 1:63,400 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0, 500, 1000, 2000, 3000

Feet: 0, 3000, 6000, 12000, 18000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Mojave Desert Area, Northeast Part, California
Survey Area Data: Version 8, Sep 14, 2018

Soil Survey Area: Mojave National Preserve Area, California
Survey Area Data: Version 6, Oct 27, 2017

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Feb 12, 2015—Sep 6, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
3000	Copperworld association, 30 to 60 percent slopes	D	4,798.9	24.0%
3520	Arizo loamy sand, 2 to 8 percent slopes	A	2,521.6	12.6%
4122	Popups sandy loam, 4 to 30 percent slopes	B	323.3	1.6%
5000	Copperworld-Lithic Ustic Haplargids association, 30 to 60 percent slopes	D	61.3	0.3%
NOTCOM	No Digital Data Available		8,573.9	42.8%
Subtotals for Soil Survey Area			**16,278.9**	**81.4%**
Totals for Area of Interest			**20,009.6**	**100.0%**

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
NOTCOM	No Digital Data Available		3,730.7	18.6%
Subtotals for Soil Survey Area			**3,730.7**	**18.6%**
Totals for Area of Interest			**20,009.6**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

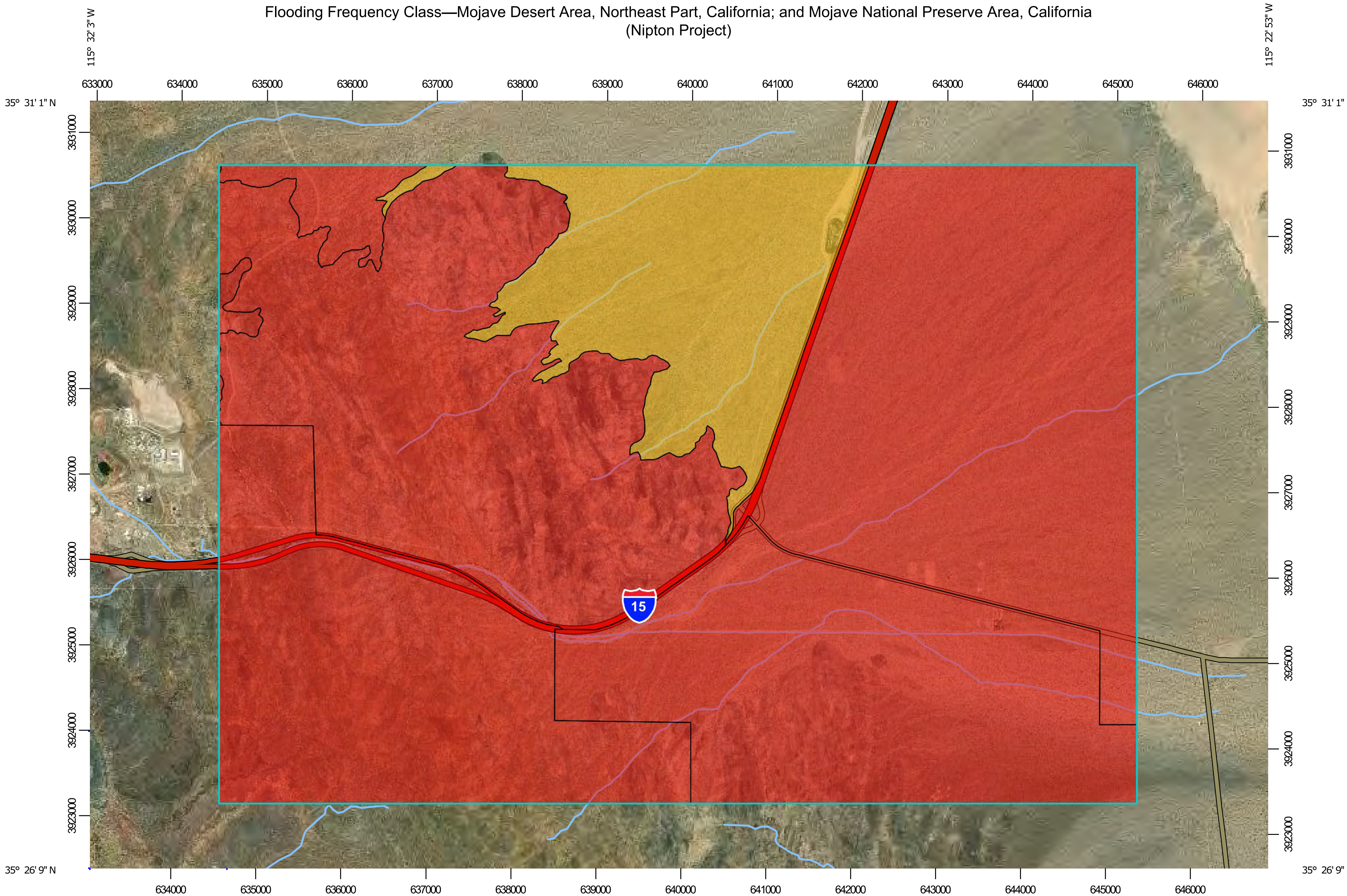
Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Flooding Frequency Class—Mojave Desert Area, Northeast Part, California; and Mojave National Preserve Area, California
(Nipton Project)



Map Scale: 1:63,400 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 500 1000 2000 3000

Feet
0 3000 6000 12000 18000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- None
- Very Rare
- Rare
- Occasional
- Frequent
- Very Frequent
- Not rated or not available

Soil Rating Lines
- None
- Very Rare
- Rare
- Occasional
- Frequent
- Very Frequent
- Not rated or not available

Soil Rating Points
- None
- Very Rare
- Rare
- Occasional
- Frequent
- Very Frequent
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

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Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

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The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Flooding Frequency Class

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
3000	Copperworld association, 30 to 60 percent slopes	None	4,798.9	24.0%
3520	Arizo loamy sand, 2 to 8 percent slopes	Very rare	2,521.6	12.6%
4122	Popups sandy loam, 4 to 30 percent slopes	None	323.3	1.6%
5000	Copperworld-Lithic Ustic Haplargids association, 30 to 60 percent slopes	None	61.3	0.3%
NOTCOM	No Digital Data Available	None	8,573.9	42.8%
Subtotals for Soil Survey Area			**16,278.9**	**81.4%**
Totals for Area of Interest			**20,009.6**	**100.0%**

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
NOTCOM	No Digital Data Available	None	3,730.7	18.6%
Subtotals for Soil Survey Area			**3,730.7**	**18.6%**
Totals for Area of Interest			**20,009.6**	**100.0%**

Description

Flooding is the temporary inundation of an area caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, and water standing in swamps and marshes is considered ponding rather than flooding.

Frequency is expressed as none, very rare, rare, occasional, frequent, and very frequent.

"None" means that flooding is not probable. The chance of flooding is nearly 0 percent in any year. Flooding occurs less than once in 500 years.

"Very rare" means that flooding is very unlikely but possible under extremely unusual weather conditions. The chance of flooding is less than 1 percent in any year.

"Rare" means that flooding is unlikely but possible under unusual weather conditions. The chance of flooding is 1 to 5 percent in any year.

"Occasional" means that flooding occurs infrequently under normal weather conditions. The chance of flooding is 5 to 50 percent in any year.

"Frequent" means that flooding is likely to occur often under normal weather conditions. The chance of flooding is more than 50 percent in any year but is less than 50 percent in all months in any year.

"Very frequent" means that flooding is likely to occur very often under normal weather conditions. The chance of flooding is more than 50 percent in all months of any year.

Rating Options

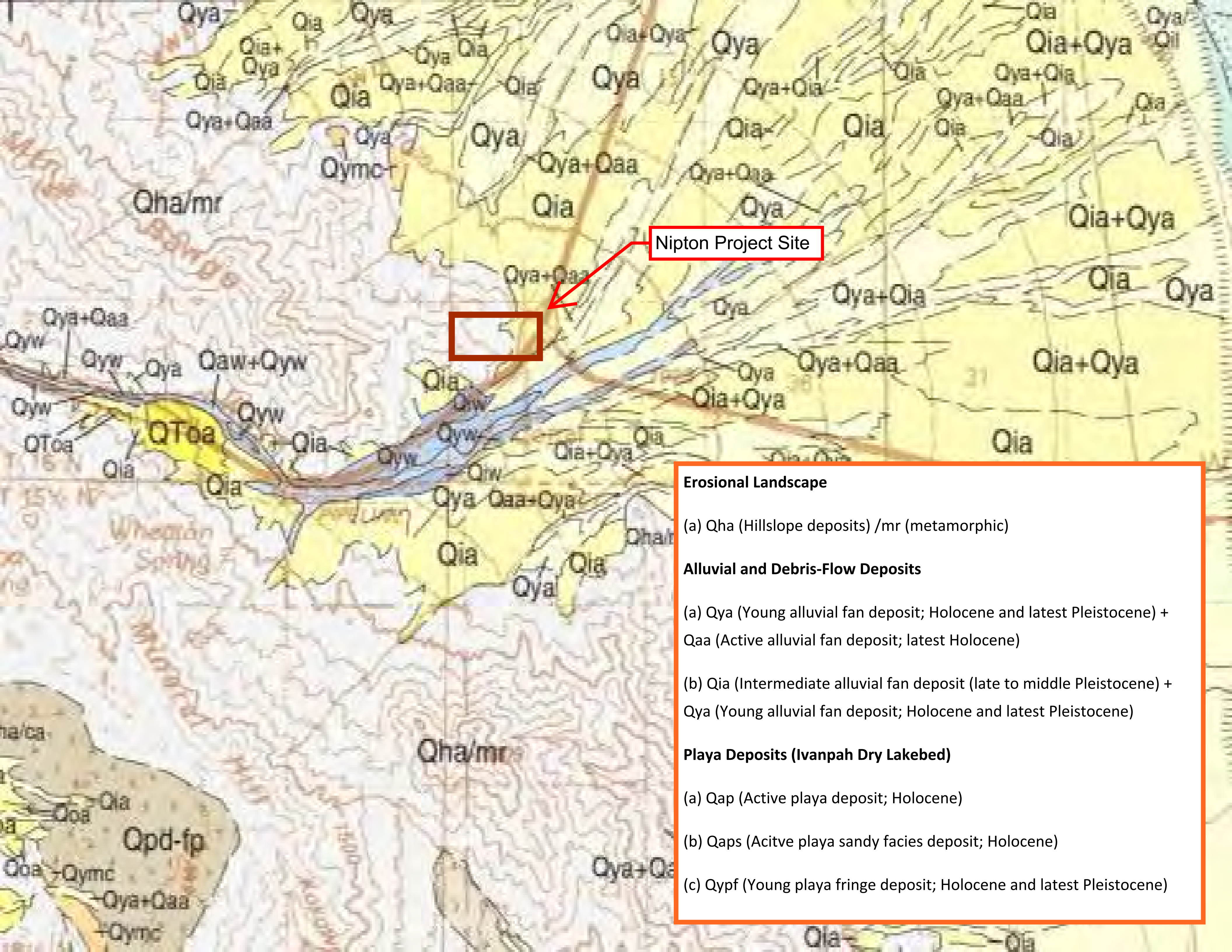
Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: More Frequent

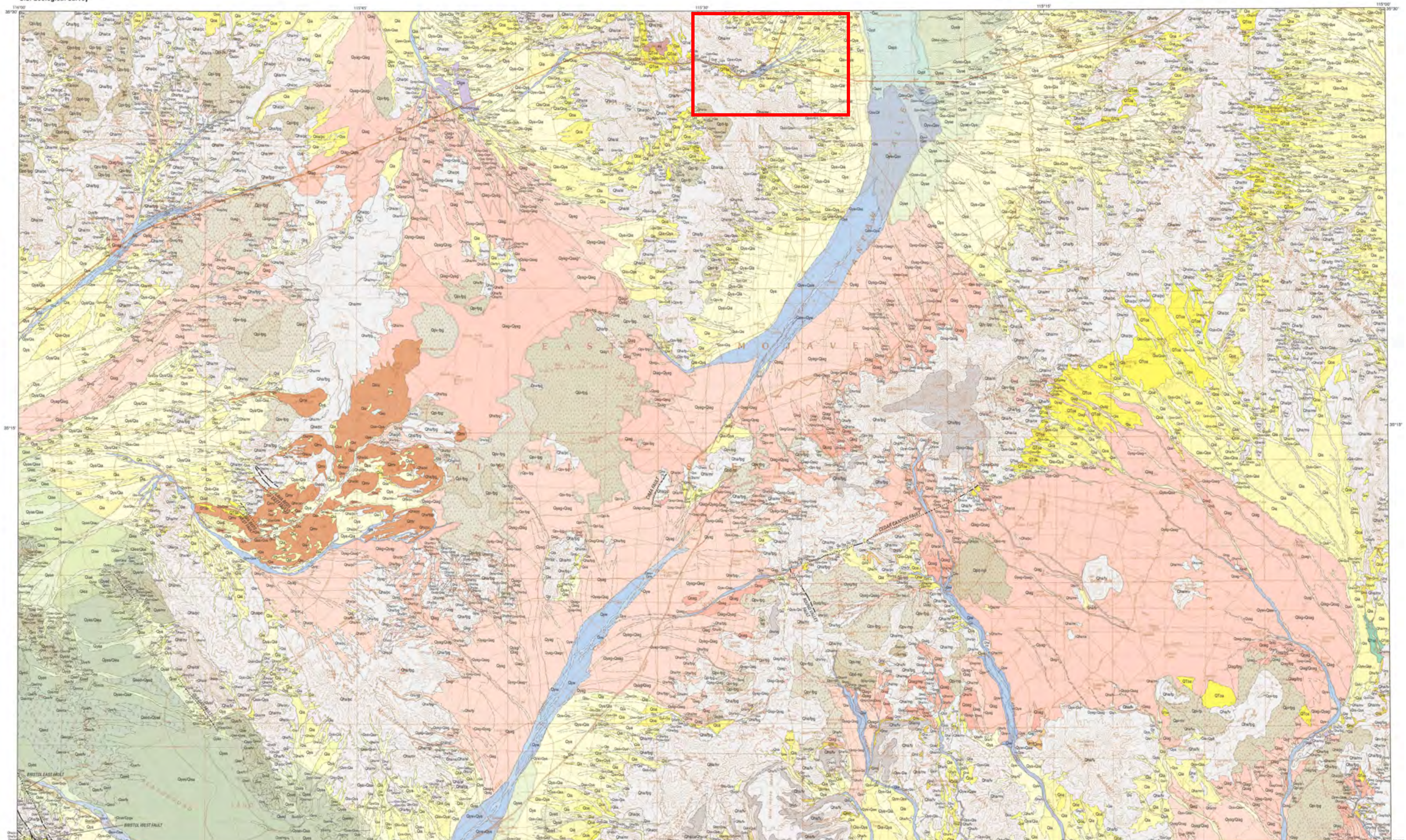
Beginning Month: January

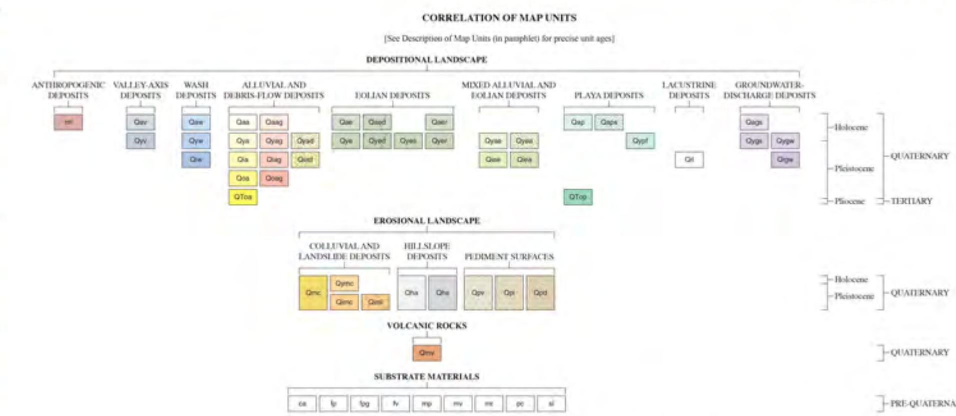
Ending Month: December


Nipton Project Site
Erosional Landscape
(a) Qha (Hillslope deposits) /mr (metamorphic)
Alluvial and Debris-Flow Deposits
(a) Qya (Young alluvial fan deposit; Holocene and latest Pleistocene) + Qaa (Active alluvial fan deposit; latest Holocene)
(b) Qia (Intermediate alluvial fan deposit (late to middle Pleistocene) + Qya (Young alluvial fan deposit; Holocene and latest Pleistocene)
Playa Deposits (Ivanpah Dry Lakebed)
(a) Qap (Active playa deposit; Holocene)
(b) Qaps (Acitve playa sandy facies deposit; Holocene)
(c) Qypf (Young playa fringe deposit; Holocene and latest Pleistocene)
Qha/mr
QToa
Qpd-fp

U.S. Department of the Interior
U.S. Geological Survey

Scientific Investigations Map 3206
Pamphlet accompanies map





LIST OF MAP UNITS

[Explanation of Composite Symbols: Surficial geologic units that form thin veneers over other units are shown with the younger, or overlying, unit indicated first, followed by a slash, and the older, underlying unit. Thus, Qya/Qoa indicates a veneer of unit Qya overlying unit Qoa. Where the lateral extent of deposits is too small to show individually at the map scale, they are grouped as two units separated by a plus sign (+), with the most common deposit listed first. Thus, Qya+Qia indicates an area with both Qya and Qia deposits, and Qya is more common than Qia. Pediments are erosional surfaces that are represented by two terms separated by a hyphen (-). The first term indicates the degree to which the pediment is dissected and the second term indicates substrate materials. Thus, Qpv-fpg indicates a veneered pediment (Qpv) cut into grus-forming felsic plutonic rock (fpg). Unit boxes shown without color represent bedrock underlying surficial deposits shown on map. See Description of Map Units (in pamphlet) for complete unit descriptions]

DEPOSITIONAL LANDSCAPE

ANTHROPOGENIC DEPOSITS

- mf — **Made land or artificial fill (latest Holocene)**

VALLEY-AXIS DEPOSITS

- Qav — **Active valley-axis deposit (latest Holocene)**
- Qyv — **Young valley-axis deposit (Holocene and latest Pleistocene)**

WASH DEPOSITS

- Qaw — **Active wash deposit (latest Holocene)**
- Qyw — **Young wash deposit (Holocene and latest Pleistocene)**
- Qiw — **Intermediate wash deposit (late to middle Pleistocene)**

ALLUVIAL AND DEBRIS-FLOW DEPOSITS

- Qaa — **Active alluvial fan deposit (latest Holocene)**
- Qaag — **Active alluvial fan deposit composed of grus (latest Holocene)**
- Qya — **Young alluvial fan deposit (Holocene and latest Pleistocene)**
- Qyag — **Young alluvial fan deposit composed of grus (Holocene and latest Pleistocene)**
- Qyad — **Young alluvial fan deposit composed of debris-flow deposits (Holocene and latest Pleistocene)**
- Qia — **Intermediate alluvial fan deposit (late to middle Pleistocene)**
- Qiag — **Intermediate alluvial fan deposit composed of grus (late to middle Pleistocene)**
- Qiad — **Intermediate alluvial fan deposit composed of debris-flow deposits (late to middle Pleistocene)**
- Qoa — **Old alluvial fan deposit (middle to early Pleistocene)**
- Qoag — **Old alluvial fan deposit composed of grus (middle to early Pleistocene)**
- QToa — **Extremely old alluvial fan deposit (Pleistocene to Pliocene)**

EOLIAN DEPOSITS

- Qae — **Active eolian sand deposit (latest Holocene)**
- Qaed — **Active eolian sand dune deposit (latest Holocene)**
- Qaer — **Active eolian sand ramp deposit (latest Holocene)**
- Qye — **Young eolian sand deposit (Holocene and latest Pleistocene)**
- Qyed — **Young eolian sand dune deposit (Holocene and latest Pleistocene)**
- Qyes — **Young eolian sand sheet deposit (Holocene and latest Pleistocene)**
- Qyer — **Young eolian sand ramp deposit (Holocene and latest Pleistocene)**

MIXED ALLUVIAL AND EOLIAN DEPOSITS

- Qyae — **Young mixed alluvial and eolian sand deposit (Holocene and latest Pleistocene)**
- Qyea — **Young mixed eolian sand and alluvial deposit (Holocene and latest Pleistocene)**
- Qiae — **Intermediate mixed alluvial and eolian sand deposit (late to middle Pleistocene)**
- Qiea — **Intermediate mixed eolian sand and alluvial deposit (late to middle Pleistocene)**

PLAYA DEPOSITS

- Qap — **Active playa deposit (Holocene)**
- Qaps — **Active playa sandy facies deposit (Holocene)**
- Qypf — **Young playa fringe deposit (Holocene and latest Pleistocene)**
- QTop — **Extremely old playa deposit (early Pleistocene and Pliocene)**

LACUSTRINE DEPOSITS

- Qil — **Intermediate lacustrine deposit (late to middle Pleistocene)**—Underlies alluvial depsoits near edge of Ivanpah Lake

GROUNDWATER-DISCHARGE DEPOSITS

- Qags — **Active groundwater-discharge spring mound deposit (Holocene)**
- Qygs — **Young groundwater-discharge spring mound deposit (Holocene and latest Pleistocene)**
- Qygw — **Young groundwater-discharge wetland deposit (Holocene and latest Pleistocene)**
- Qigw — **Intermediate groundwater-discharge wetland deposit (late to middle Pleistocene)**

EROSIONAL LANDSCAPE

COLLUVIAL AND LANDSLIDE DEPOSITS

- Qmc — **Mass-movement colluvial deposits, undivided (Holocene and Pleistocene)**
- Qymc — **Young mass-movement colluvial deposit (Holocene and Pleistocene)**
- Qimc — **Intermediate mass-movement colluvial deposit (Pleistocene)**
- Qiml — **Intermediate mass-movement landslide deposit (Pleistocene)**

HILLSLOPE DEPOSITS

- Qha — **Abundant hillslope deposits (Holocene and Pleistocene)**
- Qhs — **Sparse hillslope deposits (Holocene and Pleistocene)**

PEDIMENT SURFACES

- Qpv — **Veneered pediment**
- Qpi — **Incised pediment**
- Qpd — **Deeply dissected pediment**

VOLCANIC ROCKS

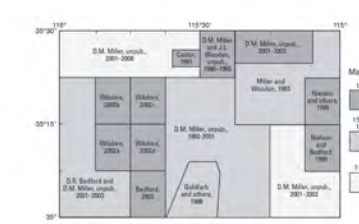
- Qmv — **Mafic volcanic rocks (Quaternary)**

SUBSTRATE MATERIALS

- ca — **Carbonate rocks**
- fp — **Felsic plutonic rocks**
- fpg — **Felsic plutonic rocks that weather to grus**
- fv — **Felsic volcanic rocks**
- mp — **Mafic plutonic rocks**
- mv — **Mafic volcanic rocks**
- mt — **Metamorphic rocks**
- pc — **Partly consolidated materials**
- sl — **Siliciclastic rocks**

SYMBOL EXPLANATION

- **Contact**—Dashed where approximate
- **Gradational contact**
- **Fault**—Dashed where approximate; dotted where concealed. Queried where identity or existence questionable



Index to Sources of Surficial Geologic Mapping

Surficial geology mapped by David M. Miller and others (1988–2008)
GIS database and digital cartography by David M. Miller and Shannon R. Leslie
Edited by J.L. Zigler
Digital cartographic production by Darlene A. Ryan
Manuscript approved for publication March 26, 2012

Surficial Geologic Map of the Ivanpah 30′ x 60′ Quadrangle, San Bernardino County, California, and Clark County, Nevada

By
David M. Miller

2012

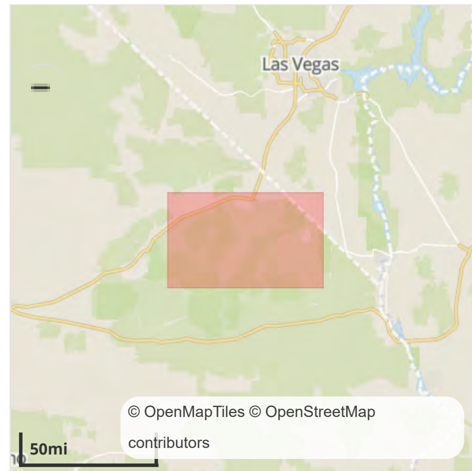
Digital files available at http://pubs.usgs.gov/sim/3206/

Suggested Citation: Miller, D.M., 2012, Surficial geologic map of the Ivanpah 30′ x 60′ quadrangle, San Bernardino County, California, and Clark County, Nevada: U.S. Geological Survey Scientific Investigations Map 3206, pamphlet 14 p., scale 1:100,000. (Available at http://pubs.usgs.gov/sim/3206/.)

National Geologic Map Database
Product Description Page

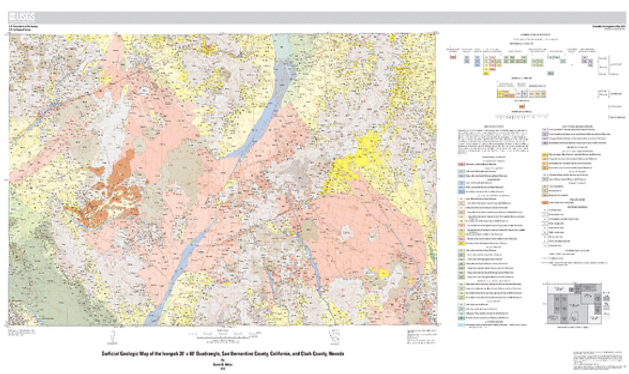
General Information

Title: Surficial geologic map of the Ivanpah 30' x 60' quadrangle, San Bernardino County, California, and Clark County, Nevada
Author(s): Miller, D.M.
Publishing Organization: U.S. Geological Survey
Series and Number: Scientific Investigations Map SIM-3206
Publication Date: 2012
Map Scale: 1:100,000
Cross Section: None
North Latitude: 35° 30' 0" N (35.5000)
South Latitude: 35° 0' 0" N (35.0000)
East Longitude: 115° 0' 0" W (-115.0000)
West Longitude: 116° 0' 0" W (-116.0000)
Corrections to this entry?



Find more maps in this area with mapView

Map Preview (Click image to enlarge)

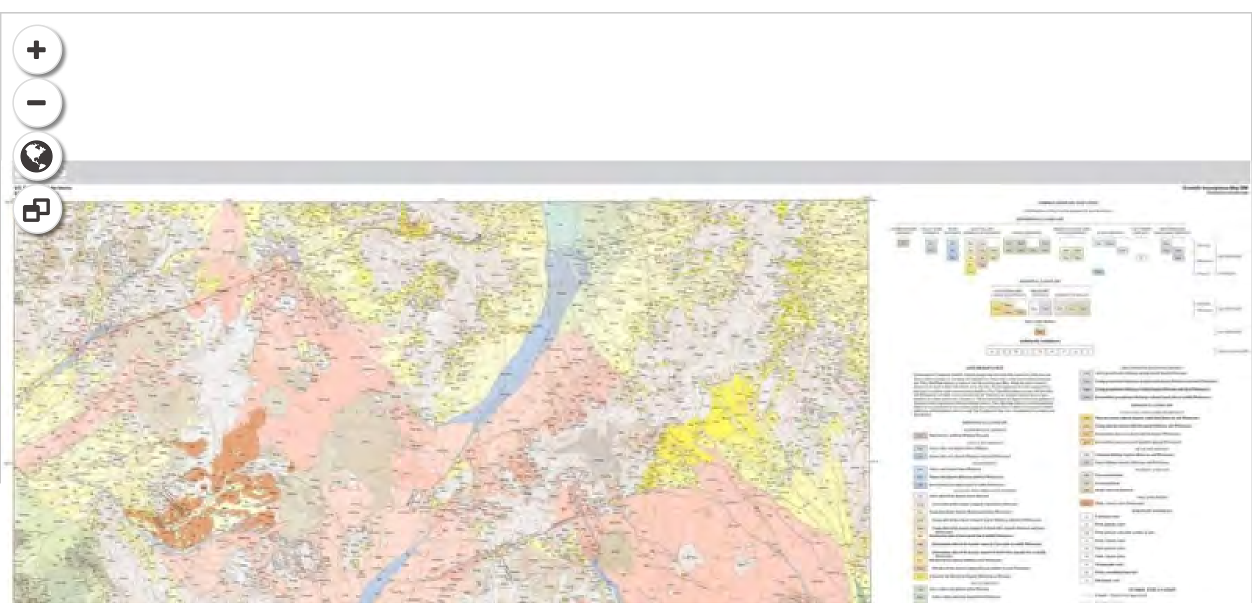


Downloads from the NGMDB

Select an image from the Map Preview section and choose a download option below

- Print Optimized PDF (13Mb)
- Compressed Tiff (23Mb)
- Browse Graphic (JPG) (1Mb)
- Google Earth KMZ (N/A)

NOTE: Images shown may not constitute the entire publication, see below for publisher links.



External Resources

Links and Downloads:

Publication (includes GIS data)

U.S. Geological Survey

For more information, please contact:

U.S. Geological Survey
USGS Information Services
Box 25286
Denver, CO 80225
Phone: (303) 202-4700 or 1-888-ASK-USGS
Fax: (303) 202-4710

or contact:

Nevada Bureau of Mines and Geology
Publication Sales
Great Basin Science Sample and Records Library
2175 Raggio Parkway
Reno, NV 89512
Phone: (775) 682-8766
Fax: (775) 784-6690
Email: nbmg@unr.edu

Appendix D.2

Alternative Locations for Access Road Along East Drainage Memorandum

AECOM
999 Town and Country Road
Orange, CA 92868
www.aecom.com

Project name:
InterConnect Nipton Communication Project

To: Tiffany Steinert, GIT
Tiffany.Steinert@Waterboards.ca.gov
Lahontan RWQCB, Victorville, CA

CC: Tom Gammon
tom@ictowers.com
InterConnect Towers, LLC
Ladera Ranch, CA

From: Erik Larsen, D.Env.
Erik.Larsen@aecom.com
AECOM, Orange, CA

Date: January 15, 2020

Memorandum

RE: Nipton Communication Project; Request for Information; Alternative Locations for Access Road along East Drainage

This memorandum is in response to your e-mails of November 18, 2019 and December 17, 2019, in which you requested information regarding whether alternatives were considered to the placement of the access road into "Drainage East" (Figure 4 from JD Report; AECOM 2019; Attachment 1). In addition, you requested additional evidence that placement in the wash was the only practicable path up the hill. In response to this request, InterConnect and AECOM have evaluated two alternatives where this segment of the access road is placed either west or east of the wash. Although potential impacts to the wash and adjacent wash vegetation would be reduced by either of these alternatives, these options would increase impacts to upland vegetation located adjacent to the wash. The alternatives are shown in the attached figure, *Access Route Alternatives for East Drainage*. (Attachment 2).

In the process of analyzing east and west alternatives to the segment of the access road that was proposed to follow a portion of the East Drainage, the access road impacts at both the East Drainage and West Drainage were re-calculated using a 25-foot corridor width. As discussed in both the application for water quality certification and/or waste discharge requirements (401/WDR), and in the jurisdictional delineation report, the access road would be constructed to a standard width of 14 feet. However, for the purposes of impact calculations, it is assumed that the average width of disturbance along the entire roadway would be 25 feet. Although a 25-foot impact corridor may be needed to grade the route along steeper segments of the proposed roadway, the width at drainage/tributary crossings will be minimized to the extent feasible. Table 1, below, provides the updated acreage calculations for jurisdictional impacts. Photograph 1 shows the location of Photograph 2, and Photograph 2 shows the proposed access road alternatives. The new East Alternative is the updated "preferred route" for the East Drainage segment of the access road.

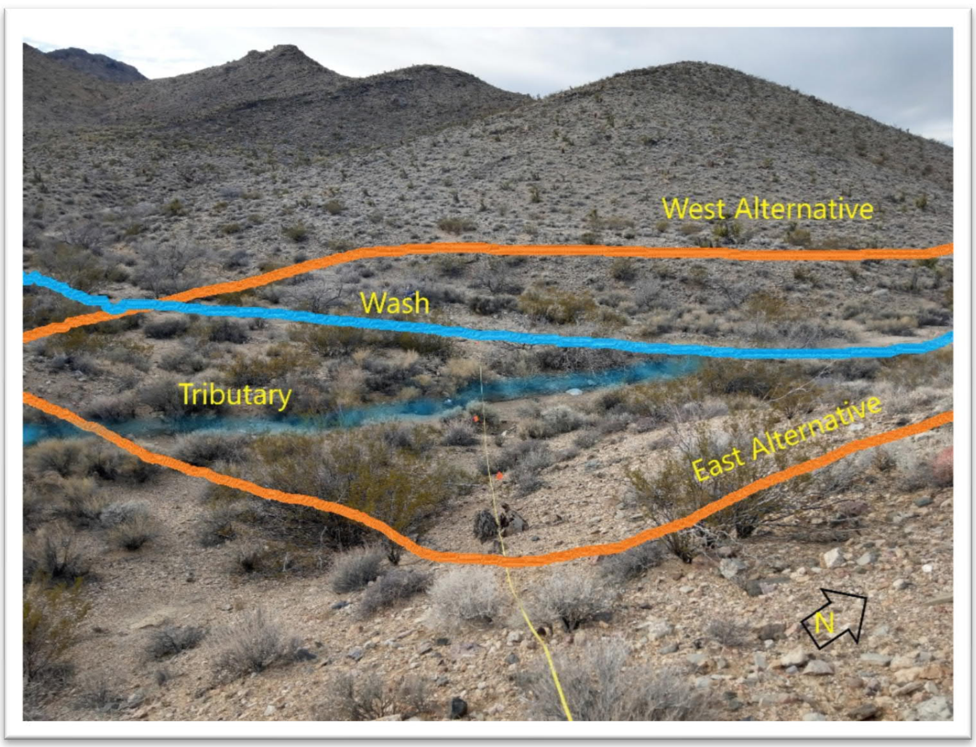
Table 1. Jurisdictional Results for Original Access Road Segment and Two Alternatives.

Jurisdictional Features	**Agency Jurisdiction** [1]	**Alignment as Proposed in JD Report (2019)**		**Alternatives to the East Drainage Alignment (2020)**	
		West Drainage	**East Drainage**	**West Alternative** [3]	**East Alternative** [3]
		One Wash Crossing; 25 linear ft	Within Channel Alignment	Two Wash Crossings; 50 linear ft	Two Tributary Crossings; 50 linear ft
	Agency Jurisdiction [1]	**West Drainage**	**East Drainage**		
		Proposed Location (2019)	Originally Proposed Location (2019) [2]	West Access Road Alternative (2020) [3]	East Access Road Alternative (2020) [3]
Waters of the State / Desert Riparian Scrub		Wash Crossing (1); 10 ft width; 25 linear ft	567 linear ft	Wash Crossings (2); 12 ft width each; 50 linear ft	Tributary Crossings (2); 10 ft width each; 50 linear ft
Waters of the State (*Unvegetated Wash within OHWM*)	RWQCB; CDFW	< 0.01 (0.006)	0.13	0.01	0
Mojave Desert Wash Scrub (*Vegetated Floodplain Along East Drainage*)	CDFW	0.02 (0.018)	0.20	0.10	0.04
Mojave Desert Wash Scrub (*Vegetated Tributary Channels to East Drainage*) [4]	RWQCB; CDFW	n/a	0.02	0.02	0.01
TOTAL	RWQCB	< 0.01 (0.006)	0.15	0.03	0.01
TOTAL	CDFW	0.02	0.35	0.13	0.05
Upland Scrub					
Mojave Creosote Bush Scrub (*Non-Jurisdictional Areas Adjacent to East Drainage*)	n/a	0.02	0.03	0.27	0.34

Notes:

1. Agency jurisdiction note: RWQCB = unvegetated channel within OHWM; CDFW (“watercourse”) = RWQCB jurisdiction + adjacent riparian scrub. CDFW jurisdiction may also be considered all streambed and vegetation within the top of bank.
2. This represents the original location, and was calculated using 25-foot impact width.
3. See attached figure for access road alternative locations (Attachment 2).
4. During fieldwork in 2019, two tributaries were found that flow into the East Drainage.

Photograph 1. Google Earth image showing placemark of Photograph 2, below.



Photograph 2. Photograph at transect across "Drainage East," showing the location of the two alternative access road locations, the main wash, and one of the two tributaries (flow from left to right, or northward). The East Alternative is the updated "preferred route."

As stated in our e-mail response of November 27, 2019, alternative alignments for this segment (associated with Drainage East) were not previously evaluated on a formal basis. During project planning and in negotiations with the BLM, the use of a portion of the wash was deemed acceptable and other options to reaching the facility were not addressed further. The BLM approved the proposed right-of-way for the originally-proposed access alignment, including the segment that coincides with the wash. The wash has been heavily driven in the past and continues to be used for occasional access by vehicles that ingress into this area from the existing access road from the I-15/Nipton interchange. Travel along the unvegetated wash is ‘open’ along the entire 567-foot segment and thus was originally proposed for project access (i.e., until the proposed access alignment diverges south and out of the wash). Potential temporary impacts (e.g., estimated three to four pick-up truck trips per month) to wash functions were initially considered minimal.

We request that you review this submittal and provide your approval of the new East Alternative alignment in order to begin preparing the RWQCB authorization per General Order (e.g., R6T-2003-0004 or Water Quality Order 2004-0004 DWQ) as determined appropriate for the proposed Nipton Communication Site project.

Due to the inclusion of two alternatives and given that the East Alternative is the applicant’s new preferred alignment, potential impacts (acreage, linear feet) for the East Drainage were revised. According to the revised data in Table 1, the following updated impact data should be incorporated into the initial 401/WDR application form for fill-related impacts to waterbodies (Table 2).

In order to compare the new alternative data with the JD Report, Table 7-1 (from the JD Report, AECOM 2019) has been updated to reflect the updated impact data (due to reduction of impacts within the main wash). Table 2 below provides the comparison and updated impact calculation.

Table 2. Overview of Anticipated Impacts within Study Area (Update of Table 7-1 from JD Report; AECOM 2019).

	Waters of the State – OHWM (RWQCB / CDFW)		Streambeds – Top of Bank (CDFW-Only)		Total Jurisdictional Area (RWQCB / CDFW) [1]		Linear Feet	
	2019	**2020**	**2019**	**2020**	**2019**	**2020**	**2019**	**2020**
Drainage East [2]	0.10	0.01	0.22	0.04	0.33	0.05	567	50
Drainage West	~ 0.001	0.006 [3]	0.01	0.018	0.01	0.024	18	25
Total	0.10	0.016	0.23*	0.058	0.33	0.074	585	75

Notes:

[1] This comment represents total potential impacts to all jurisdictional features (RWQCB/CDFW). The original Table 7-1 from the JD Report (AECOM 2019) utilized different assumptions for calculating impacts. Now that the access road alignment has been modified, an updated version of Table 7-1 is provided. Note that 2019 refers to original JD Report, and 2020 refers to this memorandum.

[2] For Drainage East, it is assumed that the new preferred alternative is utilized- the East Access Road Alternative (adjacent to Drainage East). The wash was referred to as “Drainage East” in the JD Report, and is the same as the Eastern-most of the two Nipton wash features.

[3] Updated calculations with a 25-foot road corridor within original and updated road configurations; results in a slightly higher, though not significant, area of impact (as compared to ~0.001 acre). Impact remains below 0.01 acre.

The following two items are in preparation, and these documents will be sent to you when finalized by the USACE and CDFW, respectively.

- A request for concurrence that the desert washes within the project area are geographically isolated waters, and thus not regulated by the USACE, has been submitted to USACE and is in process (SPL-2019-00400).
- The California Environmental Quality Act (CEQA) document is a Mitigated Negative Declaration (MND). The State lead agency is the CDFW.

We look forward to continued coordination with you on this project. Let us know if you would like to discuss on the phone. Please address any comments or questions to Dr. Erik Larsen at 714.648.2043 or erik.larsen@aecom.com.

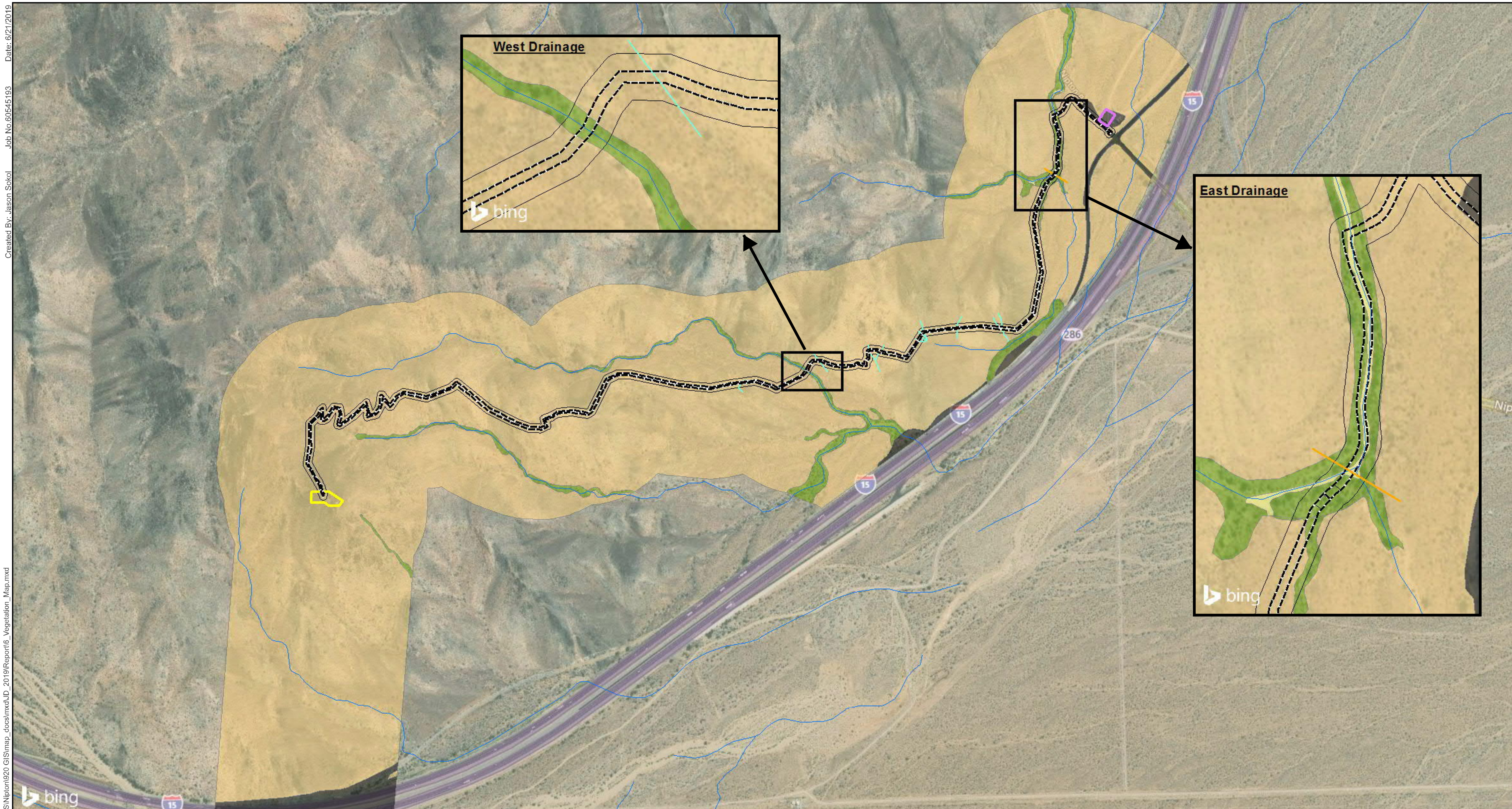
Attachments:

Attachment 1. Figure 4 from JD Report (AECOM 2019).

Attachment 2. Figure - Access Route Alternatives for East Drainage.

ATTACHMENTS

Attachment 1.



Legend

- Proposed Access Route
- Staging Area
- Lease Area
- 25ft. Study Area Buffer
- Mesa Transect
- Non-jurisdictional Feature
- Ephemeral Stream

Vegetation

- Mojave Creosote Bush Scrub
- Mojave Desert Wash Scrub
- OHWM - Unvegetated Wash - CDFW/RWQCB
- Developed/Maintained

0 700 1,400 Feet

Base Map Source:
ESRI, ArcGIS Online
Bing Maps Hybrid

Source: JD Report (AECOM 2019).

FIGURE 4
VEGETATION &
JURISDICTIONAL FEATURES

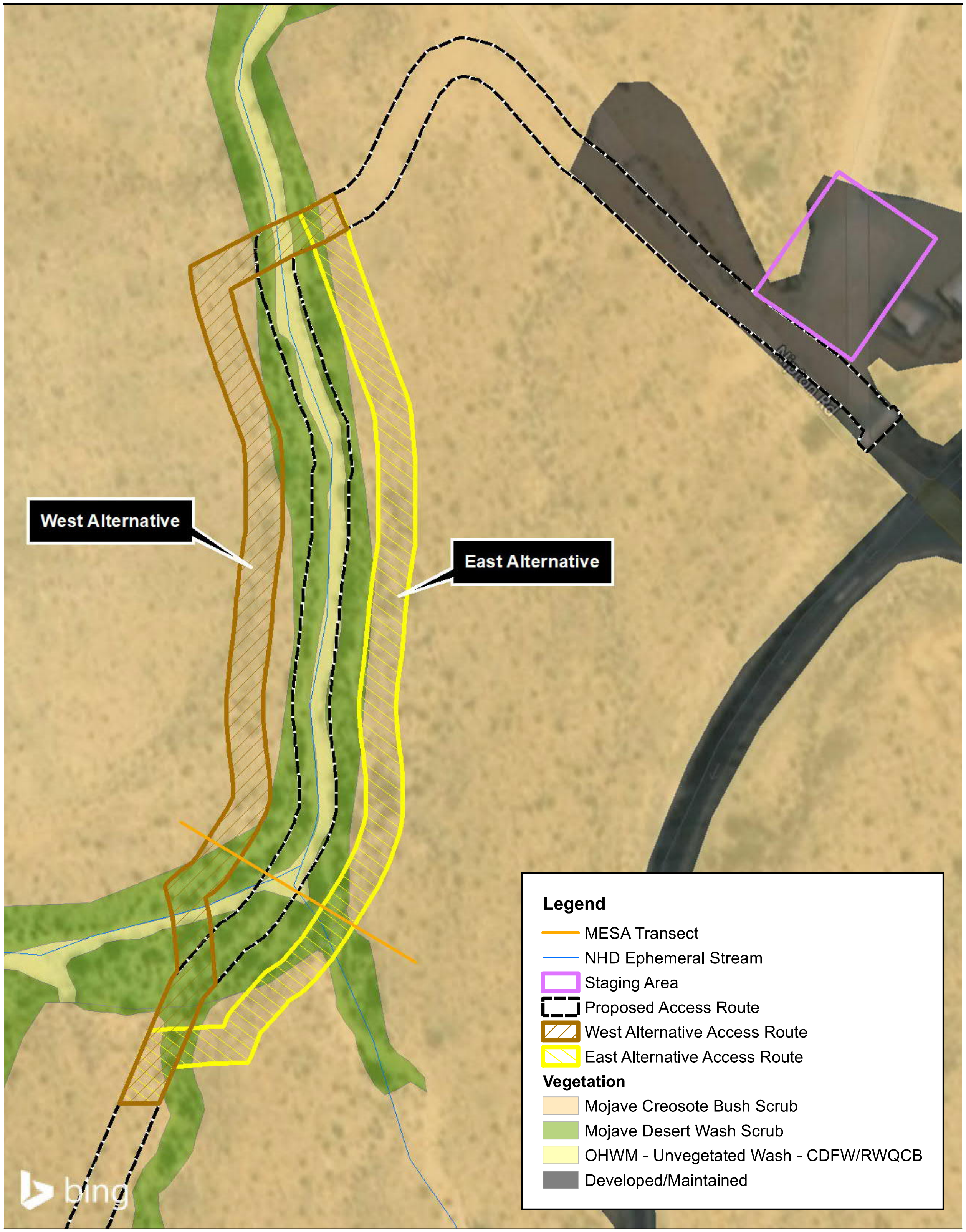
Interconnect Towers
Nipton Project

AECOM

Date: 6/21/2019 Job No.60545193 Created By: Jason Sokol

P:_6053\60534139_ICT_Towers\900-CAD-GIS\Nipton\920 GIS\map_docs\mxd\JD_2019\Report\6_Vegetation_Map.mxd

Attachment 2.



Source: ESRI, ArcGIS Online, Bing Maps Hybrid

100 50 0 100 Feet

Scale: 1: 1,200; 1 inch = 100 feet

Access Route Alternatives for East Drainage

Path: P:_6053\60534139_ICT_Towers\900-CAD-GIS\Nipton\920 GIS\map_docs\mxd\MND\Nipton_Access_Rd_Alternatives_EastDrainage.mxd, 1/6/2020, paul.moreno

Appendix D.3

Jurisdictional Delineation Update Memorandum

AECOM
401 West A Street
Suite 1200
San Diego, CA 92101
www.aecom.com

619.610.7600 tel
619.610.7601 fax

Memorandum

To	Rica Nitka and Dawna Marshall, Dudek Julia Karo and Ali Aghili, CDFW
CC	Tom Gammon, InterConnect Towers, LLC
Subject	Nipton Communication Site Project–Jurisdictional Delineation Report Addendum
From	Michael Anguiano, AECOM
Date	July 8, 2021

This memorandum provides an addendum to the Jurisdictional Delineation of Arid Streams for the Proposed Nipton Communication Site San Bernardino County, CA Report (AECOM 2019). A discrepancy in the study acreage was discovered as part of responding to the Nipton Communication Site Project – Data Request #2 (CDFW and Dudek 2021). The vegetation community acreages within the study area were incorrectly reported in Table 6-1. The study area for the jurisdictional delineation included the access road plus a 25-foot buffer as well as the lease area and staging area. The corrected acreages for the study area are shown in the revised Table 6-1 below. In addition, to avoid confusion, references to the Manual of California Vegetation[1] communities were removed and replaced with the Holland[2] vegetation classifications.

Table 6-1 (Revised). Vegetation Communities within Study Area

Vegetation Community	Area (acres)
Mojave Creosote Bush Scrub	12.79
Mojave Desert Wash Scrub	0.86
Disturbed/developed	0.44
Total	**14.09**

We look forward to continued coordination with you on this project. Let us know if you have any further comments or questions.

[1] California Native Plant Society (CNPS). 2019. *A Manual of California Vegetation*, Online Edition. Accessed online at http://www.cnps.org/cnps/vegetation/. Accessed through November 2017. California Native Plant Society, Sacramento, CA.

[2] Holland, R. 1986. *Preliminary Descriptions of the Terrestrial Natural Communities of California*. Nongame Heritage Program, State of California, Department of Fish and Game

Appendix D.4

Regional Water Quality Control Board Concurrence

Anguiano, Michael

From: Steinert, Tiffany@Waterboards <Tiffany.Steinert@Waterboards.ca.gov>
Sent: Tuesday, April 27, 2021 1:30 PM
To: Anguiano, Michael
Cc: Larsen, Erik; Zimmerman, Jan@Waterboards
Subject: [EXTERNAL] RE: Nipton Project; Resubmittal of 401-WDR Cover Letter, Application, Attachments

Hi Michael,

I was ready to issue the permit for this Project because I felt the impacts had been accurately depicted in the final impact maps that were to be used in the permit.

Tiffany Steinert
Engineering Geologist

Regional Water Quality Control Board - Lahontan Region 6
15095 Amargosa Road – Bldg 2, Ste 210
Victorville, CA 92394
Direct (760) 241-7305
Front desk (760) 241-6583
Fax (760) 241-7308

The majority of Lahontan Water Board staff are teleworking due to an Executive Order from Governor Newsom. However, we are available via email and voicemail. We are responding to emails throughout the workday. Responses to voicemail may take more than one business day.

From: Anguiano, Michael <Michael.Anguiano@aecom.com>
Sent: Monday, April 26, 2021 10:46 AM
To: Steinert, Tiffany@Waterboards <Tiffany.Steinert@Waterboards.ca.gov>
Cc: Larsen, Erik <Erik.Larsen@aecom.com>
Subject: RE: Nipton Project; Resubmittal of 401-WDR Cover Letter, Application, Attachments

EXTERNAL:

Hi Tiffany,

CFDW if moving forward as CEQA lead on this project and they sent us the following request in regards to our report called "Jurisdictional Delineation of Arid Streams for the Proposed Nipton Communication Site." This was attachment B1 in the 401-WDR Application we sent you below

"Indicate if the Regional Water Quality Control Board (RWQCB) has reviewed the report and concurs with the conclusion for the "non-jurisdictional swales". If yes, provide written communication with RWQCB. If verbal only, provide information regarding communication, such as dates, contact person(s), and details regarding conversations."

My understanding from the last time you and I spoke was that you were happy with everything for this project and you were ready to sign off, but could not because the CEQA document was not complete. Can you send me an email confirming you have reviewed the report and concur with the conclusion for the "non-jurisdictional swales?" Let me know if you have any questions about this or need me to resend reports to you.

Thanks,

Mike

Michael Anguiano
Senior Biologist and Project Manager
D +1 619.610.7654
C +1 619.315.8866

From: Larsen, Erik <Erik.Larsen@aecom.com>
Sent: Thursday, May 7, 2020 7:46 AM
To: Steinert, Tiffany@Waterboards <Tiffany.Steinert@Waterboards.ca.gov>
Cc: Phillips, Erin M. <Erin.Phillips@aecom.com>; Anguiano, Michael <Michael.Anguiano@aecom.com>
Subject: RE: Nipton Project; Resubmittal of 401-WDR Cover Letter, Application, Attachments

Tiffany,

Thanks for the e-mail. Let me check with the project team about CEQA and I'll get back to you.

Sincerely,

-Erik

____

Erik Larsen, D.Env.
Sr. Wetlands Scientist/Regulatory Specialist
AECOM – Orange, CA | D 714.648.2043

From: Steinert, Tiffany@Waterboards <Tiffany.Steinert@Waterboards.ca.gov>
Sent: Friday, April 24, 2020 12:21 PM
To: Larsen, Erik <Erik.Larsen@aecom.com>
Cc: Zimmerman, Jan@Waterboards <jan.zimmerman@waterboards.ca.gov>
Subject: [EXTERNAL] Re: Nipton Project; Resubmittal of 401-WDR Cover Letter, Application, Attachments

Hi Erik,

I just wanted to touch base with you. My last note for this Project says that CEQA is not complete. How is CEQA coming along?

Tiffany Steinert
Engineering Geologist

Regional Water Quality Control Board - Lahontan Region 6
15095 Amargosa Road – Bldg 2, Ste 210
Victorville, CA 92392
Direct (760) 241-7305
Front desk (760) 241-6583
Fax (760) 241-7308

The majority of Lahontan Water Board staff are teleworking due to an Executive Order from Governor Newsom. However, we are available via email and voicemail. We are responding to emails throughout the workday. Responses to voicemail may take more than one business day.

From: Larsen, Erik <Erik.Larsen@aecom.com>
Sent: Thursday, February 27, 2020 10:35 AM
To: Steinert, Tiffany@Waterboards <Tiffany.Steinert@Waterboards.ca.gov>
Cc: Zimmerman, Jan@Waterboards <jan.zimmerman@waterboards.ca.gov>; Anguiano, Michael <Michael.Anguiano@aecom.com>; Jacks, Paula <Paula.Jacks@aecom.com>; Phillips, Erin M. <Erin.Phillips@aecom.com>; Tom Gammon <tom@ictowers.com>
Subject: Nipton Project; Resubmittal of 401-WDR Cover Letter, Application, Attachments

EXTERNAL:

Tiffany,

Please see the attached letter and revised application for the Nipton Project.

The memorandum we submitted to you recently is now an attachment to the package. Below is a link to download the Attachments (Approx. 55MB). CTRL+CLICK to follow link.

Please verify when you have received all the files, and let me know if you have any questions or comments.

erik.larsen@aecom.com
sent you some files

1 item, 54.6 MB in total · Will be deleted on 26 March, 2020

Nipton Project - Revised 401-WDR Application Package

Get your files

Download link

https://aecom.wetransfer.com/downloads/90efe8b582eb5b88bb28642aa489c5ad20200227182520/aa498e492c06007f4e2e5c9f23763c2e20200227182520/a7af76

1 item

Nipton_RWQCB 401-WDR Attach A-E_26Feb2020 Final.pdf
54.6 MB

To make sure our emails arrive, please add noreply@wetransfer.com to your contacts.

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Sincerely,

-Erik

Erik Larsen, D.Env.
Sr. Wetlands Scientist / Regulatory Specialist
D 714.648.2043
erik.larsen@aecom.com

AECOM Environment - Impact Assessment & Permitting
999 Town & Country Road, 2nd Floor, Orange, CA 92868
www.aecom.com

Appendix D.5

Army Corps of Engineers Concurrence

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, LOS ANGELES DISTRICT
915 WILSHIRE BOULEVARD, SUITE 930
LOS ANGELES, CALIFORNIA 90017

March 20, 2020

SUBJECT: Determination of Need for Department of the Army Permit

Tom Gammon
InterConnect Towers, LLC
27762 Antonio Parkway, L1-471
Ladera Ranch, California 92694

Dear Mr. Gammon:

I am responding to your request (File No. SPL-2019-00400-SLP) dated April 17, 2019, for clarification whether a Department of the Army Permit is required for the InterConnect Nipton Communication project site. The project is located in an unincorpoated area southwest of Primm (NV), San Bernardino County, California (lat. 35.4783°N, long. -115.451757°W).

The Corps' evaluation process for determining if you need a permit is based on whether or not the proposed project is located within or contains a water of the United States, and whether or not the proposed project includes an activity potentially regulated under Section 10 of the Rivers and Harbors Act or Section 404 of the Clean Water Act. If both conditions are met, a permit would be required.

Based on the separately mailed approved jurisdictional determination dated March 20, 2020, it appears the InterConnect Nipton Communication project site does not contain waters of the United States pursuant to 33 CFR Part 325.9. Therefore, I have determined the proposed project does not require a permit under Section 404 of the Clean Water Act pursuant to 33 CFR Part 323.4.

Notwithstanding this determination, your proposed project may be regulated under other Federal, State, and local laws. If any aspect of your proposed project is located within the vicinity of an existing U.S. Army Corps of Engineers water resources development project, you may be required to seek permission from the Corps pursuant to 33 USC 408 ("Section 408") and/or real estate related permissions. Alterations/modifications to completed Corps projects requires a Corps permission pursuant to Section 408. In addition, real estate permissions may be necessary if the proposed project would affect United States real estate interests managed by the Corps. You are advised that the Corps' issuance of this letter does not preclude or discharge your obligation to acquire a Section 408 permission(s) or real estate permission(s) from the Corps should such permissions be required for you to undertake your proposed project. For information on our Section 408 request process or to determine whether a Section 408 or real estate permission is required, please contact our Engineering Division at spl.408permits@usace.army.mil.

If you have any questions, please contact me at (213) 452-3412 or via email at Shannon.L.Pankratz@usace.army.mil. Thank you for participating in the Regulatory Program. Please help me to evaluate and improve the regulatory experience for others by completing the customer survey form at http://corpsmapu.usace.army.mil/cm_apex/f?p=regulatory_survey.

Sincerely,

PANKRATZ.SHANNON.L.1291250579

Digitally signed by PANKRATZ.SHANNON.L.1291250579
Date: 2020.03.23 12:08:26 -07'00'

Shannon Pankratz
Senior Project Manager
L.A. & San Bernardino Counties Section
North Coast Branch
Regulatory Division

Appendix E

Special-Status Plant Species Known to Occur in the Vicinity of the Nipton Communication Site Survey Area

Special-Status Plant Species Known to Occur in the Vicinity Nipton Communication Site Survey Area

Scientific Name	Common Name	Status[1]	Habitat	Probability of Occurrence
Acmispon argyraeus var. *multicaulis*	scrub lotus	BLM: Sensitive CRPR: 1B.3	Pinyon and juniper woodland, granitic. Elevation 1,200–1,500 meters. Perennial herb. Blooms April–June.	Not expected. The preferred habitat of this species does not occur within the survey area.
Agave utahensis var. *nevadensis*	Clark Mountain agave	CRPR: 4.2	Occurs in Joshua tree woodland, Mojavean desert scrub, pinyon and juniper woodland, in carbonate or volcanic soils. Elevation 900–1,585 meters. Blooms May –July.	**Low:** Suitable habitat is present within the survey area; however, this species is fairly conspicuous and overall vegetative cover is low. It is unlikely that this species is present and was not detected.
Ageratina herbacea	desert ageratina	CRPR: 2B.3	Pinyon-juniper woodland. Rocky sites. Elevation 1,525–2,200 meters. Perennial herb. Blooms July–October.	Not expected. The preferred habitat of this species does not occur within the survey area.
Aliciella triodon	coyote gilia	CRPR: 2B.2	Great basin scrub, pinyon and juniper woodland, fine clayey sand or sand. Elevation 610–1,700 meters. Annual herb. Blooms April–June.	Not expected. The preferred habitat of this species does not occur within the survey area.
Allium nevadense	Nevada onion	CRPR: 2B.3	Pinyon-juniper woodland, sandy or gravelly slopes in desert mountains. Elevation 1,300–1,700 meters. Perennial bulbiferous herb. Blooms April–May.	Not expected. The preferred habitat of this species does not occur within the survey area.
Aloysia wrightii	Wright's beebrush	CRPR: 4.3	Occurs in Joshua tree woodland and pinyon and juniper woodland, in rocky, often carbonate soils. Elevation 900–1,600 meters. Blooms April–October.	Not expected**:** Potentially suitable habitat for this species is absent from the survey area.
Androstephium breviflorum	small-flowered androstephium	CRPR: 2B.2	Mojavean desert scrub, desert dunes, bajadas. One site known from sand dunes. Elevation 270–1,600 meters. Perennial bulbiferous herb. Blooms March–April.	Not expected. The preferred habitat of this species does not occur within the survey area.
Arctomecon merriamii	white bear poppy	CRPR: 2B.2	Chenopod scrub, Mojavean desert scrub, rocky slopes, calcareous soil, loose shale, or sandy washes. Elevation 490–1,585 meters. Perennial herb. Blooms April–May.	Not expected. The preferred habitat of this species does not occur within the survey area.
Argyrochosma limitanea ssp. limitanea	southwestern false cloak-fern	CRPR: 2B.1	Pinyon and juniper woodland. In crevices, especially bases of calcareous rocks. Elevation 1,800 meters. Perennial rhizomatous herb. Blooms April–October.	Not expected. The preferred habitat of this species does not occur within the survey area.

Scientific Name	Common Name	Status[1]	Habitat	Probability of Occurrence
Asclepias nyctaginifolia	Mojave milkweed	CRPR: 2B.1	Mojavean desert scrub, pinyon-juniper woodland. Elevation 1,000–1,700 meters. Perennial herb. Blooms May–June.	Not expected. The preferred habitat of this species does not occur within the survey area.
Astragalus allochrous var. *playanus*	playa milk-vetch	CRPR: 2B.2	Mojavean desert scrub, sandy flats, in creosote bush scrub. Known in California only from two occurrences near Goffs. Elevation 780–805 meters. Perennial herb. Blooms April.	Not expected. The preferred habitat of this species does not occur within the survey area.
Astragalus bernardinus	San Bernardino milk-vetch	CRPR: 1B.2	Joshua tree woodland, pinyon and juniper woodland, granitic or carbonate rock. Elevation 900–2,000 meters. Perennial herb. Blooms April–June.	Not expected. The preferred habitat of this species does not occur within the survey area.
Astragalus cimae var. *cimae*	Cima milk-vetch	CRPR: 1B.2	Great basin scrub, Joshua tree woodland, pinyon-juniper woodland, mesas and stony hillsides, in stiff, calcareous clay soils, commonly among or sheltering under sagebrush. Elevation 890–1,850 meters. Perennial herb. Blooms April–May.	Not expected. The preferred habitat of this species does not occur within the survey area.
Astragalus tidestromii	Tidestrom's milk-vetch	CRPR: 2B.2	Mojavean desert scrub, washes; limestone. Elevation 600–1,585 meters. Perennial herb. Blooms April–July.	Not expected. The preferred habitat of this species does not occur within the survey area.
Astrolepis cochisensis ssp. *cochisensis*	scaly cloak fern	CRPR: 2B.3	Joshua tree woodland, pinyon and juniper woodland. Elevation 900–1,800 meters. Perennial rhizomatous herb. Blooms April–October.	Not expected. The preferred habitat of this species does not occur within the survey area.
Berberis fremontii	Fremont barberry	CRPR: 2B.3	Chaparral, pinyon-juniper woodland, Joshua tree woodland, dry rocky points and slopes. Elevation 840–1,850 meters. Evergreen shrub. Blooms April–June.	Not expected. The preferred habitat of this species does not occur within the survey area.
Bouteloua eriopoda	Black grama	CRPR: 4.2	Occurs in Joshua tree woodland, pinyon and juniper woodland. Blooms May–August. Elevation 900–1,900 meters	Not expected: Potentially suitable habitat for this species is absent from the survey area.
Bouteloua trifida	three-awned grama	CRPR: 2B.3	Mojavean desert scrub, limestone ravines and rocky hills, sometimes in narrow crevices. Associates include *Agave utahensis*, *Salvia funerea*. Elevation 700–2,000 meters. Perennial herb. Blooms May–September.	Not expected. The preferred habitat of this species does not occur within the survey area.

Scientific Name	Common Name	Status[1]	Habitat	Probability of Occurrence
Myriopteris wootonii	Wooton's lace fern	CRPR: 2.3	Joshua tree woodland, pinyon-juniper woodland, in crevices and rocky sites. Elevation 1,450–1,900 meters. Perennial rhizomatous herb. Blooms May–October.	Not expected. The preferred habitat of this species does not occur within the survey area.
Cirsium arizonicum var. *tenuisectum*	desert mountain thistle	CRPR: 1B.2	Joshua tree woodland, Mojavean desert scrub, pinyon and juniper woodland; rocky sites. Elevation 1,500–2,800 meters. Perennial herb. Blooms June–November.	Not expected. The preferred habitat of this species does not occur within the survey area.
Cordylanthus parviflorus	small-flowered bird's-beak	CRPR: 2B.3	Joshua tree woodland, pinyon-juniper woodland, Mojavean desert scrub. Elevation 700–2,200 meters.	Not expected. The preferred habitat of this species does not occur within the survey area.
Coryphantha chlorantha	desert pincushion	CRPR: 2B.1	Mojavean desert scrub, Sonoran desert scrub, Joshua tree woodland, pinyon and juniper woodland. Calcareous substrates; rocky and gravelly sites. Elevation 300–2,400 meters. Perennial stem succulent. Blooms April–September.	Detected. One individual was detected on the hill slope in the southern portion of the survey area.
Coryphantha vivipara var. *rosea*	viviparous foxtail cactus	CRPR: 2B.2	Mojavean desert scrub, pinyon and juniper woodland. On gravelly limestone or volcanic slopes and brushy hillsides. Elevation 1,250–2,700 meters. Perennial stem succulent. Blooms May–June.	Not expected. The preferred habitat of this species does not occur within the survey area.
Cymopterus gilmanii	Gilman's cymopterus	CRPR: 2B.3	Mojavean desert scrub. Carbonate; dry rocky slopes in creosote bush scrub; from the Last Chance Range to Death Valley. Elevation 1,000–2,000 meters. Perennial herb. Blooms April–May.	Not expected. The preferred habitat of this species does not occur within the survey area.
Cymopterus multinervatus	purple-nerve cymopterus	CRPR: 2B.2	Mojavean desert scrub, pinyon and juniper woodland, Joshua tree woodland; sandy or gravelly places. Elevation 790–1,800 meters. Perennial herb. Blooms March–April.	Not expected. The preferred habitat of this species does not occur within the survey area.
Elymus salina	Salina Pass wild-rye	CRPR: 2B.3	Pinyon and juniper woodland; rocky. Elevation 1,350–2,135 meters. Perennial rhizomatous herb. Blooms May–June.	Not expected. The preferred habitat of this species does not occur within the survey area.

Scientific Name	Common Name	Status[1]	Habitat	Probability of Occurrence
Enneapogon desvauxii	nine-awned pappus grass	CRPR: 2B.2	Pinyon and juniper woodland. On decomposed granite or in gravelly limestone soils. Elevation 1,240–1,825 meters. Perennial herb. Blooms August–September.	Detected. A large population of this species occurs within the survey area.
Eremogone congesta var. *charlestonensis*	Charleston sandwort	CRPR: 1B.3	Pinyon and juniper woodland; sandy. In California, known only from the New York Mountains. Elevation 2,200–2,225 meters. Perennial herb. Blooms June.	Not expected. The preferred habitat of this species does not occur within the survey area.
Erigeron uncialis var. *uncialis*	limestone daisy	CRPR: 1B.2	Great basin scrub, subalpine coniferous forest, pinyon and juniper woodland; crevices of limestone cliffs. Elevation 1,900–2,900 meters. Perennial herb. Blooms May–July.	Not expected. The preferred habitat of this species does not occur within the survey area.
Erigeron utahensis	Utah daisy	CRPR: 2B.3	Pinyon-juniper woodland. Limestone. Elevation 1,500–2,320 meters. Perennial herb. Blooms May–June.	Not expected. The preferred habitat of this species does not occur within the survey area.
Eriodictyon angustifolium	narrow-leaved yerba santa	CRPR: 2B.3	Pinyon-juniper woodland. In California, known only from the New York Mountains. Elevation 1,500–1,900 meters. Evergreen shrub. Blooms May–August.	Not expected. The preferred habitat of this species does not occur within the survey area.
Eriogonum umbellatum var. *juniporinum*	juniper sulphur-flowered buckwheat	CRPR: 2B.3	Pinyon-juniper woodland, Mojavean desert scrub. Sandy soil. Elevation 1,300–2,500 meters.	Not expected. The preferred habitat of this species does not occur within the survey area.
Erioneuron pilosum	hairy erioneuron	CRPR: 2B.3	Pinyon-juniper woodland. Rocky or gravelly places; can be on carbonate. Elevation 1,500–2,000 meters. Perennial herb. Blooms May–June.	Not expected. The preferred habitat of this species does not occur within the survey area.
Euphorbia exstipulata var. *exstipulata*	Clark Mountain spurge	CRPR: 2B.1	Mojavean desert scrub. Rocky slopes. In California, known only from Clark Mountain. Elevation 1,800–2,000 meters. Annual herb. Blooms September.	Not expected. The preferred habitat of this species does not occur within the survey area.
Galium proliferum	desert bedstraw	CRPR: 2B.2	Joshua tree woodland, Mojavean desert scrub, pinyon and juniper woodland. Rocky, limestone substrate. Elevation 1,190–1,570 meters. Annual herb. Blooms March–June.	Not expected. The preferred habitat of this species does not occur within the survey area.
Galium wrightii	Wright's bedstraw	CRPR: 2B.3	Pinyon-juniper woodland, lower montane coniferous forest. Rocky, limestone areas with juniper or pinyon-juniper woodland in	Not expected. The preferred habitat of this species does not occur within the survey area.

Scientific Name	Common Name	Status[1]	Habitat	Probability of Occurrence
			California. Elevation 1,600–2,000 meters. Perennial herb. Blooms June–October.	
Glossopetalon pungens	pungent glossopetalon	BLM: Sensitive CRPR: 1B.2	Pinyon-juniper woodland, chaparral. Restricted to limestone; associated with *Heuchera rubescens*, *Petrophytum*, and *Cheilanthes*. Elevation 1,700–2,000 meters.	Not expected. The preferred habitat of this species does not occur within the survey area.
Grusonia parishii	Parish's club-cholla	CRPR: 2B.2	Mojavean desert scrub, Sonoran desert scrub, Joshua tree woodland. Sandy sites. Elevation 300–1,524 meters. Perennial stem succulent. Blooms May–July.	Not expected. The preferred habitat of this species does not occur within the survey area.
Hedeoma drummondii	Drummond's false pennyroyal	CRPR: 2B.2	Great basin scrub, pinyon and juniper woodland. Gravelly, rocky, usually calcareous substrates. Known in California from a single occurrence in Keystone Canyon. Elevation 1,400–1,700 meters. Perennial herb. Blooms May–July.	Not expected. The preferred habitat of this species does not occur within the survey area.
Hymenopappus filifolius var. *eriopodus*	hairy-podded fine-leaf hymenopappus	CRPR: 2B.3	Pinyon and juniper woodland. Carbonate substrates. Elevation 1,600–1,700 meters. Perennial herb. Blooms May–July.	Not expected. The preferred habitat of this species does not occur within the survey area.
Ivesia jaegeri	Jaeger's ivesia	BLM: Sensitive CRPR: 1B.3	Pinyon-juniper woodland, upper montane coniferous forest. In California, on limestone cliffs in pinyon-juniper or pinyon-white fir forest. Elevation 1,815–3,600 meters. Perennial herb. Blooms June–July.	Not expected. The preferred habitat of this species does not occur within the survey area.
Juncus interior	inland rush	CRPR: 2B.2	Pinyon and juniper woodland. In washes in sand. Elevation 1,830–1,840 meters. Perennial herb. Blooms June–August.	Not expected. The preferred habitat of this species does not occur within the survey area.
Juncus nodosus	knotted rush	CRPR: 2B.3	Meadows, marshes, and swamps. Mesic sites and lake margins. Elevation 1,130–1,700 meters. Perennial rhizomatous herb. Blooms July–September.	Not expected. The preferred habitat of this species does not occur within the survey area.
Linum puberulum	plains flax	CRPR: 2B.3	Pinyon and juniper woodland, Great basin scrub, Joshua tree woodland, Mojavean desert scrub. Dry ridges. Elevation 1,000–2,500 meters. Perennial herb. Blooms May–July.	Not expected. The preferred habitat of this species does not occur within the survey area.

Scientific Name	Common Name	Status[1]	Habitat	Probability of Occurrence
Lithospermum incisum	plains stoneseed	CRPR: 2B.3	Pinyon-juniper woodland. Elevation 1,650–1,720 meters. Perennial herb. Blooms May.	Not expected. The preferred habitat of this species does not occur within the survey area.
Menodora scabra var. *scabra*	rough menodora	CRPR: 2B.3	Joshua tree woodland, Mojavean desert scrub, pinyon and juniper woodland. Rocky soils; canyons. Elevation 1,200–1,800 meters. Perennial herb. Blooms May–June.	Not expected. The preferred habitat of this species does not occur within the survey area.
Mentzelia polita	polished blazing star	BLM: Sensitive CRPR: 1B.2	Mojavean desert scrub. Carbonate soils. Elevation 1,200–1,500 meters. Perennial herb. Blooms April–August.	Not expected. The preferred habitat of this species does not occur within the survey area.
Mentzelia pterosperma	wing-seed blazing star	CRPR: 2B.2	Mojavean desert scrub. Clay, gypseous substrates. Elevation 1,140 meters. Annual/perennial herb. Blooms April–June.	Not expected. The preferred habitat of this species does not occur within the survey area.
Mirabilis coccinea	red four o'clock	CRPR: 2B.3	Pinyon and juniper woodland. Elevation 1,070–1,800 meters. Perennial herb. Blooms May–July.	Not expected. The preferred habitat of this species does not occur within the survey area.
Monardella eremicola	Clark Mountain monardella	BLM: Sensitive CRPR: 1B.3	Pinyon and juniper woodland, riparian scrub (desert). Granitic or carbonate. Usually in bedrock cracks and benches along canyon washes. Elevation 1,500–2,100 meters. Shrub. Blooms June–August.	Not expected. The preferred habitat of this species does not occur within the survey area.
Muhlenbergia arsenei	tough muhly	CRPR: 2B.3	Pinyon-juniper woodland. On steep slopes and ridgetops. Granite and limestone substrate. Elevation 1,400–2,000 meters. Perennial rhizomatous herb. Blooms August–October.	Not expected. The preferred habitat of this species does not occur within the survey area.
Muhlenbergia fragilis	delicate muhly	CRPR: 2B.3	Pinyon-juniper woodland. Open, more-or-less disturbed limestone gravelly wash. Elevation 515 meters. Annual herb. Blooms October.	Not expected. The preferred habitat of this species does not occur within the survey area.
Muhlenbergia pauciflora	few-flowered muhly	CRPR: 2B.3	Pinyon-juniper woodland. Sandy loam soils with *Pinus monophylla*, *Quercus turbinella*, and *Garrya*. Elevation 1,745 meters. Perennial rhizomatous herb. Blooms September–October.	Not expected. The preferred habitat of this species does not occur within the survey area.
Munroa squarrosa	false buffalo-grass	CRPR: 2B.2	Pinyon-juniper woodland. Open, gravelly or rocky places. In California, known only from the Clark and New York Mountains.	Not expected. The preferred habitat of this species does not occur within the survey area.

Scientific Name	Common Name	Status[1]	Habitat	Probability of Occurrence
			Elevation 1,500–2,400 meters. Annual herb. Blooms October.	
Nama dichotoma var. *dichotoma*	forked purple mat	CRPR: 2B.3	Pinyon-juniper woodland. Granite or limestone slopes, ridgetops. Elevation 1,900–2,200 meters. Annual herb. Blooms September–October.	Not expected. The preferred habitat of this species does not occur within the survey area.
Oenothera cavernae	cave evening-primrose	CRPR: 2B.1	Great basin scrub, Joshua tree woodland, Mojavean desert scrub. Gravelly, often calcareous substrate. Elevation 760–1,280 meters. Annual herb. Blooms March–November.	Not expected. The preferred habitat of this species does not occur within the survey area.
Oenothera longissima	long-stem evening-primrose	CRPR: 2B.2	Mojavean desert scrub, pinyon and juniper woodlands. Seasonally mesic sites. Elevation 1,000–1,700 meters. Annual/perennial herb. Blooms July–September.	Not expected. The preferred habitat of this species does not occur within the survey area.
Pellaea truncata	spiny cliff-brake	CRPR: 2B.3	Pinyon-juniper woodland. Granitic boulders and fissures in granite cliffs, also in volcanic or sandy limestone soils. Elevation 1,200–2,150 meters. Perennial rhizomatous herb. Blooms April–June.	Not expected. The preferred habitat of this species does not occur within the survey area.
Penstemon thompsoniae	Thompson's beardtongue	CRPR: 2B.3	Pinyon-juniper woodland. Limestone soils; gravelly sites. Elevation 1,500–2,700 meters. Perennial herb. Blooms May–June.	Not expected. The preferred habitat of this species does not occur within the survey area.
Penstemon utahensis	Utah beardtongue	CRPR: 2B.3	Chenopod scrub, Great basin scrub, Mojavean desert scrub, pinyon-juniper woodland. Rocky sites. Elevation 1,065–2,500 meters. Perennial herb. Blooms April–May.	Not expected. The preferred habitat of this species does not occur within the survey area.
Phacelia anelsonii	Aven Nelson's phacelia	CRPR: 2B.3	Joshua tree woodland, pinyon and juniper woodland. Shady places in rich soil, base of sandstone or limestone cliffs, among rocks or in washes. Elevation 1,200–1,575 meters. Annual herb. Blooms April–May.	Not expected. The preferred habitat of this species does not occur within the survey area.
Phacelia barnebyana	Barneby's phacelia	CRPR: 2B.3	Great basin scrub, pinyon and juniper woodland. Gravelly and rocky, usually calcareous substrates. Elevation 1,600–2,700 meters. Annual herb. Blooms May–July.	Not expected. The preferred habitat of this species does not occur within the survey area.

Scientific Name	Common Name	Status[1]	Habitat	Probability of Occurrence
Phacelia coerulea	sky-blue phacelia	CRPR: 2B.3	Mojavean desert scrub, pinyon-juniper woodland. Elevation 1,400–2,000 meters. Annual herb. Blooms April–May.	Detected. One individual located along the proposed electric distribution line.
Phacelia perityloides var. *jaegeri*	Jaeger's phacelia	CRPR: 1B.3	Pinyon-juniper woodland. Rocky, often limestone soils. Elevation 1,830–2,345 meters. Perennial herb. Blooms May–July.	Not expected. The preferred habitat of this species does not occur within the survey area.
Phacelia pulchella var. *gooddingii*	Goodding's phacelia	CRPR: 2B.2	Mojavean desert scrub. Clay soils, often alkaline; flats. Elevation 785–1,000 meters. Annual herb. Blooms April–June.	Not expected. The preferred habitat of this species does not occur within the survey area.
Physalis lobata	lobed ground-cherry	CRPR: 2B.3	Mojavean desert scrub, playas. Decomposed granite soil, alkaline dry lakes. Elevation 500–800 meters. Perennial herb. Blooms May–January.	Not expected. The preferred habitat of this species does not occur within the survey area.
Physaria chambersii	Chambers' physaria	CRPR: 2B.3	Pinyon-juniper woodland. Limestone soils; rocky sites. Elevation 1,500–2,590 meters. Perennial herb. Blooms April–May.	Not expected. The preferred habitat of this species does not occur within the survey area.
Polygala acanthoclada	thorny milkwort	CRPR: 2B.3	Chenopod scrub, Joshua tree woodland, pinyon-juniper woodland. Elevation 760–2,285 meters. Shrub. Blooms May–August.	Not expected. The preferred habitat of this species does not occur within the survey area.
Portulaca halimoides	Desert portulaca	CRPR: 4.2	Occurs in Joshua tree woodland. Prefers sandy soils. Blooms in September. Elevation 1000 – 1200 meters.	Not expected: Potentially suitable habitat for this species is absent from the survey area.
Sanvitalia abertii	Abert's sanvitalia	CRPR: 2B.2	Pinyon-juniper woodland. Rocky limestone slopes and washes. Known in California only from the Clark and New York Mountains. Elevation 1,570–1,800 meters. Annual herb. Blooms August–September.	Not expected. The preferred habitat of this species does not occur within the survey area.
Bahia neomexicana	many-flowered bahia	CRPR: 2B.3	Pinyon-juniper woodland. Sandy soils. Elevation 1,500–1,700 meters. Annual herb. Blooms September–October.	Not expected. The preferred habitat of this species does not occur within the survey area.
Sclerocactus johnsonii	Johnson's bee-hive cactus	CRPR: 2B.2	Mojavean desert scrub. Granitic soils. Elevation 500–1,200 meters. Perennial stem succulent. Blooms April–May.	Not expected. The preferred habitat of this species does not occur within the survey area.
Sphaeralcea rusbyi var. *eremicola*	Rusby's desert-mallow	BLM: Sensitive CRPR: 1B.2	Mojavean desert scrub, Joshua tree woodland. Sometimes on carbonate; sometimes in washes. Known only from Death Valley National Park and	Not expected. The preferred habitat of this species does not occur within the survey area.

Scientific Name	Common Name	Status[1]	Habitat	Probability of Occurrence
			Clark Mountain. Elevation 965–1,500 meters. Perennial herb. Blooms March–June.	
Stipa arida	Mormon needle grass	CRPR: 2B.3	Joshua tree woodland, pinyon and juniper woodland, on carbonate. Elevation 500–2,570 meters. Perennial herb. Blooms May–July.	Not expected. The preferred habitat of this species does not occur within the survey area.
Stipa divaricata	small-flowered rice grass	CRPR: 2B.3	Pinyon and juniper woodland, gravelly, carbonate. Elevation 700–2,950 meters. Perennial herb. Blooms June–September.	Not expected. The preferred habitat of this species does not occur within the survey area.
Tetracoccus hallii	Hall's tetracoccus	CRPR: 4.3	Mojavean desert scrub. Elevation 30–1,200 meters. Deciduous shrub. Blooms January–May.	Not expected. The preferred habitat of this species does not occur within the survey area.
Thysanocarpus rigidus	rigid fringepod	BLM: Sensitive CRPR: 1B.2	Pinyon and juniper woodland, dry rocky slopes. Elevation 600–2,200 meters. Annual herb. Blooms February–May.	Not expected. The preferred habitat of this species does not occur within the survey area.
Tragia ramosa	Desert tragia	CRPR: 4.3	Occurs in Chenopod scrub, pinyon and juniper woodland. Prefers rocky soils. Blooms April–May. Elevation 900–1,860 meters.	Not expected: Potentially suitable habitat for this species is absent from the survey area.
Woodsia plummerae	Plummer's woodsia	CRPR: 2B.3	Pinyon-juniper woodland. Mesic sites; bases of granitic cliffs and boulders. Elevation 1,600–2,000 meters. Perennial rhizomatous herb. Blooms May–September.	Not expected. The preferred habitat of this species does not occur within the survey area.

[1]**Status Key**

California Endangered Species Act (CESA) – State endangered
Bureau of Land Management (BLM) Sensitive – BLM sensitive species
CRPR 1A – presumed extirpated in California and either rare or extinct elsewhere
CRPR 1B – rare, threatened, or endangered in California and elsewhere
CRPR 2A – presumed extirpated in California but common elsewhere
CRPR 2B – rare, threatened, or endangered in California but more common elsewhere
CRPR 3 – plants for which more information is needed (a review list)
CRPR 4 - plants of limited distribution (watch list)

-.1 Seriously endangered in California
-.2 Fairly endangered in California
-.3 Not very endangered in California

Appendix F

Special-Status Wildlife Species Known to Occur in the Vicinity of the Nipton Communication Site Survey Area

Special-Status Wildlife Species Known to Occur in the Vicinity of the Nipton Communication Site Survey Area

Common Name	Scientific Name	Sensitivity Status	Habitat	Probability of Occurrence in Project Area
Reptiles				
Desert tortoise	*Gopherus agassizii*	Federally Threatened; State Threatened	Alluvial fans and plains and rocky slopes with vegetation such as creosote bush (*Larrea tridentate*), blackbrush (*Coleogyne ramosissima*), and Joshua tree (*Yucca brevifolia*) habitat. At higher elevations, the species can be found in juniper woodlands and, at lower elevations, saltbush (*Atriplex* sp.) habitat is suitable. In general, the species prefers creosote bush habitat.	Documented. Desert tortoise adults and sign were observed in the project area during 2013/2014 surveys for the species.
Banded Gila monster	*Heloderma suspectum cinctum*	CDFW Species of Special Concern	Required habitat includes scrubland, succulent desert, and oak and woodland. Burrows, thickets, and rocky locations are required for shelter.	Low: Suitable habitat within the survey area, but the species is rare in California with only 28 sightings in a period of 153 years (Lovich and Haxel 2011).
Birds				
Golden eagle	*Aquila chrysaetos*	CDFW Fully Protected; BLM Sensitive	Required habitat includes partially or completely open country, especially mountains, hills, and cliffs. Habitat varies widely across arctic, desert, shrublands, grasslands, forests and farmlands. Predominantly in the western United States.	Low: Suitable foraging habitat within the survey area is marginal, though there is potential for this species to occur as a transient. The species is known to nest in the Clark Mountains north of the project site (BLM 2010).
Western burrowing owl	*Athene cunicularia hypugaea*	CDFW Species of Special Concern; BLM Sensitive	Found mainly in grassland and open scrub from the coast to the foothills. Also found in deserts and scrublands.	Not Expected: Species detected at ISEGS (BLM 2010), but there is no suitable nesting habitat in the survey area for this species. Habitat is too rocky for species to occur.

Common Name	Scientific Name	Sensitivity Status	Habitat	Probability of Occurrence in Project Area
Swainson's hawk	*Buteo swainsonii*	BLM Sensitive	Required habitat includes open spaces such as grasslands, prairies, pastures, and hay and alfalfa fields. Scattered stands of trees near these areas are required for nesting,	Not expected: No suitable nesting habitat is present. May rarely temporarily occupy the project area during migration movements.
Gilded flicker	*Colaptes chrysoides*	State Endangered BLM Sensitive	In California, primarily found in the lower Colorado River valley in desert riparian, desert wash, and Joshua tree habitats.	Not expected: No suitable nest sites present (e.g., no tall and dense Joshua trees and tall cacti present). May temporarily occupy the project area during migration movements.
Vaux's swift	*Chaetura vauxi*	CDFW Species of Special Concern	Occurs in redwood, Douglas-fir, and other coniferous forests. Nests in large hollow trees and snags.	Low: Species detected at ISEGS, as a migrant (BLM 2010). No nesting habitat occurs in the survey area.
Loggerhead shrike	*Lanius ludovicianus*	CDFW Species of Special Concern	Occurs in semi-open country with desert scrub vegetation for nesting. Uses nearby structures (fences, posts, thorny vegetation) for perching and impaling prey items.	Moderate potential: Species detected at ISEGS (BLM 2010) and is a common breeder in desert environments in sparsely vegetated areas. Species can nest in relatively short, sparse vegetation.
Bendire's thrasher	*Toxostoma bendirei*	CDFW Species of Special Concern; BLM Sensitive	Breeding habitat in California is typically described as Mojave desert scrub with tall, mature Joshua trees (*Yucca brevifolia*), Spanish bayonet (*Y. baccata*), Mojave yucca (*Y. schidigera*), cholla cactus (*Opuntia acanthocarpa, O. echinocarpa, or O. ramosissima*), or other succulents.	Not expected: no suitable nesting habitat is present due to lack of tall, mature Joshua trees, and patches of dense desert scrub vegetation are too short and sparse. May temporarily occupy the project area during migration movements.
Crissal thrasher	*Toxostoma crissale*	CDFW Species of Special Concern	Required habitat includes dense, shrubby vegetation such as desert and foothill scrub and riparian brush.	Not expected: Potentially suitable habitat for this species is absent from the survey area. Species detected at ISEGS in the valley where more suitable habitat exists (BLM 2010).
LeConte's thrasher	*Toxostoma lecontei*	CDFW Species of Special Concern	Desert resident; primarily of open desert wash, desert scrub, alkali desert scrub, and desert succulent scrub habitats. Requires patches	Low: Species detected at ISEGS (BLM 2010), but vegetation height and density in survey area is marginal for this species. Desert scrub is

Common Name	Scientific Name	Sensitivity Status	Habitat	Probability of Occurrence in Project Area
			of tall dense desert scrub or desert riparian vegetation for nesting.	too short and sparse to support nesting.
Gray vireo	*Vireo vicinior*	CDFW Species of Special Concern; BLM Sensitive	Typically breed in mature, arid chaparral or open pinyon-juniper woodland. Range is restricted in California, primarily to areas south of the Mojave Desert.	Not expected: No known nearby nesting locations. Species typically breeds in higher elevations; suitable habitat not present in the project area. May temporarily occupy the project area during migration movements.
Mammals				
Townsend's big-eared bat	*Corynorhinus townsendii*	CDFW Species of Special Concern; BLM Sensitive	Wide variety of habitats. Requires caves or cave-like roosting habitat, such as old mines, bridges, buildings and other man-made structures and rarely in tree cavities. Inland and desert roosts are frequently a number of kilometers from the nearest water. Forage in a variety of habitats, primarily between the canopy and mid-canopy of forests, woodlands, and riparian zones, but also in sagebrush shrub steppe.	Not expected to roost in the project area given lack of suitable roosting habitat. Moderate potential to forage in project area given that potential roost sites exist in surrounding mountains. The nearest documented occurrence within 5 miles was reported in 1995 and located approximately 4 miles south of the proposed project (CDFW 2019).
American badger	*Taxidea taxus*	CDFW Species of Special Concern	Required habitat includes plains, prairies, deserts, open valleys, woodland edges, and alpine meadows.	Detected: Suitable habitat is present within the survey area, and sign was detected during biological surveys.
Desert bighorn sheep	*Ovis canadensis nelson*	CDFW Fully Protected; BLM Sensitive	Requires a variety of habitat characteristics related to topography, visibility, forage quality and quantity, and water availability. Prefer areas on or near mountainous terrain that are visually open, as well as steep and rocky. Steep, rugged terrain is used for escape and lambing. Alluvial fans and washes in flatter terrain are also used for forage and water and as connectivity habitat between more rugged areas.	Scat observed in the project area. The project area is generally not rugged enough for lambing. However, the species likely occasionally moves through and forages in the project area.

BLM = Bureau of Land Management; CDFW = California Department of Fish and Wildlife; ISEGS = Ivanpah Solar Electric Generating System

Bureau of Land Management (BLM). 2010. *California Desert Conservation Area Plan Amendment / Final Environmental Impact Statement for Ivanpah Solar Electric Generating System*. BLM/CA/ES-2010-010+1793

California Department of Fish and Wildlife (CDFW). 2019. California Natural Diversity Database (CNDDB). Available: https://www.wildlife.ca.gov/Data/CNDDB. Accessed June 2019.

Lovich, J. and G. Haxel. 2011. A Previously Unreported Locality Record for the Gila Monster (Heloderma suspectum). Bulletin, Southern California Academy of Sciences 110(2), 59-–62. https://doi.org/10.3160/1006.1

Appendix G

Desert Tortoise Pre-Project Survey Report

AECOM
401 West A St.
Suite 1200
San Diego, CA 92101
www.aecom.com

619.610.7600 tel
619.610.7601 fax

September 3, 2015

Lara Kobelt
Needles Field Office
Bureau of Land Management
1303 South U.S. Highway 95
Needles, California 92363

RE: Nipton Communication Site – 2013 - 2015 Desert Tortoise Pre-Project Survey Report, San Bernardino County, California

Dear Ms. Kobelt:

This letter report summarizes the results of pre-project surveys conducted by AECOM during 2013, 2014, and 2015 for the federally listed and state-listed threatened desert tortoise (*Gopherus agassizii*) (DT) associated with the Nipton Communication Site. Surveys were conducted on behalf of InterConnect Towers.

Project Location

The Nipton Communication Site, hereafter referred to as the project site, is located in San Bernardino County, California, approximately 10 miles (16.1 kilometers) south of the California/Nevada state line, immediately southwest of the junction of Interstate 15 (I-15) and Nipton Road, in the far eastern half of Section 33 Township 16 North, Range 14 East (Figure 1). The center of the communication tower would be located at 35°28'03.0"N, 115°28'10.0"W at an elevation of approximately 4,460 feet (1,359 meters) above mean sea level (Figure 2). The proposed site and all ancillary components would be located entirely on public lands managed by the Bureau of Land Management (BLM).

Project Description

The project site would consist of an irregularly shaped 6,240-square-foot (0.143-acre) lease area, within which would be located a fenced communication site compound. The project would also include the use of an existing access road measuring 375 feet (114.3 meters) in length and 14 feet (4.3 meters) in width, as well as the construction and use of a new access road segment measuring approximately (1.73 miles; 2.78 kilometers) in length and an average of 25 feet (7.6 meters) in width. Five vehicle pull-off/passing areas measuring 25 feet (7.6 meters) by 100 feet (30.5 meters) would be located at appropriate intervals along the new roadway.

Commercial electric power would be provided to the site from an adjacent distribution line approximately 2,640 feet (805 meters) south of the site (Figure 2). The electric power easement would run on a southerly/northerly alignment from the communication site lease area to an existing Southern California Edison (SCE) distribution power pole lying south of the I-15 right-of-way.

Construction of the electric distribution line would occur before the construction of the communication site. The communication site and the access road would be graded prior to the start of construction of the electric distribution line. The graded communication site would then be used as a temporary helicopter landing pad for the construction of the electric distribution line. Poles and digging equipment would be delivered to location via helicopter. The helicopter would be used to set each wood pole into position and string the conductors. A 0.18-acre (0.07-hectare) temporary staging area measuring 80-foot by 100-foot (24-meter by 30.5-meter) would be located in a previously disturbed parking area.

Disturbance associated with the electric distribution line outside of the communication site lease area would be limited to the installation of 12 - Class 3 Douglas Fir wood poles, approximately 14 inches (36 centimeters) in diameter. Each pole would be approximately 45 feet (13.8 meters) tall as measured from ground level after installation. Excavation for the new utility poles would be performed by hand utilizing an air powered hand auger and jack hammer. The holes prepared for the new utility poles would be approximately 2 feet (61 centimeters) in diameter and 4.5 to 6 feet (137 to 183 centimeters) in depth. No cranes would be required for setting the poles. Backfill would be the excavated native soils compacted with an air powered tamper. The poles may be set in a concrete caisson using PreCast Concrete Sonotubes. No imported soils would be required. No adjacent access road would be required for installation.

Equipment at the site would include a self-supporting, three-legged, lattice-type structure measuring 196 feet (59.7 meters) in height; an equipment shelter, likely a 20-foot (6.1-meter) by 48-foot (14.6-meter) concrete masonry block building; four 25-kilowatt (kW) standby generators located inside the equipment shelter; and four 2,000-gallon (7,570-liter) propane tanks. The tower, shelter, and propane tanks would be enclosed within a chain-link fence measuring 10 feet (3 meters) in height. Fencing would be constructed of 1.5-inch (3.8-centimeter) closed-loop anti-climb, anti-cut materials. A gate would provide access into the compound for persons and vehicles. A downward-shielded security light would be mounted to the outside of the equipment shelter and would be activated by a motion sensor.

Access to the project site would begin at the Nipton Road interchange and would travel northwesterly along an existing graded dirt road for approximately 375 feet (114.3 meters). From this point, a new dirt roadway would be graded in a southwesterly direction, approximately (1.73 miles; 2.78 kilometers) to the proposed communication site at the top of a hill. The total elevation gain from the base of the hill to the proposed communication site location is approximately 900 feet (274.3 meters) (Figure 2). The roadway would be constructed to a width of 14 feet (4.3 meters) to accommodate trucks and other large vehicles required during construction and operation of the site. Up to 50 feet (15.2 meters) of upslope and downslope fall-off disturbance could occur on either side of the roadway along the steeper stretches.

The initial portion of the new roadway would travel for approximately 450 feet (137.2 meters) along the bottom of an ephemeral desert wash before circling around a low hill and passing through a low saddle. The roadway would then cross another ephemeral wash and begin to climb up the ridge to the site.

The new roadway segment would cross the aforementioned ephemeral desert wash approximately 3,650 feet (1,113 meters) along the alignment. At the location of the proposed crossing, the wash is approximately 16 feet (4.9 meters) in width. Although substantial surface flows within this waterway are infrequent, improvements at the crossing would need to be made to ensure serviceability of the roadway following major storm water runoff events. This would be accomplished by placement of ribbed galvanized steel pipes placed directly on the streambed. The pipes would then be overlain with rock riprap and gravel. Inflow and outflow areas would also be hardened with riprap to prevent scouring both upstream and downstream of the crossing. The quantity and size of the pipes at the crossing would be designed to accommodate projected peak flows along the watercourse, but preliminary indications based on experience with similar projects in similar locations indicate that a minimum of three 36-inch-diameter (91-centimeter-diameter) pipes would be required. The roadway surface at the crossing would be 14 feet (4.3 meters) in width, consistent with the rest of the roadway.

Site Description and Environmental Setting

For purposes of this report, the “survey area” includes the lease area, staging area, the proposed access road, electric distribution line, and the buffer area, which consists of three 30-foot-wide (10-meter-wide) belt transects out to 656 feet (200 meters) parallel to and/or encircling the project site perimeter. The three belt transects were conducted at approximately 217-foot (66-meter) intervals (217, 433, and 650 feet [66, 132, and 198 meters]) parallel to the project site perimeter. Per BLM direction, buffer area transects along the access road did not traverse or extend to the southeast side of I-15.

Topographically, the project site begins at the proposed access road, which follows a low ridgeline toward the lease area. The electric distribution line begins south of I-15 and traverses up the hill side to the lease area. The buffer area is rugged mountainous terrain and is a part of the Clark Mountain Range. To the south of Clark Mountain Range is Wheaton Wash, generally on the south side of I-15 in the survey area. Elevations in the survey area range from approximately 3,412 to 4,724 feet (1,040 meters to 1,440 meters) above mean sea level.

Habitat within the survey area is composed mainly of Mojave creosote bush scrub (Holland 1986) (Figure 3). Although shrub cover is sparse, common shrubs within the survey area for this community include creosote bush (*Larrea tridentata*), white bursage (*Ambrosia dumosa*), cheesebush (Ambrosia salsola), white ratany (Krameria bicolor), leafy California buckwheat (*Eriogonu*m *fasciculatum* var. *foliolosum*), Mojave yucca (*Yucca shidigera*), and Joshua tree (*Yucca brevifolia*). Smaller washes with Mojave desert wash scrub habitat are also found within the survey area. Common shrubs within this habitat include catclaw (*Senegalia gregii*), bladder sage (*Scutellaria mexicana*), woolly bluestar (*Amsonia* *tomentosa*), and big galleta (*Hilaria rigida*). Soils appear to be mainly decomposed granite. Site photographs are included in Appendix A.

The climate of this desert region is a typical arid desert climate characterized by low precipitation and atmospheric humidity, high summer temperatures and relatively cool winter temperatures. There are strong fluctuations in daily temperatures. Precipitation is generally bimodal, with winter/spring rains in December through March and a spike in precipitation in August during the monsoon season (NOAA 2013; USGS 2013).

Background Information

DT is listed as threatened under the federal Endangered Species Act, with critical habitat designated by the U.S. Fish and Wildlife Service (USFWS 1994a). The listing was initially made on August 4, 1989, by emergency rule (USFWS 1989) and by final rule on April 2, 1990 (USFWS 1990). This listing status applies to the Mojave population of DT, north and west of the Colorado River. An approved recovery plan was published by the U.S. Fish and Wildlife Service (USFWS 1994b, 2011). DT was listed as threatened under the California Endangered Species Act on June 22, 1989 (CFGC 1989).

DT is widely distributed in the deserts of California, southern Nevada, extreme southwestern Utah, and western and southern Arizona, and throughout most of Sonora, Mexico. However, populations over approximately 50% of its U.S. range (30% of its overall range) began declining in the late 1960s and early 1970s (USFWS 1990, 1994b, 2011). These declines have been attributed to several factors, paramount of which are an upper respiratory tract disease; habitat loss and fragmentation due to urbanization and off-road vehicular use; illegal collecting and vandalism by humans; and predation on young DT, especially by ravens.

According to the U.S. Fish and Wildlife Service (USFWS 2008), suitable DT habitat is typically alluvial fans and plains and rocky slopes with vegetation such as creosote bush, blackbrush (*Coleogyne ramosissima*), and Joshua tree habitat. At higher elevations DT can be found in juniper woodlands, and at lower elevations, saltbush (*Atriplex* sp.) habitat is suitable. In general, DT prefer creosote bush habitat, but of most importance is high productivity of annual species, as the primary diet of DT is ephemeral plants (Avery 1998; Esque 1994; Jennings 1997). Therefore, the composition of the shrub layer is likely less important than the productivity of the ephemeral plants. Soils generally need to accommodate burrowing (Andersen et al. 2000) or consist of caliche burrows.

DT home ranges vary with locality, year, resource availability, and social interactions (Berry 1986; O'Connor et al. 1994). The male DT home range (0.04 to 0.31 square mile [0.1 to 0.8 square kilometer]) is estimated to be twice the size of that for females (Berry 1986; Burge 1977), and home ranges can be as large as 1.5 square miles (3.9 square kilometers) (Berry 1986). DT use multiple dens throughout individual home ranges (Barrett 1990).

Survey Methodology

The survey area is within the known range of DT. Prior to the initiation of surveys, a nine-quad search of the California Natural Diversity Database (CNDDB) was conducted to obtain information on DT known to occur within or in the vicinity of the project site. This included the primary quad that encompasses the site and the eight quads immediately surrounding each quad. No CNDDB DT observations were found within the search area. The nearest CNDDB location of DT is a 2004 observation approximately 1.3 miles (2.1 kilometers) to the southeast, on the east side of I-15 from the project site (CDFW 2013) (Figure 4). The Ivanpah Solar Electric Generating System (ISEGS) project is located approximately 5 miles (1.6 kilometers) north of the survey area. Approximately 152 DT were detected during activities associated with the clearance and translocation of DT for the 3,454-acre (1,398-hectare) ISEGS site in 2010 (USFWS 2010a). This suggests relatively high DT densities within the vicinity of the proposed project.

No federally designated critical habitat for DT occurs within the survey area. The nearest DT critical habitat occurs on the southeast side of I-15 approximately 600 feet (183 meters) from the beginning of the access road project site (Figure 4). The communication site itself (i.e. lease area) is approximately 6,200 feet (1,890 meters) from critical habitat with significant rocky terrain and the I-15 between the two. The Ivanpah Desert Wildlife Management Area, a BLM established area to protect high-quality DT habitat, also occurs on the east side of I-15 to the southeast of the project site (Figure 4).

Pre-project surveys for DT, per the U.S. Fish and Wildlife Service (USFWS) protocol (USFWS 2010b), were initially conducted on April 2, 2013. The project was redesigned in 2014, and USFWS protocol DT surveys were conducted again on April 23, 2014 and April 24, 2014 for the lease area and proposed access road described in this report. Following the completion of 2014 surveys, an electric distribution line was added to the project. Therefore, USFWS protocol DT surveys were conducted again on April 18, 2015 for the electric distribution line discussed in this report. Results of the 2013 and 2014 surveys are included for context; however, the previous survey area and project footprint are not discussed further in this report.

The entire survey area contained suitable habitat for DT, and 100% coverage presence-or-absence surveys were conducted within the project site using transects spaced approximately 30 feet (10 meters) apart in accordance with the 2010 USFWS protocol. Three belt transects (buffer transects) out to 656 feet (200 meters) and spaced at 217-foot (66-meter) intervals parallel to and/or encircling the project perimeter at 217, 433, and 650 feet (66, 132, and 198 meters, respectively) from the perimeter of the project site were also surveyed, per BLM direction (LaPre 2014).

DT surveys were conducted by slowly and systematically walking linear transects while surveyors visually searched for DT individuals and sign. Buffer transects along the access road did not extend across I-15.

All DT sign (e.g., live tortoises, shells, bones, scutes, limbs, scat, burrows, pallets, tracks, egg shell fragments, drinking sites) were mapped using Global Positioning System (GPS) units and were classified according to the USFWS (1992) Information Index for Desert Tortoise Sign (Appendix B). All wildlife species detected were recorded. Any federally listed and/or BLM sensitive species detected during DT pre-project surveys were recorded and mapped using GPS.

Results and Discussion

A summary of the survey effort and field conditions is presented in Table 1. Field data collected are included in Appendix C. A list of all wildlife species detected is included in Appendix D.

Table 1
Desert Tortoise Pre-Project Surveys
Dates, Time, Weather Conditions, Personnel, and Observations

Date	Survey Personnel	Time	Weather Conditions[1]	DT Observations
4/2/2013	Michael Anguiano, Michael Rathbun	1251–1600	Start: 69°F (20.5°C), wind 7 mph (11 km/h), 5% cover, relative humidity: 28% End: 73°F (22.8°C), wind 9 mph (14 km/h), 10% cover, relative humidity: 20%	Class 4 DT burrow
4/1/2014	Lance Woolley, Fred Sproul		Rare Plant Surveys	Adult DT
4/23/2014	Michael Anguiano, Andrew Fisher	1354–1913	Start: 75°F (24°C), wind 2.5 mph (4 km/h), 0% cover, relative humidity: 15% End: 63°F (17°C), wind 1 mph (1.6 km/h), 10% cover, relative humidity: 10%	Adult DT; Class 1 DT burrow; Class 2 DT burrow; two Class 4 DT scat
4/24/2014	Michael Anguiano, Andrew Fisher	0845–1413	Start: 57°F (14°C), wind 0 mph (0 km/h), 0% cover, relative humidity: 15% End: 71°F (22°C), wind 0 mph (0 km/h), 0% cover, relative humidity: 15%	Three adult DT; Class 2 DT pallet; Class 4 burrow; Class 5 burrow; two DT scat (Class 1 and Class 2)
4/18/2015	Michael Anguiano, Andrew Fisher	0847-1249	Start: 70°F (21°C), wind 1 mph (1.6 km/h), 0% cover, relative humidity: 10% End: 77°F (25°C), wind 5 mph (8.0 km/h), 0% cover, relative humidity: 14%	No DT or DT sign detected.

[1]°C = degrees Centigrade; °F = degrees Fahrenheit; mph = miles per hour; km/h = kilometers per hour

2013 Surveys

During 2013 DT pre-project surveys, one Class 4 DT burrow (deteriorated condition, possibly DT) was observed in the survey area. A Class 4 burrow was found within a few feet of this location in 2014 and is likely the same burrow (Figure 5). No individual DTs or other definitive DT sign was observed during the 2013 surveys.

2014 Surveys

During rare plant surveys conducted at the site on April 1, 2014, one adult DT was observed within the project site near a DT pallet (this pallet was classified as a Class 2 pallet during DT surveys). During DT surveys on April 23 and 24, 2014, four adult DTs, one Class 1 DT burrow, two Class 2 DT burrows (one a pallet), one Class 4 burrow (likely same burrow as observed in 2013), one Class 5 burrow, and four DT scat (one Class 1, one Class 2, and two Class 4) (Figure 5) were observed. It is unknown if the any of the individual DT observed during DT surveys, were the same individual that was detected during rare plant surveys. Within the project site, up to four DTs (3 DT observed during DT survey and 1 DT observed during rare plant surveys), four DT burrows (one definitely DT, three possible DT), and two DT scat (Figure 5) were observed. Within the buffer transects, one additional DT, two DT burrows (one definitely DT, one possibly DT), and two DT scat were observed (Figure 5).

2015 Surveys

During DT surveys on April 18, 2015, no DT or DT sign was found along the power line alignment or along the buffer transects.

The suitable DT habitat within the survey area is considered to be occupied by DT. There is a moderate amount of suitable forage present, and the survey area is near desert washes. Potential forage present within the survey area for DT includes native annual plant species such as Mojave aster (*Xylorhiza tortifolia* var. *tortifolia*) and sixweeks three-awn (*Aristida adscensionis*), and nonnative plant species such as redstem filaree (*Erodium cicutarium*) and common Mediterranean grass (*Schismus barbatus*). Shrub cover, which provides shade for DT, included several species, mainly creosote bush (*Larrea tridentata*) and white bur-sage (*Ambrosia dumosa*), with some Mojave yucca (*Yucca shidigera*), Joshua tree (*Yucca brevifolia*), and big galleta grass (*Hilaria rigida*).

The site is considered to be occupied by DT. Five observations of adult DT, two definitive DT burrows, and four observations of DT scat were made within the survey area.

Should you have any questions, please contact me at (619) 610-7654.

Sincerely,

Michael Anguiano
Michael.Anguiano@aecom.com
Wildlife Biologist

cc: Tom Gammon, InterConnect Towers

Attachments: Figure 1 – Regional Map
Figure 2 – Local Vicinity Topographic Map
Figure 3 – Vegetation Map
Figure 4 – California Natural Diversity Database (CNDDB) Desert Tortoise Observations Regional Map
Figure 5 – Desert Tortoise Observations within the Vicinity of the Survey Area
Appendix A – Site Photographs
Appendix B – U.S. Fish and Wildlife Service (1992) Information Index for Desert Tortoise Sign
Appendix C – Field Data Collected during 2014 Desert Tortoise Pre-Project Surveys
Appendix D – Wildlife Species Detected during 2014 Desert Tortoise Pre-Project Surveys

Certification Statement

I certify that the information in this survey report and attached exhibits fully and accurately represent my work.

Michael Anguiano
Wildlife Biologist

I certify that the information in this survey report and attached exhibits fully and accurately represent my work.

Andrew Fisher
Wildlife Biologist

Literature Cited

Andersen, M.C., J.M. Watts, J.E. Freilich, S.R. Yool, G.I. Wakefield, J.F. McCauley, and P.B. Fahnestock. 2000. Regression-Tree Modeling of Desert Tortoise Habitat in the Central Mojave Desert. *Ecological Applications* 10:890–900.

Avery, H.W. 1998. Nutritional Ecology of the Desert Tortoise (*Gopherus agassizii*) in Relation to Cattle Grazing in the Mojave Desert. Ph.D. dissertation. University of California, Los Angeles.

Barrett, S.L. 1990. Home Range and Habitat of the Desert Tortoise (*Xerobates agassizi*) in the Picacho Mountains of Arizona. *Herpetologica* 46(2):202–206.

Berry, K.H. 1986. Desert Tortoise (*Gopherus agassizii*) Relocation: Implications of Social Behavior and Movements. *Herpetologica* 42(1):113–125.

Burge, B.L. 1977. *Movements and Behavior of the Desert Tortoise, Gopherus agassizii*. University of Nevada, Las Vegas.

California Department of Fish and Wildlife (CDFW). 2013. RareFind 3 computer program. California Natural Diversity Database (CNDDB) Search. California Department of Fish and Wildlife, State of California Resources Agency. Sacramento, California.

California Fish and Game Commission (CFGC). 1989. Animals of California Declared to Be Endangered or Threatened. 14 CCR § 670.5, Barclays Official California Code of Regulations Title 14. Natural Resources, Division 1, Fish and Game Commission-Department of Fish and Game, Subdivision 3. General Regulations, Chapter 3, Miscellaneous.

Esque, T.C. 1994. Diet and Diet Selection of the Desert Tortoise (*Gopherus agassizii*) in the Northeastern Mojave Desert. Master’s thesis. Colorado State University, Fort Collins.

Holland, R. 1986. *Preliminary Descriptions of the Terrestrial Natural Communities of California*. Nongame Heritage Program, State of California Department of Fish and Game.

Jennings, W.B. 1997. Habitat Use and Food Preferences of the Desert Tortoise, *Gopherus agassizii*, in the Western Mojave and Impacts of Off-Road Vehicles. Pages 42–45 in J. Van Abbema (ed.), Proceedings of the International Conference on Conservation, Restoration, and Management of Tortoises and Turtles. New York Turtle and Tortoise Society, New York.

LaPre, Larry. 2014. Bureau of Land Management, California Desert District. Email communication. March 4, 2014

National Oceanic and Atmospheric Administration (NOAA). 2013. National Weather Service Climate Office for Barstow, California. Available at http://forecast.weather.gov/MapClick.php?CityName=Barstow&stateCA&site=VEF&textField1=34.8986&textField2=-117.022. Accessed May 2013.

O'Connor, M.P., L.C. Zimmerman, D.E. Ruby, S.J. Bulova, and J.R. Spotila. 1994. Home Range Size and Movements by Desert Tortoises, *Gopherus agassizii*, in the Eastern Mojave Desert. *Herpetological Monographs* 8:60–71.

U.S. Fish and Wildlife Service (USFWS). 1989. Endangered and Threatened Wildlife and Plants; Emergency Determination of Endangered Status for the Mojave Population of the Desert Tortoise. August 4. *Federal Register* 54(149):32326–32331.

U.S. Fish and Wildlife Service (USFWS). 1990. Endangered and Threatened Wildlife and Plants; Final Rule of Endangered Status for the Mojave Population of the Desert Tortoise. April 2. *Federal Register* 54(149):32326–32331.

U.S. Fish and Wildlife Service (USFWS). 1992. *Field Survey Protocol for Any Non-Federal Action That May Occur within the Range of the Desert Tortoise*.

U.S. Fish and Wildlife Service (USFWS). 1994a. Endangered and Threatened Wildlife and Plants; Determination of Critical Habitat for the Mojave Population of the Desert Tortoise. *Federal Register* 59(26):5820–5866.

U.S. Fish and Wildlife Service (USFWS). 1994b. *The Desert Tortoise (Mojave Population) Recovery Plan.* U.S. Fish and Wildlife Service, Region 1 – Lead Region, Portland, Oregon. 73 pp. + appendices.

U.S. Fish and Wildlife Service. 2008. Draft Revised Recovery Plan for the Mojave Population of the Desert Tortoise. Available at http://www.fws.gov/nevada/desert%5Ftortoise/documents/recovery_plan/DraftRevRP_Mojave_Desert_Tortoise.pdf.

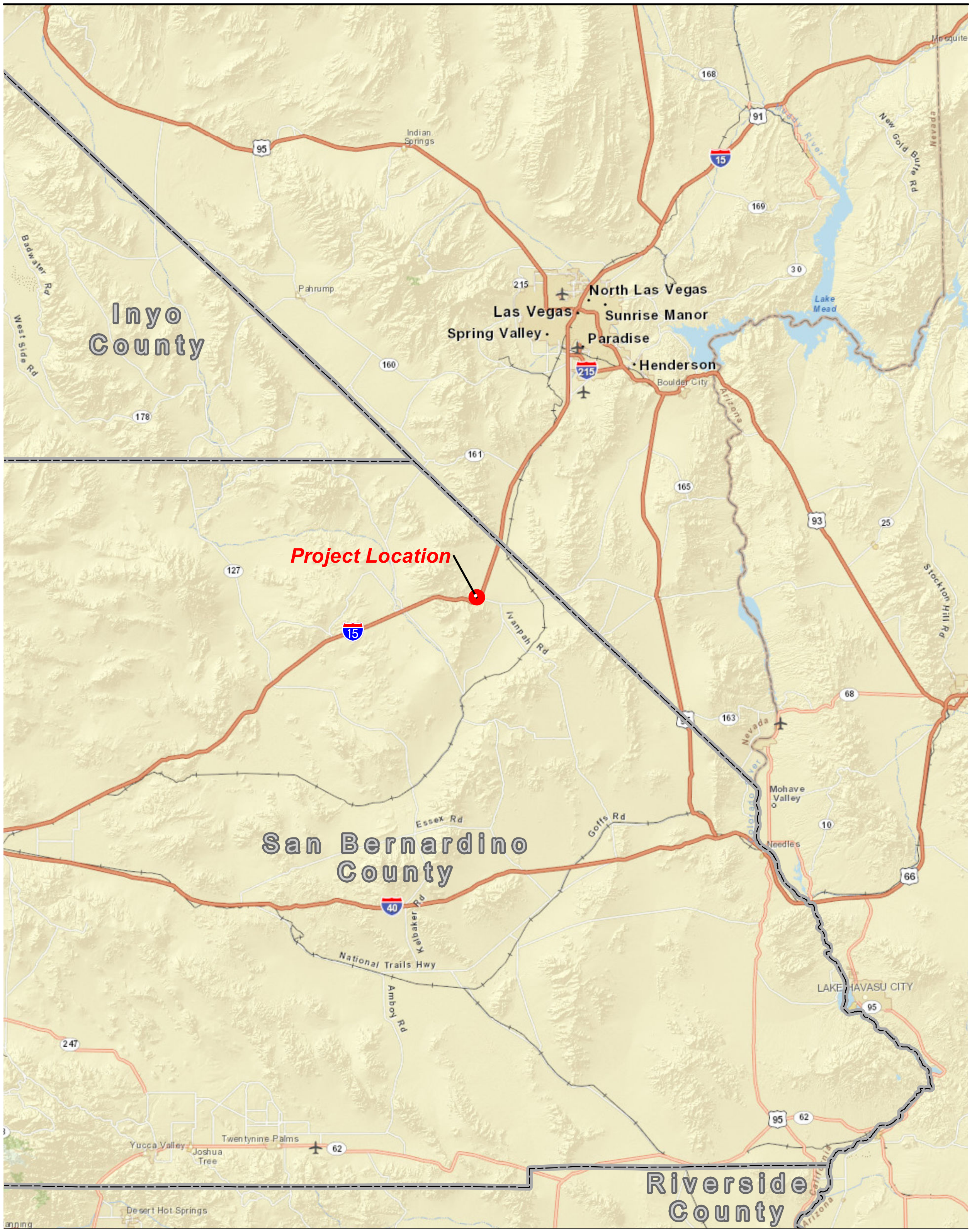
U.S. Fish and Wildlife Service (USFWS). 2010a. Biological Opinion on BrightSource Energy's Solar Electric Generating System Project, San Bernardino County, California (CACA-48668, 49502, 49503, 49504) (8-8-10-F-24R).

U.S. Fish and Wildlife Service (USFWS). 2010b. *Preparing for Any Action That May Occur within the Range of the Mojave Desert Tortoise (Gopherus agassizii)*.

U.S. Fish and Wildlife Service. 2011. Revised Recovery Plan for the Mojave Population of the Desert Tortoise (*Gopherus agassizii*). U.S. Fish and Wildlife Service, Pacific Southwest Region, Sacramento, California. 222 pp.

U.S. Geological Survey (USGS). 2013. Climate History of the Mojave Desert Region. Available at http://mojave.usgs.gov/climate-history/. Accessed May 2013.

FIGURES

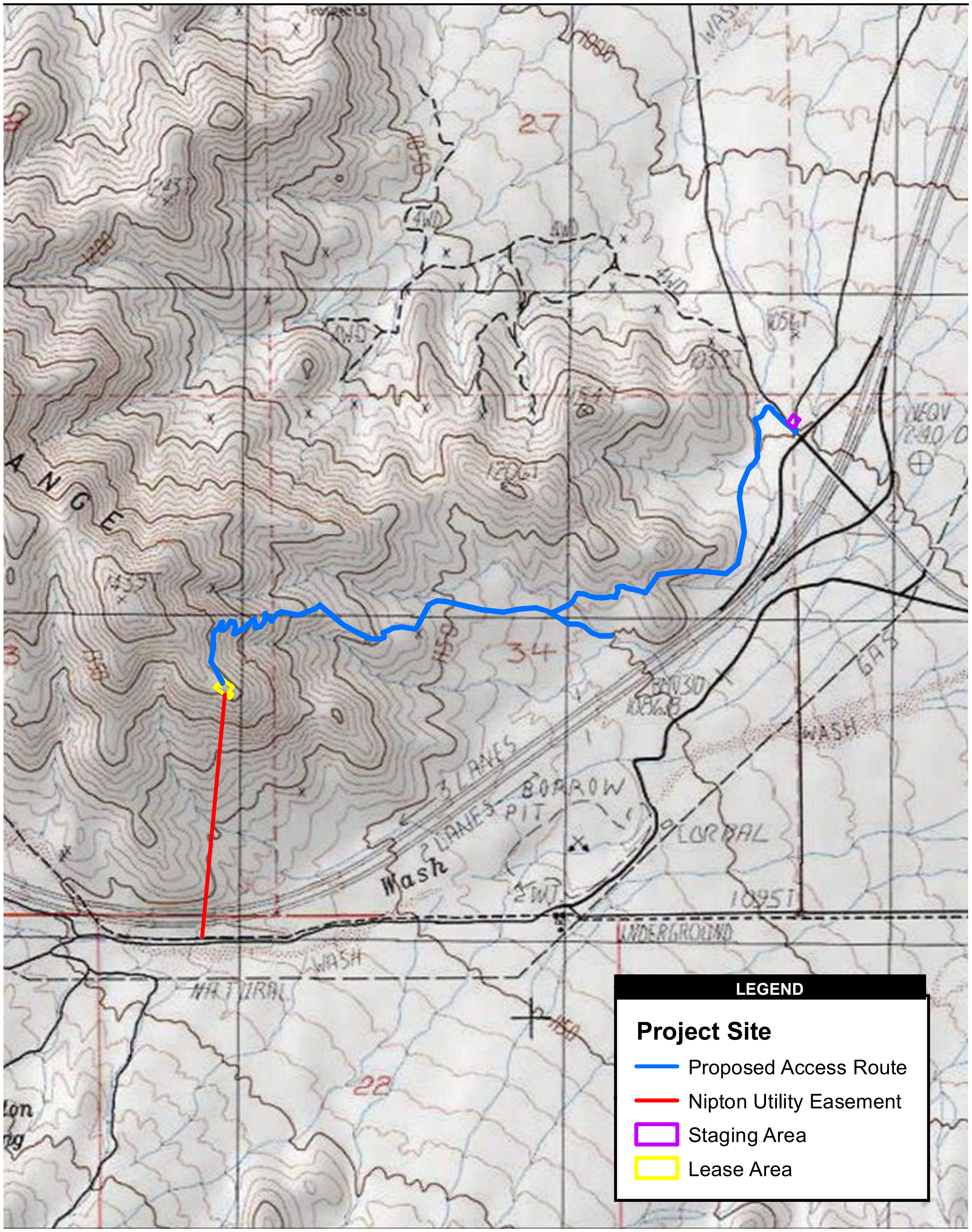


Source: ESRI 2012; SANGIS 2012

25 12.5 0 25 Miles

Scale: 1:1,584,000; 1 inch = 25 miles

Figure 1
Regional Map



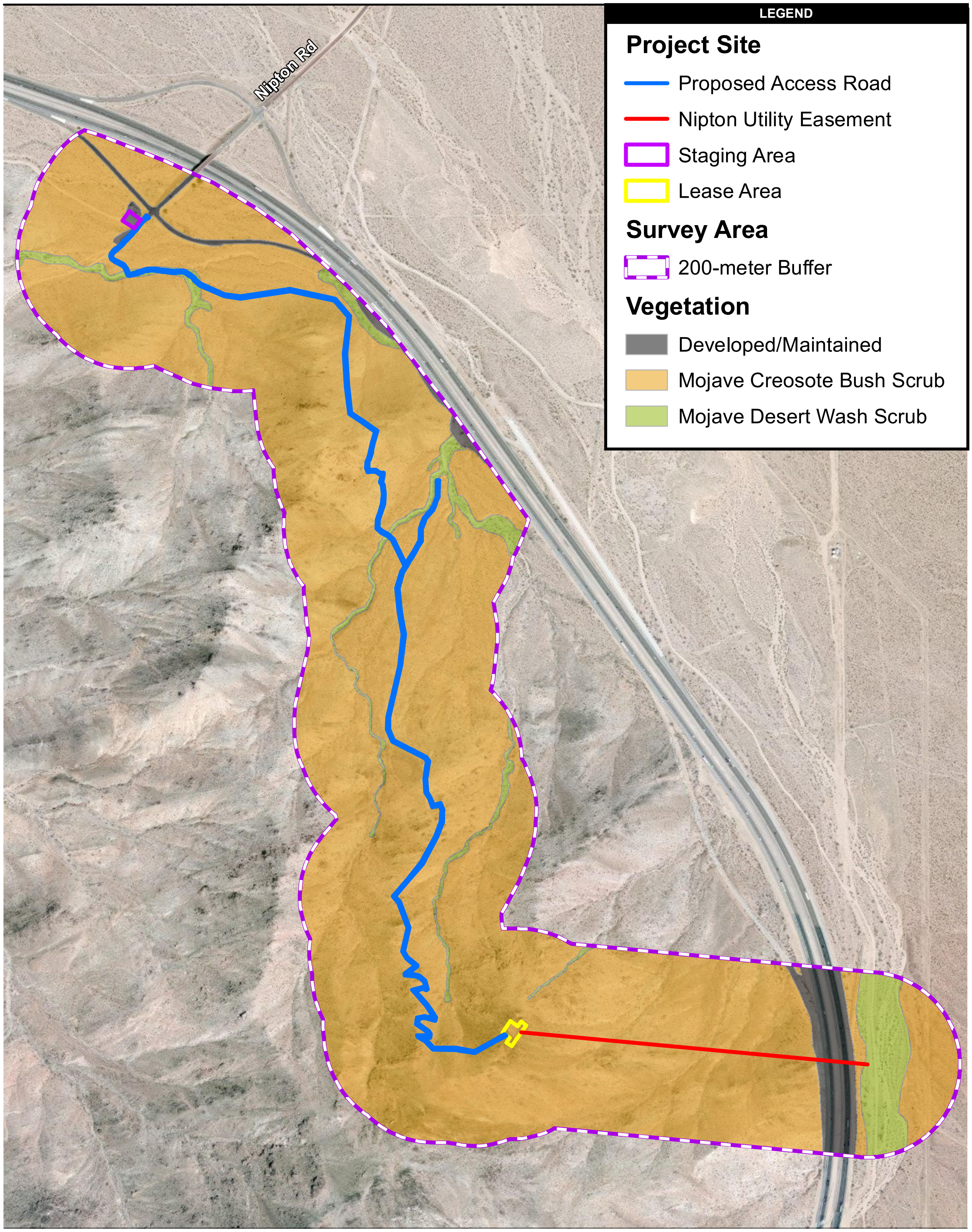
Source: USGS Topo Quad Mineral HIll, CA

1,500 750 0 1,500 Feet

Scale: 1:18,000; 1 inch = 1,500 feet

Figure 2
Vicinity Map

Path: M:_Marketing Files through FY2014\Proposals\2013\Interconnect Towers\GIS\MXD\DT\DT_2015\Figure2_Nipton_Vicinity.mxd, 8/11/2015, sorensenj



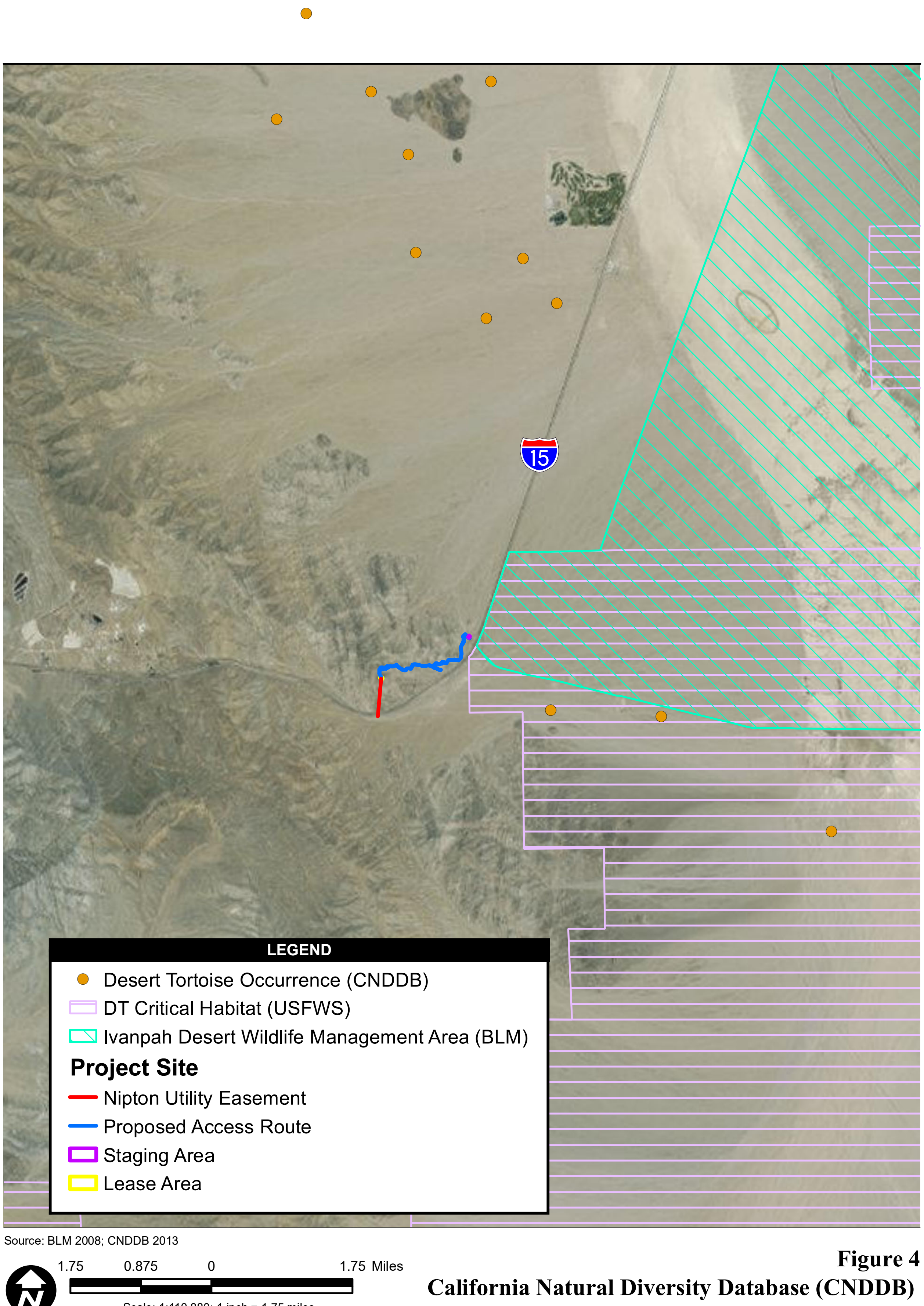
Source: Microsoft 2010

1,050 525 0 1,050 Feet

Scale: 1:12,600; 1 inch = 1,050 feet

Figure 3
Vegetation Map

Path: M:_Marketing Files through FY2014\Proposals\2013\Interconnect Towers\GIS\MXD\DT\DT_2015\Figure3_Nipton_VegMap.mxd, 6/2/2015, SorensenJ



Source: BLM 2008; CNDDB 2013

Figure 4
California Natural Diversity Database (CNDDB)
Desert Tortoise Observations Regional Map

Path: M:_Marketing Files through FY2014\Proposals\2013\Interconnect Towers\GIS\MXD\DT\DT_2015\Figure4_Nipton_DETO_CNDDB_.mxd, 6/2/2015, SorensenJ

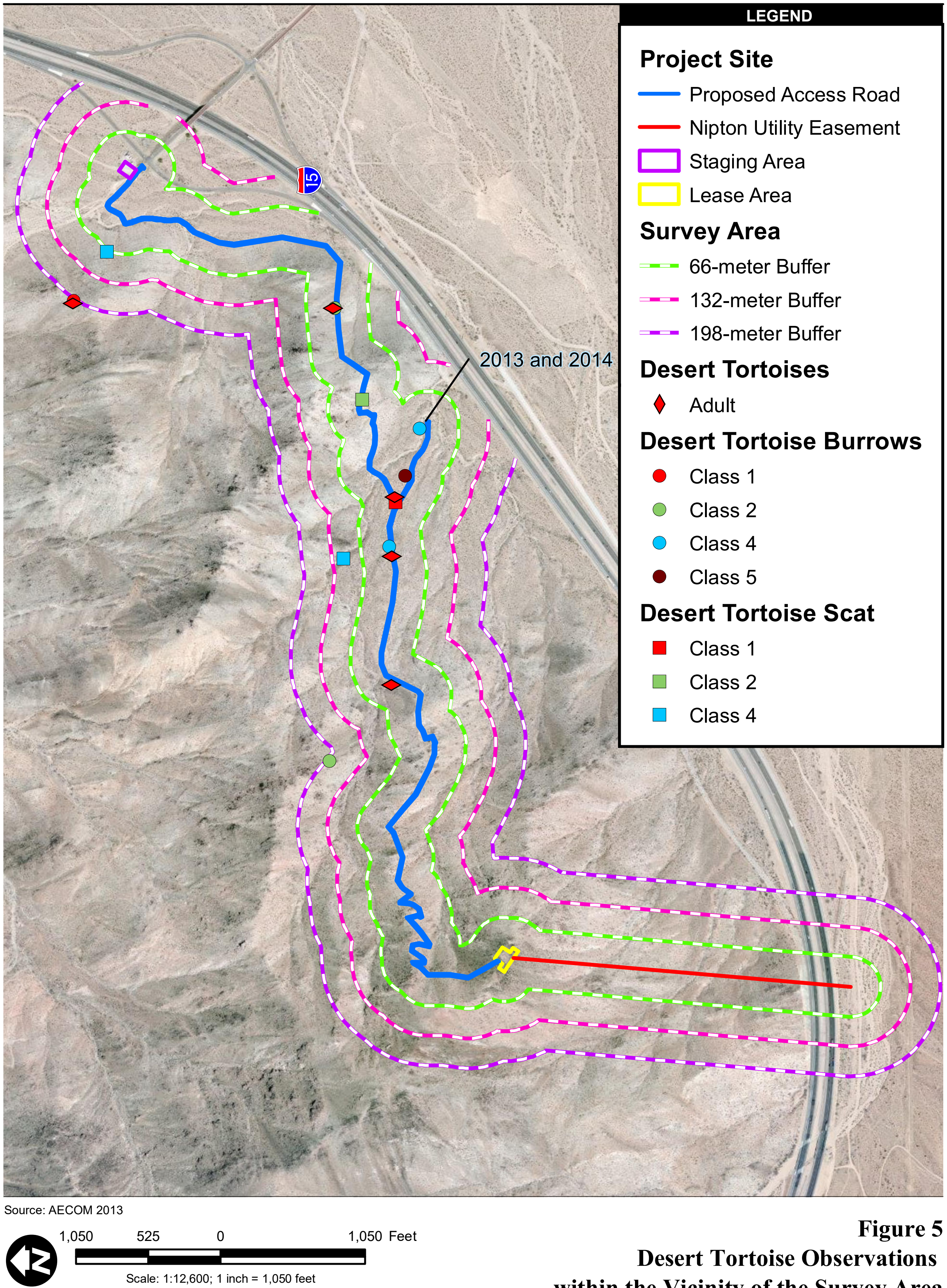


Figure 5
Desert Tortoise Observations within the Vicinity of the Survey Area

Path: M:_Marketing Files through FY2014\Proposals\2013\Interconnect Towers\GIS\MXD\DT\DT_2015\Figure5_Nipton_DT_Observations.mxd, 6/2/2015, SorensenJ

APPENDIX A

SITE PHOTOGRAPHS


Photo A-1. Mojave creosote bush scrub habitat in the survey area; view to south toward staging yard at the Interstate 15 and Nipton Road intersection.


Photo A-2. View south along ridge toward lease area from buffer; sparse creosote bush habitat present.

Photo A-3. View from the western end of the proposed access road looking southeast toward Interstate 15 over the valley the proposed access road would traverse.

Photo A-4. View of lease area looking south.

Photo A-5. Adult desert tortoise; individual #1.


Photo A-6. Adult desert tortoise; individual #2.


Photo A-7. Adult desert tortoise; individual #3.


.
Photo A-8. Adult desert tortoise; individual #4.

APPENDIX B

U.S. FISH AND WILDLIFE SERVICE (1992)
INFORMATION INDEX
FOR DESERT TORTOISE SIGN

Table B-1. USFWS (January 1992) Information Index for Desert Tortoise Sign: Burrows and Dens, Scats, and Shell Remains

Sign Type	Class
Burrows and Dens	1. Currently active, with tortoise or recent tortoise sign
	2. Good condition, definitely tortoise; no evidence or recent use
	3. Deteriorated condition (describe); definitely tortoise
	4. Deteriorated condition; possible tortoise (describe)
	5. Good condition; possibly tortoise (describe)
Scats	1. Wet (not from rain or dew) or freshly dried; obvious odor
	2. Dried with glaze; some odor; dark brown
	3. Dried; no glaze or odor; signs of bleaching (light brown)
	4. Dried; light brown to pale yellow; loose material; scaly
	5. Bleached or consisting only of plant fiber
Shell Remains	1. Fresh or putrid
	2. Normal color; scutes adhere to bone
	3. Scutes peeling off bone
	4. Shell bone is falling apart; growth rings on scutes are peeling
	5. Disarticulated and scattered

APPENDIX C

FIELD DATA COLLECTED DURING 2014 DESERT TORTOISE PRE-PROJECT SURVEYS

Table C-1. Field Data Collected During 2014 Desert Tortoise Pre-Project Surveys; Special-Status Wildlife Species and Sign Within and Adjacent to the Survey Area (NAD 83)

Observation Type	Northing	Easting	Notes
Desert Tortoise – Adult	3926924	640317	Adult DT sitting outside of burrow.
Desert Tortoise – Adult	3926211	639888	Vegetation on mouth from recent foraging.
Desert Tortoise – Adult	3926218	639757	Eating cactus.
Desert Tortoise – Adult	3926219	639472	Vegetation on mouth from recent foraging.
Desert Tortoise – Adult	3926348	640307	Outside of pallet.
Desert Tortoise Burrow – Class 1	3926921	640322	No notes.
Desert Tortoise Burrow – Class 2	3926356	639304	Photo taken.
Desert Tortoise Burrow – Class 2	3926344	640307	Pallet where botanists had found a DT on April 1, 2014.
Desert Tortoise Burrow – Class 4[1]	3926155	640040	Burrow under stone ledge within wash. No DT sign, some veg matter in entrance. Could be DT burrow.
Desert Tortoise Burrow – Class 4	3926223	639779	No notes.
Desert Tortoise Burrow – Class 5	3926188	639935	No notes.
Desert Tortoise Scat – Class 1	3926209	639877	Very fresh; found DT 15 meters away.
Desert Tortoise Scat – Class 2	3926283	640104	No notes.
Desert Tortoise Scat – Class 4	3926324	639752	No notes.
Desert Tortoise Scat – Class 4	3926848	640431	Old.

[1] 2013 observation

APPENDIX D

WILDLIFE SPECIES DETECTED DURING DESERT TORTOISE SURVEYS

Table D-1. Wildlife Species Detected Within and Adjacent to the Survey Area During Desert Tortoise Surveys

Common Name	Scientific Name	Order	Family	Federal Status (Endangered/ Threatened)	BLM Status
Invertebrates					
California Patch	*Chlosyne californica*	Lepidoptera	Nymphalidae	none	none
Reptiles & Amphibians					
ZEBRATAIL LIZARD	*Callisaurus draconoides*	Squamata	Phrynosomatidae	none	none
SIDE-BLOTCHED LIZARD	*Uta stansburiana*	Squamata	Phrynosomatidae	none	none
COACHWHIP	*Masticophis flagellum*	Squamata	Colubridae	none	none
CHUCKWALLA	*Sauromalus ater*	Squamata	Iguanidae	none	none
WESTERN DIAMOND-BACKED RATTLESNAKE	*Crotalus atrox*	Squamata	Viperidae	none	none
GRANITE SPINY LIZARD	*Sceloporus orcutti*	Squamata	Phrynosomatidae	none	none
GREAT BASIN WHIPTAIL	*Aspidoscelis tigris tigris*	Squamata	Teiidae	none	none
DESERT TORTOISE	*Gopherus agassizii*	Testudines	Testudinidae	Threatened	none
Avian					
RED-TAILED HAWK	*Buteo jamaicensis*	Accipitriformes	Accipitridae	none	none
TURKEY VULTURE	*Cathartes aura*	Accipitriformes	Cathartidae	none	none
HORNED LARK	*Eremophila alpestris*	Passeriformes	Alaudidae	none	none
COMMON RAVEN	*Corvus corax*	Passeriformes	Corvidae	none	none
BLACK-THROATED SPARROW	*Amphispiza bilineata*	Passeriformes	Emberizidae	none	none
SAGE SPARROW	*Atemisiospiza belli*	Passeriformes	Emberizidae	none	none
WHITE-CROWNED SPARROW	*Zonotrichia leucophrys*	Passeriformes	Emberizidae	none	none
CACTUS WREN	*Campylorhynchus brunneicapillus*	Passeriformes	Troglodytidae	none	none
ROCK WREN	*Salpinctes obsoletus*	Passeriformes	Troglodytidae	none	none
GRAY FLYCATCHER	*Empidonax wrightii*	Passeriformes	Tyrannidae	none	none
ASH-THROATED FLYCATCHER	*Myiarchus cinerascens*	Passeriformes	Tyrannidae	none	none
Mammals					
COYOTE*	*Canis latrans*	Carnivora	Canidae	none	none
AMERICAN BADGER*	*Taxidea taxus*	Carnivora	Mustelidae	none	none
NELSON'S BIGHORN SHEEP*	*Ovis canadensis nelsoni*	Artiodactyla	Bovidae	None	sensitive
MULE DEER*	*Odocoileus hemionus*	Artiodactyla	Cervidae	none	none
DESERT COTTONTAIL	*Sylvilagus audubonii*	Lagomorpha	Leporidae	none	none
WHITE-TAILED ANTELOPE SQUIRREL	*Ammospermophilus leucurus*	Rodentia	Sciuridae	none	none
DESERT WOODRAT	*Neotoma lepida*	Rodentia	Muridae	none	none

* Sign observed

Appendix H

Restoration Techniques

Appendix H
Restoration Techniques

Restoration would be conducted through one or more of the following techniques. These techniques are intended to help reduce the occurrences of inappropriate route use by restoring and camouflaging undesignated routes.

- **Vertical Mulching**: Dead plant material would be placed at the beginning of illegal routes in the line-of-sight off of BLM-designated routes to disguise the routes and deter additional illicit OHV traffic. Large dead pieces of plants (e.g., nearby trees, including Joshua trees, shrubs, and materials cleared from the communication site and access road) and rocks placed on the soil surface can act as barricades. Similarly, shrubs or branches planted upright in the soil make the trail blend in with surrounding vegetation. Mulch would be placed in a naturally appearing random pattern, with some scattered on the surface of the soil, and some vertically planted back into the soil. Vertical mulch also benefits restoration by trapping wind-blown seeds and lessening wind erosion just above the ground surface. This work would be primarily accomplished with hand tools. Little soil disturbance would occur, except where mulch is "planted" and thus requires a small hole to anchor the material.
- **Soil Decompaction**: Undesignated routes with repeated OHV traffic may require soil decompaction to increase water infiltration and facilitate seed germination. Improving water infiltration also allows burrowing wildlife, such as desert tortoise, to inhabit the soil again. Workers would preferably use hand tools such as soil spades, spading forks, and shovels to loosen the top 2 to 6 inches of soil.
- **Mechanical Ripping:** Routes too compacted or wide for use of hand tools may require mechanical ripping to a depth of 6 to 10 inches. A trail bulldozer or grader would pull an attachment to mechanically rip the soil. After ripping, hand tools would be used to camouflage bulldozer tracks. Ripping may provide conditions for germinating nonnative invasive plant species. Therefore, weed control measures would be implemented to limit the spread of these species.
- **Soil/Vertical Pitting**: Soil/vertical pitting of the soil surface would be applied in key areas to create depressions for windblown seeds, provide for local water collection and increased infiltration, reduce surface erosion, discourage vehicular traffic, and create a visual texture to the surface that blends with surrounding undisturbed areas. Soil/vertical pitting contours the soil to direct water flow and draw windblown seeds to focal spots on the ground. Pits would be approximately 1 to 2 feet wide, 6 inches deep, and spaced 1 to 2 feet apart in order to provide the estimated amount of water that may be needed for a

plant to naturally germinate and grow in an arid environment. Pitting would create suitable microsites to increase seed germination rates and to promote higher survival and growth rates of small plants. This work would be done by shovel, spade, or power auger. Vertical mulch would be added as needed to some of the vertical pits.

- **Soil Imprinting**: Soil imprinting would entail raking small trenches to roughen the texture on surface soil and to collect windblown seed. Hand tools such as shovels and rakes would be used in sites with fragile soils or steep slopes.
- **Raking**: On undesignated routes formed from a single trespass (one person on one vehicle at one time) or on routes with scarce vegetation, work crews would rake or sweep, usually with a broom, the top 1 inch of soil to hide evidence of tracks. Soil surfaces may also be contoured to match surrounding land. Hand tools would be the primary method used for this work.
- **Rocks**: A row of large rocks and boulders would be used as barriers to deter use in especially fragile areas. Placement of small rocks would require no equipment and little or no soil disturbance. Large rocks may also be used through the use of dump trucks, trailers, and loaders. Large rocks and boulders removed to the side of the disturbance shall be placed back with the darkened/naturally varnished side facing up in a natural appearing pattern. To help ensure that rock placement appears natural, several rocks would be partially buried into the soil surface (similar to original conditions), rather than being set only on top of the surface.
- **Planting Vegetation**: Revegetating would involve directly planting native species in the line-of-sight from a BLM-designated OHV trail to accelerate improvements to soil stability, vegetation cover and diversity, and wildlife habitat. Eventually revegetation would disguise routes. Planting would make use of hand tools (shovels) and some mechanized equipment (augers) to dig holes up to 2 feet deep and 1 foot wide, for the largest transplants. In extraordinary cases, transplantation of larger plants would require somewhat larger holes potentially up to 3 feet deep and 3 feet wide. After planting, work can contour soil to direct the flow of rainwater or irrigation water to plant roots.
- **Seeding:** Seeding would require rakes to collect seed from seed banks in the soil or from dried seedpods still attached on plants. Hand sowing would be used to spread seeds across the soil surface. Raking would disturb, at most, the top 1 inch of soil. Hand seeding also may be concurrent with soil pitting (see above) to improve seed germination rates. Several methods described herein provide a seedbed for seed already onsite.
- **Removing Manufactured Materials and Structures:** A restoration team would remove litter and other unsightly or potentially dangerous manufactured materials or structures less than 50 years old. If the restoration team discovered materials more than 50 years old, they would consult with the BLM archaeologist. The archaeologist would assess

whether removing any materials older than 50 years is appropriate and what archeological documentation is required. Removal would include large structures and materials of nonhistorical value such as abandoned automobiles, fences, and buildings, including those built in trespass.

Impacts of route restoration are expected to be less than the communication site due to the limited ground disturbance of restoration techniques and the brief and temporary use of personnel and equipment. The same Applicant proposed measures/design features as described for the communication facility would be followed, except for installation of desert tortoise fencing.

Limited pollutant emissions would occur during route restoration, principally from the use of equipment where rehabilitation is taking place, additional vehicle travel by rehabilitation crews, and the surface disturbance caused by the rehabilitation process. Typically, only one or two pieces of equipment would be in use at any one time, and the duration of use would be temporary and brief. Overall, there would be a long-term positive effect to air quality from the reduction of undesignated routes and revegetation of the surface. These actions would reduce particulates introduced to the air through vehicle travel and wind.

Wildlife would benefit from the decrease in vehicle traffic through their habitat. Routes would grow over and reseed, creating new forage and undisturbed habitat. Native vegetation in the restored areas would be allowed to proliferate undisturbed.

Route restoration could result in a perceived limitation on opportunities for motorized vehicle use and related recreational activities. There would be a negligible effect on OHV riding in the restoration areas because the routes that would be restored are undesignated and not legally available for riding on now. The proposed route restoration does not affect the existing legal riding opportunities. There would be positive benefits to travel in the area because the route restoration would clarify the open route network. Open routes provide a sufficient network to access the restoration areas for recreation purposes. The restoration effort would cause the undesignated routes to be less noticeable.

Restoring the surface contour and vegetation cover in the bed and side banks of undesignated routes to a natural contour can improve soil conservation. Steep terrain is particularly vulnerable to losing soil crusts and mineral soils after OHV impact. Decompaction would increase water infiltration and facilitate seed germination. Improving water infiltration also allows burrowing animals, such as ants and rodents, to inhabit the soil again. Decompaction may promote seed germination of nonnative invasive species.

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Appendix I

Cultural Resources Survey

CULTURAL RESOURCES SURVEY FOR THE INTERCONNECT TOWERS NIPTON PROJECT SAN BERNARDINO COUNTY, CALIFORNIA

Prepared for:

U.S. Department of Interior, Bureau of Land Management
Needles Field Office
1303 South Highway 95
Needles, California 92363

Prepared by:

AECOM
410 West A Street, Suite 1200
San Diego, California 92101

Authors:

Patrick McGinnis, M.A., RPA
Rachel Droessler, B.S.

Contributors:

Stephanie Jow, M.A.

June 2015

Keywords: USGS Quadrangle: Mineral Hill, 7.5', Cultural Resources Survey, San Bernardino County, Bureau of Land Management, Mining

National Archaeological Database Information

Author(s):	Patrick McGinnis, M.A., RPA, and Rachel Droessler, B.S.
Consulting Firm:	AECOM 410 West A Street, Suite 1200 San Diego, California 92101 (619) 610-7600
Report Date:	June 2015
Report Title:	Cultural Resources Survey for the Interconnect Towers Nipton Project San Bernardino County, California
Type of Study:	Class III Field Survey
New Sites:	CA-SBR-17217H, CA-SBR-17218H
Updated Sites:	N/A
USGS Quadrangle:	Mineral Hill 7.5'
Acreage:	37 Acres
Project Number:	60290076
Keywords:	Cultural Resources Survey, San Bernardino County, Bureau of Land Management, Mining

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EXECUTIVE SUMMARY

InterConnect Towers (ICT), LLC, proposes to construct a communication site and associated access road that would be located on public lands managed by the Bureau of Land Management (BLM), near Nipton, an unincorporated area of San Bernardino County, California. The Nipton Communication Site is located west of Interstate 15 (I-15), commencing from the Nipton Road exit and terminating after 1.76 miles (9,330 feet) on the top of a hill at the proposed cellular tower location. An additional 0.4-mile (2,506-foot) power alignment will extend from the top of the hill south across Interstate 15. BLM is overseeing this process in compliance with the National Environmental Policy Act and Section 106 of the National Historic Preservation Act.

Prior to commencing fieldwork, a records search and literature review were conducted at the San Bernardino Archaeological Information Center (SBAIC) and the Native American Heritage Commission (NAHC). The records search at the SBAIC revealed 24 previously recorded cultural resources within 1 mile of the Project, none of which are located within the area of potential effects (APE). Although the NAHC file check did not identify any sacred sites within the records search area, the files indicated that sacred sites have been documented nearby.

Survey of the APE was conducted on May 6, 2014, and June 1, 2015, by AECOM archaeologists using 10- to 15-meter transects. Conditions during the pedestrian survey of the 37-acre APE were overcast and warm on May 6, 2014, and clear and hot on June 1, 2015, with surface visibility of nearly 100%.

Two previously unrecorded cultural resources (CA-SBR-17217H and CA-SBR-17218H) were identified during the pedestrian survey on May 6, 2014. Site CA-SBR-17217H consists of a small refuse dump of historic-age soda, wine, and beer bottles. CA-SBR-17218H consists of a prospecting pit, associated campsite, and mining trail connecting the two. Neither of the two resources located in the APE is recommended eligible for the National Register of Historic Places. No cultural resources were identified during the June 1, 2015, pedestrian survey.

CHAPTER 1
INTRODUCTION

PROJECT DESCRIPTION

InterConnect Towers, LLC, proposes to construct a communication site and associated access road that would be located on public lands managed by the Bureau of Land Management (BLM), near Nipton, an unincorporated area of San Bernardino County, California (Figure 1). The Nipton Communication Site, hereafter referred to as the study area or Project, is located on land managed by BLM, adjacent to Interstate 15 (I-15) approximately 10 miles southwest of the California-Nevada state line, immediately west of the junction of I-15 and Nipton Road. More specifically, the proposed communication tower would be located in the northeast quarter of Section 34, Township 16 North, Range 14 East, as depicted on the Mineral Hill, California U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle (Figure 2).

The Nipton study area would consist of a 98-foot by 98-foot (approximately 0.22-acre) communication site within a 100-foot by 100-foot lease area. Equipment at the site would include a 190-foot self-supporting steel lattice tower with no guide wires, a 20-foot by 40-foot prefabricated equipment shelter, one 100-kilowatt propane-powered backup generator, and one 2,000-gallon propane tank. Ground disturbance for tower foundations could exceed 15 feet, depending on results from geological tests. If bedrock is encountered early, the maximum depth would be less. The communication site would be enclosed within a gated chain-link fence measuring 8 feet in height. Commercial electric power would be provided by on-site solar panels placed at ground level with equipment cabinets mounted beneath them. A power alignment will begin at the communication site and run southwest down the hillside and across I-15 for 0.4 mile (2,506 feet). An additional 100-foot by 100-foot staging area would be constructed on a cleared area north of the Nipton Road off-ramp.

Access to the site would begin at the I-15 and Nipton Road junction and travel southwest along the base of the Clark Mountain Range for approximately 1.3 miles (6,864 feet) before climbing approximately 0.4 mile (2,112 feet) to the top of an unnamed hill where the proposed communication site lease area is located. There is no proposed access road associated with the proposed power alignment. Crews will hike up the hill and hand dig the pole holes to a depth that could exceed 8 feet and poles will be dropped in via helicopter.

AREA OF POTENTIAL EFFECTS

Pursuant to 36 Code of Federal Regulations (CFR) 800.4(a)(1), an area of potential effects (APE) is the geographic area within which an undertaking may directly or indirectly alter the character or use of historic properties. The APE for the Project consists of approximately 37 acres and includes the proposed 100-foot by 100-foot lease area for the communication site's tower and equipment shelter (Figure 3). A staging area would be constructed on a cleared area north of the Nipton Road off-ramp, as well as a new access road measuring approximately 1.76 miles (9,330

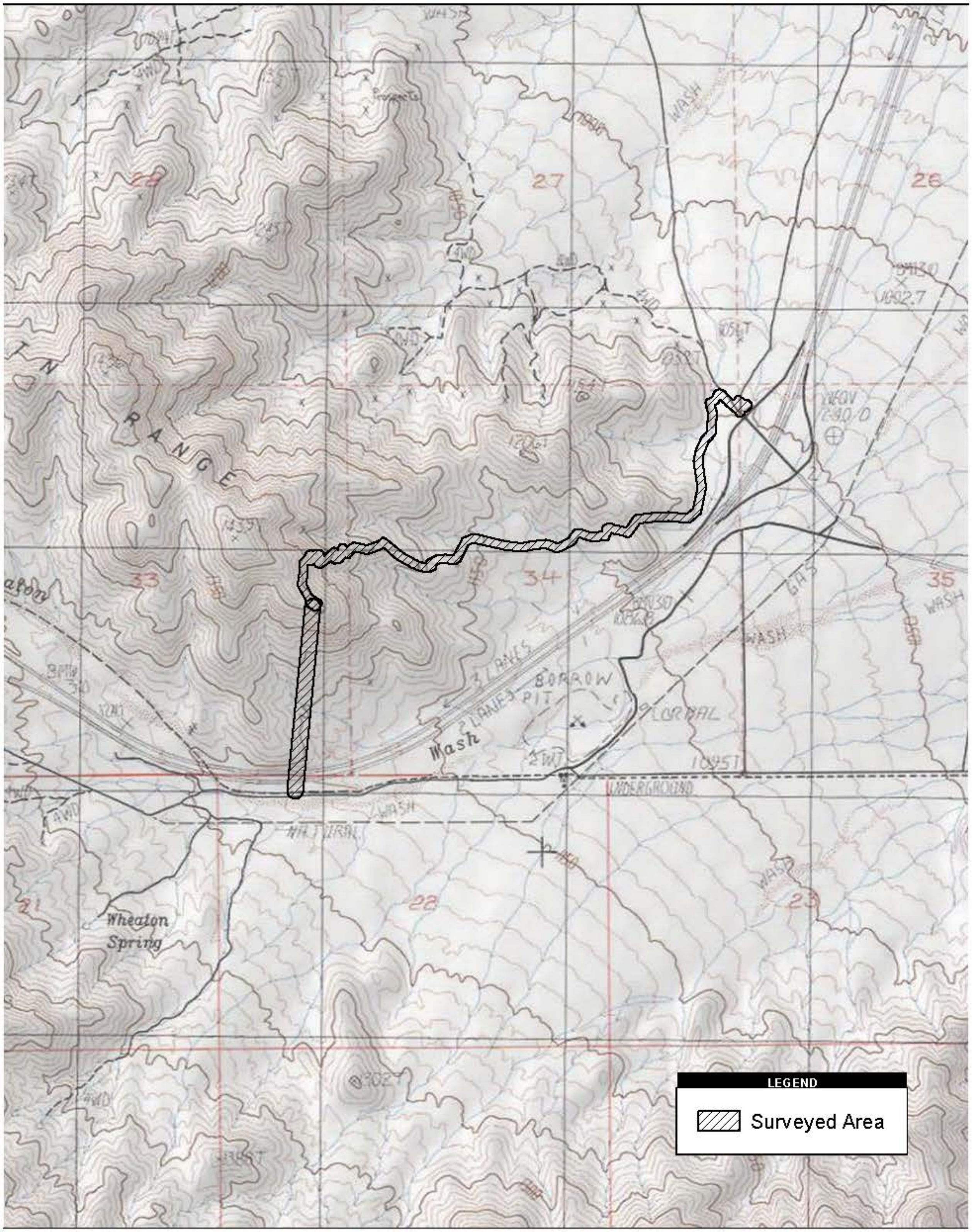
Source: AECOM, ESRI 2013

40 20 0 40 Miles

Scale: 1:2,534,400; 1 inch = 40 mile(s)

Figure 1
Regional Setting of the Project Area

Path: M:_Marketing Files through FY2014\Proposals\2013\Interconnect Towers\GIS\MXD\Cultural\1.ReportMaps\Nipton\Figure01_NP.mxd, 6/3/2015, droesslerr

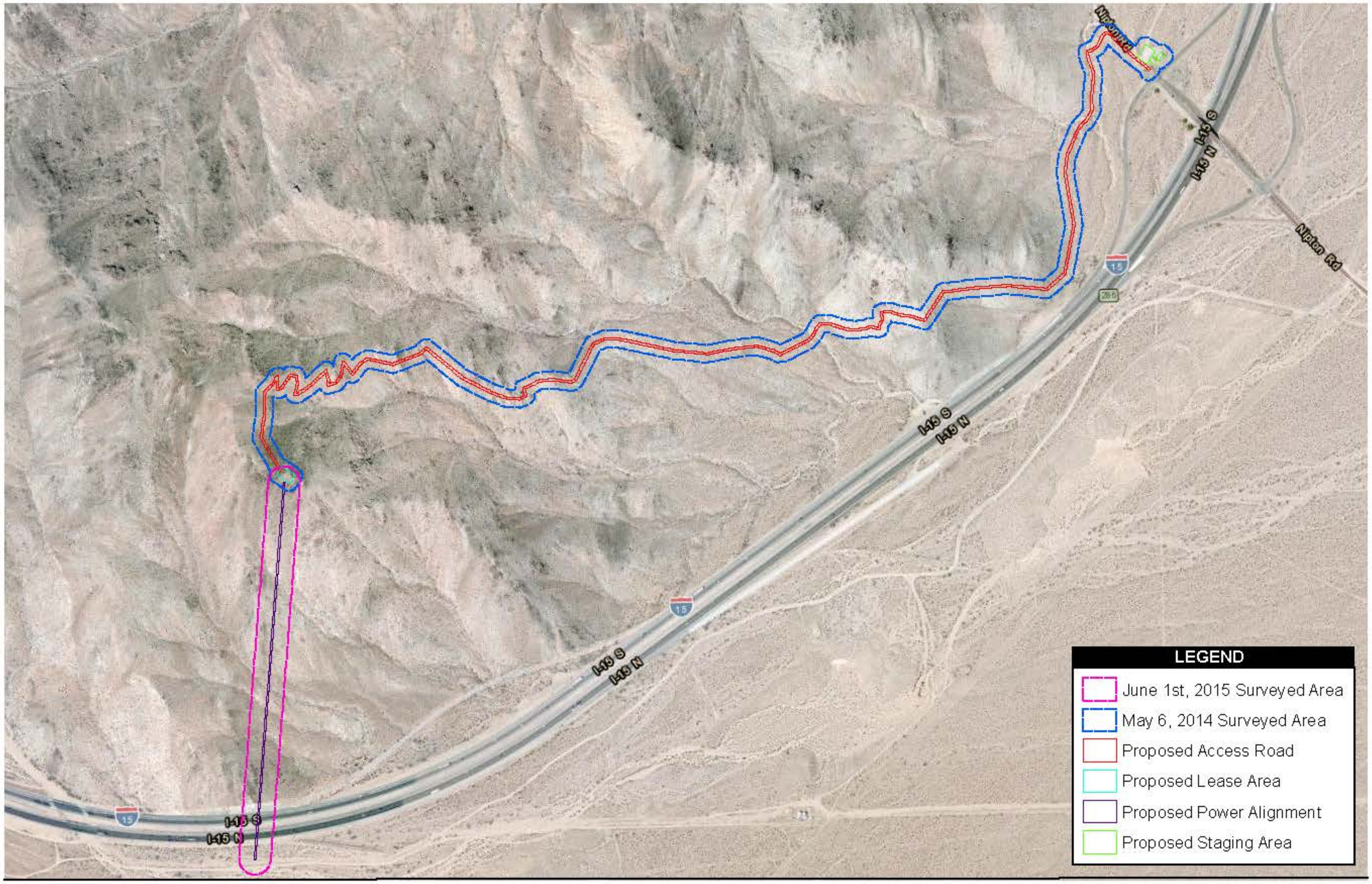


Source: ESRI 2012; SANGIS 2012; USGS Topo 7.5' Quad Mineral Hill, CA 1984

2,000 1,000 0 2,000 Feet

Scale: 1:24,000; 1 inch = 2,000 feet

Figure 2
Project Vicinity



Source: USGS 7.5' Topographic Quadrangle Mineral Hill, CA (1984)

1,000 500 0 1,000 Feet

Scale: 1 = 12,000; 1 inch = 1,000 feet

Figure 3
Area of Potential Effects (APE) Survey Area

Path: M:_Marketing Files through FY2014\Proposals\2013\Interconnect Towers\GIS\MXD\Cultural\1.ReportMaps\Nipton\Fig3_Nipton Cultural APE.mxd, 6/11/2015, droesslerr

feet) long and 8 feet wide. The proposed power run measures approximately 0.4 mile (2,506 feet) and 10 feet wide. The APE also consists of a buffer of 50 feet around the lease area, staging area, and on either side of the proposed access road alignment and 100 feet around the proposed power alignment.

PROJECT PERSONNEL

Patrick McGinnis, MA, RPA, served as principal investigator, directed the fieldwork, and coauthored this report. Rachel Droessler participated in the fieldwork and served as coauthor of this report. Stephanie Jow, MA, also contributed to this report.

REPORT ORGANIZATION

This report consists of an introduction that includes the project description and background (Chapter 1); the regulatory, natural, and cultural settings of the project (Chapter 2); a summary and discussion of the records search results and contact program (Chapter 3); a description of the research design and field methods (Chapter 4); a results and recommendations section (Chapter 5); and references cited (Chapter 6).

CHAPTER 2
PROJECT SETTING

REGULATORY SETTING

The proposed project requires authorization and issuance of a right-of-way grant by BLM. Because the project is a federal "undertaking" as defined at 36 CFR 800.16, compliance with Section 106 of the National Historic Preservation Act (NHPA) and its implementing regulations (36 CFR 800) is required. Section 106 of the NHPA and its implementing regulations (36 CFR 800, as amended in 1999) require federal agencies to consider the effects of their undertakings on historic properties that are or may be eligible for listing in the National Register of Historic Places (NRHP) and provide the Advisory Council on Historic Preservation (ACHP) an opportunity to comment.

Historic properties are defined as any buildings, sites, structures, or objects, each of which may have historical, architectural, archaeological, cultural, and/or scientific importance that are eligible for listing in the NRHP. To qualify as a historic property, a resource must be significant at the local, state, or national level under one or more of the following four criteria:

A. Associated with events that have made a significant contribution to the broad patterns of our history;

B. Associated with the lives of persons significant in our past;

C. Embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; and/or

D. Have yielded, or may be likely to yield, information important in prehistory or history.

In addition, resources must retain integrity to qualify for the NRHP. As defined by the ACHP, integrity is the ability of a property to convey its significance through physical features and context, including location, design, setting, materials, workmanship, feeling, and association. As part of the Section 106 compliance process, an undertaking's effects on historic properties are assessed by applying the Criteria of Adverse Effect (36 CFR 800.5[1]). An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualifies the property for inclusion in the NRHP in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association.

Other federal laws, ordinances, regulations, and standards that guide the management of cultural resources are summarized in Table 1.

Table 1. Regulatory Setting Applicable to Cultural Resources

Laws	Applicability
Antiquities Act of 1906, Title 16, United States Code (USC), Sections 431, 432, and 433	Federal legislation for protection of cultural resources.
National Historic Preservation Act, Title 16, USC Section 470a(a) –(j)	Protects cultural resources on federal lands; provides for inventory and assessment of resources.
National Historic Preservation Act, Title 16, USC Section 470f (Section 106)	Requires federal agencies to take into account the effects of their undertaking on historic properties.
Archaeological Resources Protection Act of 1979, Title 16 USC Section 470aa–470mm	Provides protection for archaeological resources on public and Native American lands.
Executive Order 13007 of May 24, 1996, 61 Federal Register, 26771	Provides for the protection of Native American sacred sites.
Executive Order 13175 of November 9, 2000, 65 Federal Register, 67249	Requires federal agencies to conduct regular and meaningful consultation with Native American tribal governments in the development of policies that have tribal implications.
Native American Graves Protection and Repatriation Act, Title 25, USC Sections 3001–3013	Establishes mechanism for Native Americans to claim ownership of human remains and certain cultural items.
American Indian Religious Freedom Act, Public Law 95-341; Title 42 USC Section 1996	Provides protection of Native American religious practices.

NATURAL SETTING

The Mojave Desert is situated between the subtropical Sonoran Desert to the south and the cold-temperature Great Basin to the north. The Mojave Desert is characterized by extreme variations in daily temperatures and more arid conditions than other American desert regions. Freezing temperatures occur during the winter, particularly in higher-elevation regions. Summers tend to be hot, dry, and windy. Precipitation in the region is highly variable from one year to the next, but typically ranges between 3 to 5 inches per year. Most precipitation falls in the winter, but the region also experiences rare, intense summer thunderstorms. It is during these rare flood events that some of the most dramatic changes take place on the desert landscape.

The Mojave has a typical mountain-and-basin topography with sparse vegetation. A large portion of the study area is marked by creosote bush (*Larrea tridentate*), which is the dominant plant species of the Mojave Desert (Warren 1984). Lower elevations are dominated by creosote bush, and higher elevations contain yuccas and agaves and then pinion-juniper habitats (Warren 1984). Plant communities within proximity of springs, marshes, and streambeds produce tules, cattails, and various grass species (Warren 1984).

Large fauna species are rare in the Mojave Desert, with the most common being mule deer (*Odocoileus hemionus*) and coyote (*Canis latrans*); rabbits, rodents, reptiles, and birds are more common. Rabbit species found in the Mojave include black-tailed jackrabbit (*Lepus californicus*) and desert cottontail (*Sylvilagus audubonii*). Rodent species include various pocket mice (*Perognathus* spp.), whitetail antelope squirrel (*Ammospermophilus leucurus*), and kangaroo rat (*Dipodomys* spp.). Reptile species include desert tortoise (*Xerobates agassizii*), desert iguana

(*Dipsosaurus dorsalis*), common king snake (*Lampropeltis getulus*), and Mojave rattlesnake (*Crotalus scutulatus*). More than 300 species of birds are found in the Mojave Desert. Species more common to the open desert are prairie falcon (*Falco mexicanus*), burrowing owl (*Athene cunicularia*), roadrunner (*Geococcyx californianus*), and horned lark (*Eremophilia alpestris*) (Warren 1984).

The project APE is located within Ivanpah Valley on the foothills of the Clark Mountain Range. The majority of the study area falls on the fingers of the Clark Mountains and some is at the base in an alluvial fan. Vegetation in this area largely consists of creosote bush, with a small amount of yucca.

CULTURAL SETTING

Prehistory

Archaeological investigations in the Mojave Desert reveal evidence of more than 10,000 years of human occupation. Although research in the Mojave has produced a wide array of cultural sequences, for the purpose of this report, a broad terminology is used to provide temporal context to the region. This sequence consists of the Paleoindian period, Pinto period, Gypsum period, and Protohistoric period (Sutton 1991).

Paleoindian Period (12,000 to 7000 years B.P.)

This period is the earliest documented evidence of human occupation in the Mojave Desert and is represented by manifestations of the Western Pluvial Lakes Tradition (WPLT) (Sutton 1991). The WPLT encompasses a broad geographic region from the western Great Basin to Southern California and north to Oregon. Evidence suggests that Paleoindian-period groups were highly mobile, with settlement patterns that reflect a dependency on lacustrine resources (Sutton 1991; Sutton et al. 2007; Warren 1990). This cultural adaptation to pluvial conditions (e.g., lakes and marshes) persisted from approximately 10,500 years before present (B.P.) until the warmer and more arid conditions of the Middle Holocene (Moratto 1984).

The Lake Mojave complex is one of the most recognized lithic complexes of the WPLT. These assemblages are typically characterized by foliated points and knives, Lake Mojave points, Silver Lake points, and flaked stone crescents.

Pinto Period (7000 to 4000 B.P.)

A period of dramatic environmental change has been posited for the Pinto period, as a transition to more arid conditions led to the desiccation of pluvial lakes and animal and plant life. This period is seen by Warren (1984) as marking the beginnings of cultural adaptations to the desert. Regional radiocarbon profiles suggest that the latter part of this period was marked by low populations and possibly abandonment of some areas of the desert. This depopulation of the area seems evident in the small size of Pinto period sites and their limitation to surface deposits. These ephemeral sites suggest temporary or seasonal occupations by small, mobile groups (Moratto 1984; Sutton et al. 2007).

The most important distinction of Pinto period assemblages relates to an increase in the abundance of groundstone implements (Sutton et al. 2007). The appearance of significant numbers of milling stones in Pinto assemblages is attributed to the exploitation of hard seeds, which is seen by Warren (1984) as part of the process of subsistence diversification brought on by increased aridity and decreasing game populations.

Gypsum Period (4000 to 1500 B.P.)

The Gypsum period is marked by an increase in the number of archaeological components and increased diversity in assemblage and site setting (Warren 1984). Gypsum-period assemblage sites are characterized by diagnostic projectile points, leaf-shaped points, rectangular-based knives, flake scrapers, T-shaped drills, large scraper-planes, choppers, and hammerstones. There is an increase in the presence of milling stones, and the mortar and pestle were introduced during this period.

Rose Spring Period (ca. 1500 to 1000 B.P.)

Archaeological evidence for the Rose Spring period indicates a major population increase, changes in artifact assemblages, and well-developed middens (Sutton 1988). The introduction of small projectile points into assemblages in the Mojave Desert and the Great Basin appear to mark the introduction of the bow and arrow and the decline of the atlatl and spear weaponry (Sutton 1996). The milling of plant foods was an important activity, with numerous bedrock milling features found at Rose Spring, including mortars and slicks (Sutton 1988).

Protohistoric Period (1000 B.P. to European contact)

There was an increase in the ethnic and linguistic complexity within the Mojave Desert during this period. Desert Side-notched points and brownware ceramics become more widely distributed throughout the Mojave Desert and the Great Basin. This development, combined with linguistic evidence, is associated with the Numic-speaking Paiute and Shoshone expansion throughout most of the area (Bettinger and Baumhoff 1982).

Characteristic artifacts of this period include Desert series projectile points (Desert Side-notched and Cottonwood Triangular), brownware ceramics, Lower Colorado Buff Ware, unshaped hand stones and milling stones, incised stones, mortars, pestles, and shell beads (Warren and Crabtree 1986).

Ethnographic Background

A number of distinct Native American groups have historical and cultural ties to the survey area and vicinity. The survey area is located near the territories of several neighboring Native American groups, as described in Kroeber (1925). The APE is most likely within joint use territory of the Mojave and Desert Chemehuevi, although the Serrano/Vanyume may have also ranged into the project vicinity. The following brief synopses provide overviews on the ethnology for these ethnolinguistic groups.

Chemehuevi

The Chemehuevi are the southernmost of 16 distinct groups of Southern Paiute speakers (Kelly and Fowler 1986). The latter groups all spoke a single language, with the various subgroups representing different dialectical divisions. These languages are members of the Southern Numic family of Uto-Aztecan linguistic stock. The Chemehuevi are distinct from their Southern Paiute linguistic kin in that they borrowed heavily from their neighbors, the Mojave; hence, in some instances, they have similar subsistence and religious cultural elements.

The traditional territory of the Chemehuevi included a large area southwest of what is now Las Vegas, Nevada, and an extensive area within the eastern Mojave Desert of California. Kroeber (1925:595) noted that this was the largest piece of land held by any single ethnolinguistic group in what is now California, and was one of the most thinly populated Native American territories anywhere within the present boundaries of the state. Kroeber estimates that there were between 500 and 800 Chemehuevi living within this territory during the pre-contact era (Kroeber 1925:595). Californian ethnographers Lowell Bean and Sylvia Brakke Vane disagree with Kroeber’s population estimate, and argue that a minimum of 13,000 Southern Paiutes inhabited a territory from what is now Las Vegas south to Palo Verde Valley, and from the Colorado River into the Iron Mountains (Bean and Vane 1978:5–20).

It appears that, throughout much of prehistory, the Chemehuevi practiced a foraging subsistence strategy. They were hunter-gatherers who moved seasonally, taking advantage of key plant and animal resources. Their territory was a vast desert biome, and so they located their more permanent settlements near reliable sources of potable water. Their daily subsistence resources consisted mainly of plant foods, but were often supplemented with small game. Waterfowl, rodents, fish, lizards, and some insects were also part of their diet. Blazing star (*Liatris*), chia (*Salvia hispanica*), rice grass (*Oryzopsis hymenoides*), goosefoot (*Chenopodium album*), piñon pine (*Pinus edulis*) nuts, and acorns were important seed and nut crops. The hearts of agave (*Agave americana*) were also gathered and roasted.

Upland hunting parties traveled to more distant areas (away from villages) to acquire bigger game animals, principally bighorn sheep (*Ovis canadensis*) and mule deer (*Odocoileus hemionus*). Antelope (*Antilocapra Americana*) and jack rabbits (*Lepus californicus*) were also hunted communally with drives using lengthy nets and diversion fences. The Chemehuevi also collaborated with neighboring tribes in the pursuit of large game. Hunting parties traveled to what are now the San Bernardino Mountains for cooperative efforts with their allies, the Serrano and Vanyume (Bean and Vane 1978).

When first contacted by European explorers, the Chemehuevi were living on irrigated horticultural lands along the Colorado River. In this part of their territory, their numbers were greater, and permanent villages existed. It appears that the Chemehuevi adopted this pattern of floodplain agriculture from the Mojave. Plants that were grown by the Chemehuevi included gourds, winter wheat (*Triticum aestivum*), yellow maize (*Zea mays*), and certain semi-cultivated grasses (Kelly and Fowler 1986:371).

Material culture for the Chemehuevi was similar to other hunter-gatherers in the present-day California and Great Basin area. Prior to their expansion into the lower Colorado River area, they did not have or use pottery. The Chemehuevi had a well-developed tradition in basketry and were also well known for their recurved, sinew-backed bows (Laird 1976:6). The bows were especially accurate and powerful, and exceptionally well suited for hunting large game animals such as deer and bighorn sheep.

Bands of Chemehuevi, who lived away from the river and without horticulture, typically fashioned conical brush structures or dome-shaped residences that were covered with grass or bark. Bands living closer to their cultivated fields adopted the use of pottery and, when living nearer to the river, fashioned more substantial dwellings of wood and mud without a front wall (Kelly and Fowler 1986:371).

The recent historic and proto-historic population movements along the Colorado River are a subject of some continuing disagreement among anthropological scientists, historians, and the living descendants of the Chemehuevi and Mojave people. Mojave tradition claims that the Chemehuevi were formally invited by the Mojave to come to the Colorado River after 1830. Other ethnographers claim that the Chemehuevi were residing at Cottonwood Island and in the Chemehuevi Valley prior to that date in the 18th century (Laird 1976:123). Kelly (1934:556) says that the southern expansion of the Chemehuevi dated to the early 1800s.

Serrano and Vanyume

The Vanyume were a desert-dwelling subgroup of the Serrano who lived primarily along the Mojave River. Whether the Vanyume spoke a dialect of Serrano or a separate Takic language cannot be determined from the brief word list available (Bean and Smith 1978). In fact, little is known about the Vanyume except as a recognized subgroup of the Serrano. It is known that the two groups diverged politically: The Vanyume had good relations with the Chemehuevi and the Mojave, their neighbors to the east, and the mountain-dwelling Serrano did not. Father Francisco Garcés traveling up the Mojave River reported on the Vanyume, calling them the Beñeme, the name he also used for the Serrano. Garcés described the groups along the Mojave River as a poor population inhabiting only a few sparse settlements (Kroeber 1925:615).

Identifying firm boundaries for Serrano and Vanyume territory is difficult due to the lack of data and the flexible nature of each group's sociopolitical organization (Bean and Smith 1978; Kroeber 1925). Political boundaries were likely flexible and generalized use areas more accurately describe their whereabouts at the time of European contact than does a delineated territory. Autonomous bands were identified with particular districts and claimed only the area immediately surrounding their primary settlements. Serrano districts included the area east of Cajon Pass and the base of the San Bernardino Mountains near present-day Victorville, eastward as far as present-day Twentynine Palms, and south to and including the Yucaipa Valley (Bean and Smith 1978; Kroeber 1925).

The Vanyume are considered to have lived along the Mojave River. The river has its headwaters east of Cajon Pass in the San Bernardino Mountains. It flows north through the town of Victorville, then curves east to pass through Barstow. It continues east through Daggett and Baker before disappearing in the Soda Lake/Silver Lake area. According to Kroeber, Vanyume territory stretched from the Providence Mountains to Daggett or Barstow (1925:614). Based on maps (Kroeber 1925; Bean and Smith 1978), it appears that Vanyume territory extended approximately 150 miles along the Mojave River drainage.

According to Baksh and Hilliard (2005), Vanyume territory was located primarily in the Bajadas Hills adjacent to the Mojave River. This area is generally between 1,500 and 5,000 feet in elevation and lies within the Lower Sonoran (below 3,500 feet) and Upper Sonoran (3,500 to 6,300 feet) life zones. Due to the aridity of this environment, Vanyume settlements were situated near the Mojave River or near springs. The territory of the Serrano had more dramatic variation in elevation, ranging from 1,500 to 11,500 feet. Most villages were located in the foothills in the Upper Sonoran ecozones, but a few others could be found in the Transition Zone (6,300 to 9,000 feet) or near water sources on the desert floor.

The Serrano collected piñon nuts and acorns from the mountain slopes as their primary staple vegetal foods. Additionally, chia and grass seeds, bulbs, roots, and tubers were typically collected, and seasonal burning was practiced to encourage seed production (Bean and Smith 1978). For the Vanyume, it is likely that honey mesquite, piñon nuts, yucca, and cacti fruits were important resources. The lowland Vanyume groups may have traveled to the foothills to trade cacti fruits and other lowland foods for pine nuts and acorns with the Serrano.

Hunting implements included bows with sinew backing and arrows with stone points. Throwing sticks, snares, and traps were used to hunt and capture smaller animals. The principal game hunted by the Serrano and the Vanyume were deer, mountain sheep, antelope, rabbits, small rodents, and various birds. No part of the game animals went to waste. The blood of game animals was drunk either cold or after cooking it into a thick broth (Bean and Smith 1978). Bones were boiled and the marrow extracted and consumed. Surplus meat and plants were dried to be eaten later (Driver 1937).

Communal resource procurement was practiced by the Serrano in the form of piñon and acorn gathering, and cooperative deer and rabbit hunting. These activities were led by one of the lineage leaders. Communal gathering and hunting activities among the Vanyume frequently occurred during the annual mourning ceremony (Bean and Smith 1978). The game taken during communal hunting was shared equally, although a larger share was often offered to the leader of the hunt (Kelly and Fowler 1986).

Settlement patterns of the Serrano and Vanyume were centered on the seasonal variation of resources. Settlement was characterized by aggregation and segregation of people around plant and water resources. Following the pattern found among most groups in the area that is now Southern California, organization occurred at the family level, in which several extended families came together into larger social groups during certain times of the year when food, water, and other scarce resources became concentrated. The Serrano had a patrilocal residence pattern that would typically include a man and his wife or wives, their unmarried female children, their male children and their families, and perhaps the man's parents and other relatives. Villages consisted of lineages united through marriage or economic ties and shared ritual (Bean and Smith 1978).

As early as 1776, Father Francisco Garcés found several small villages of Vanyume along the Mojave River. Three miles west of Afton Canyon, he found a village of 25 and, a few days later, near present-day Barstow, his party was fed rabbits and acorn mush in a village of 40 people. He also found villages of Vanyume near present-day Helendale, and 15 miles farther on, a village of

70 people. As he continued west, he encountered a small settlement of five huts and a village of 80 people (Black 1986).

Most marriages were monogamous, although occasional polygamy was reported. Exogamy did not restrict marriages to opposite moieties, but did demand that marriages occur between different groups or bands (Kroeber 1925). Among the Serrano, exogamous clans were associated with one of two moieties. One of these moieties had the primary totems of wildcats (*Tukum*), puma or mountain lion (*tukuchu*), and the crow (*kachawa*). The primary totems of the other moiety were coyote (*Wahilyam*), the wolf or jaguar (*wanats*), and the buzzard (*widukut*) (Kroeber 1925:617).

Clans were patrilineal; once married, Serrano women transferred their affiliation from their birth clan to their husband's clan. Despite this, the women kept their lineage names and sometimes joined their lineage group for ceremonies. Land-owning units were composed of one or two clans affiliated through marriages, economic practices, or religious/ceremonial obligations. Clan groups owned the land where villages were built and the district adjacent to the settlements.

Clan ties were intratribal. Band names reflected the district where the primary settlements were located. The home base, often located in the foothills, was composed of a creek, the village sites along the creek, and the area adjacent to the settlement. Among the Serrano, ceremonies were led by one specialist from each lineage in a set, with the *ki'ka* representing one lineage and the *pa'xa* the other. Religion centered on the ceremonial house of the lineage set and the sacred bundle that contained the ceremonial paraphernalia of eagle and other bird feathers (Strong 1929).

The head of a local lineage, or *ki'ka*, served as both the economic and ritual leader, and lived in the ceremonial house. The duties of the head included making decisions about where and when to hunt and gather plants, and regarding the timing, location, and organization of ceremonies (Benedict 1924). The leadership role was hereditary, but not automatic, and often the most able descendent was chosen.

History

Early Exploration

The European period in the Mojave Desert began when Spanish missionaries and explorers entered the area in the 18th century. Among the first Europeans in the area was Pedro Fages, who led an expedition into the Mojave in 1772 in pursuit of Spanish soldiers who had deserted (Pourade 1960). Later forays into the Mojave Desert were undertaken in 1776 by Franciscan missionary Francisco Garcés. Garcés was tasked with exploring overland routes between present-day Santa Fe, New Mexico, and Southern California. The establishment of trade routes between Santa Fe and Los Angeles and the establishment of missions in the Mojave Desert were difficult in the 18th century because the Mohave Indians stifled Spanish expansion beyond the coastal areas of California (Bean and Bourgeault 1989). The Mojave Road, which passes through the Mojave Desert, began as a Native American trail and became firmly established as a travel route by the 1830s (Norris and Carrico 1978).

American exploration into the Mojave Desert began in the 19th century. Jedediah Smith was the first American to enter the Mojave in 1826 and 1827. Little is known about Smith's time in the Mojave since his notes were lost in a fire (Pourade 1961). Smith followed the Mojave Road, which runs south of the current study area, and ultimately reached the Pacific Ocean, where Spanish authorities prevented him from continuing farther and temporarily imprisoned him (Beck and Haase 1974; Norris and Carrico 1978).

By the 1850s, the Mojave Road was established as a reliable overland route to California, and it became easier for people to move into the area (Norris and Carrico 1978). Once California was ceded to the United States, the land was open for settlement and development. With the discovery of gold in the Sierra Nevada, California's population boomed. Mining led to the creation of roads throughout the state. Later, these mining roads would be used to establish railroads.

The majority of early mining in California took place in the north, near Sacramento and San Francisco. In the Mojave, scientific exploration was being undertaken in conjunction with investigations into proposed railroads from the east (Sherer 1994). An expedition led by Lt. Amiel Weeks Whipple in 1854 sought to survey a railroad route leading from Arkansas to Los Angeles along the 35th parallel, passing near what is today the city of Needles. The proposed railroad was meant to tie into lines that originated in both the north and the south (Barnard 1977). Whipple's expedition included scientists who recorded information about the geology, climatology, and biology of the region (Sherer 1994; Whipple et al., 1855). A later expedition undertaken by Edward Beale in 1857 tested the feasibility of using camels for transport across the desert, and established an early wagon road through the area (Norris and Carrico 1978; Sherer 1994).

Mining

American exploration into the Mojave Desert allowed settlers to begin to move to the region. The earliest Americans to move into the Mojave were typically suppliers for miners headed north in the 1850s. A few prospectors established mines in the Mojave region as well, but it was not until the 1860s that mining expanded in the area (Norris and Carrico 1978). As mining increased, so did the number of permanent settlements. From the 1860s to the 1880s, mining became the primary economy in the area. Mining camps grew into mining towns. Another result of mining was establishment of roads through the Mojave Desert. Wagon and stage coach roads were established between the mines, camps, mining towns, and Los Angeles (Beck and Haase 1974; Coombs et al. 1979).

San Bernardino County contains large mineral deposits, including gold. Large deposits of gold have been mined at Stedman and Vanderbilt, with smaller but still important deposits at Oro Grande (near San Bernardino), Dale District (near Twentynine Palms), and Alvord. Silver and copper were other highly mined ores in the region (Cloudman et al. 1919; Shumway et al. 1980).

Salt Creek became the first confirmed gold discovery in San Bernardino County in 1849, but the 1860s brought in the most prospectors to the area, who fanned out primarily along the major transportation routes such as the Mojave Road and Colorado River. Between the 1870s and World War I, mining activity continued with fairly even intensity, with gold mining surpassing silver early in the 1890s (Cloudman et al. 1919). Small mining operations started in the mountains surrounding the APE during the turn of the 20th century. Gold was discovered in the Crescent District – New York Mountains near Crescent Peak, Nevada, about 15 miles east of APE. A large claim, given the name “Nippeno,” was staked on January 1, 1900. The crossroads wagon community nearby became known as Nippeno Camp, and the place where the miners lived. The 1912 USGS Ivanpah 15-minute quadrangle shows no mines in the APE but there are several within 2 miles, including the Standard Mine, Kewanee Mine, Copper King Mine, and Mollusk Mine.

Except for a brief period after World War I, low metal prices and inflation put a damper on mining in the 1920s. However, the Great Depression of the 1930s and an increase in the price of gold by nearly $15 an ounce brought many small operators back to reactive old mines. World War II brought more of a focus on iron extraction in the area, with sporadic mining of gold, silver, and tungsten throughout San Bernardino County (Shumway et al. 1980). Into the 20th century, mining operations became more corporate, but a few prospecting claims still proved fruitful on a small scale. Resources shifted away from precious metal mining and focused more on nonprecious metals, borax, and salt (Norris and Carrico 1978).

The first recorded mineral discovery in the Clark Mountains was the Copper World mine on the southwest slope in 1868 by Johnny Moss. Silver was later discovered in addition to the copper and Moss, along with mining expert James Crossman, staked some 130 claims in the Clark and nearby Yellow Pine District. It wasn’t until the late 1890s that the Ivanpah Smelting Company of Los Angeles purchased the mine and began smelting 6 to 7 tons of 95% pure copper matte or bullion daily. A post office was moved from Ivanpah to the camp around the mine, called Valley Wells or Rosalie Wells, but by 1900 the mine had closed due to legal issues. Because transportation of materials was expensive, the Ivanpah Smelting Company persuaded the California Eastern Railroad management to extend the line 15 miles from Copper World to the nearby settlement of Ivanpah. With the high price of copper during World War I, mining resumed in the area and the mine operated until 1918 when copper prices dwindled. Other mines in the area were the Mescal Mine on the northeast slope of Clark Mountain, which produced silver, and the Bullion Mine, which is located south on Mountain Pass, which contained both copper and silver (Vredenburgh 1996).

CHAPTER 3
RECORDS SEARCH AND CONTACT PROGRAM

This chapter outlines the results of research conducted to obtain existing information on cultural resources within and/or adjacent to the APE. This research included a records search of the Southern San Bernardino Archaeological Information Center (SBAIC) at the San Bernardino County Museum and a Native American contact program. Records search results maps are included in confidential Appendix A. A summary of findings is provided following the results of the background research.

RECORDS SEARCH

Previous Studies

A records search for the proposed Nipton project, including a 1-mile buffer, was conducted March 28, 2013, at the SBAIC by AECOM personnel. The literature search results indicated that 14 previous cultural resources surveys had been conducted within a 1-mile radius, one of which (Bureau of Land Management 1978) covered approximately 10% of the APE and other (Shackley et al. 1987) that covered less than 10% of the APE (Table 2). Records search results are included in Appendix A.

Table 2. Cultural Resources Investigations within 1 Mile of the ICT Nipton Project

Report Number	Date	Author	Title	Within APE	Within 1-Mile Buffer
1060046	1960	Grosscup; Smith	Mohave Desert Survey.		X
1061231	1977	Hammond, Stephen	The Ivanpah Generating Station Project: Ethnographic (Native American) Resources.		X
1061632	1982	Hammond, Stephen	Cultural Resources Survey of Three Materials Locations in the East Mojave Desert, San Bernardino County.		X
1061606	1986	Schroth, Adella	Environmental Impact Evaluation: An Archaeological Assessment of the Proposed Molycorp Pipeline Corridor and the Evaporation Ponds, at Ivanpah Lake, San Bernardino County, California.		X
1061734	1987	Shackley; Apple; Wooley; Reynolds	Cultural and Paleontological Resources Survey: US Sprint Fiber Optic Cable Project, Rialto, California to Las Vegas Nevada.	X	

Report Number	Date	Author	Title	Within APE	Within 1-Mile Buffer
1061735	1987	Schneider, Joan	Environmental Impact Evaluation: A Cultural Resources Assessment of the Pacific Bell Underground Telephone Cable Corridor, I-15 to Nipton Moore Road, Ivanpah Valley Area of San Bernardino County, California.		X
1062218	1978	Bureau of Land Management	Archaeological Sites of the California Desert Area (Owlshead, Amargosa, Kingston, Bitterwater Transect Forms, Stages 1-2).	X	
1062315	1991	Cook and Pallette	A Cultural Resource Assessment for Ten Proposed PAC Tel Microwave Tower Sites, I-15/Barstow to Mountain Pass.		X
1062470	1991	Cook and Pallette	Draft: A Cultural Resources Assessment for Thirteen Proposed Pac Tel Microwave Tower Sites, I-15/Barstow to Mountain Peak.		X
1063673	2001	Shaver, Christopher	Cultural Resource Inventory for 17 Proposed Tower Locations Along I-15 & I-40 Corridors, San Bernardino County, CA.		X
1064979	2002	Romani, John	Negative Archaeological Survey Report: SCE Nipton 33kV Deteriorated Pole Replacement Project.		X
1064982	2006	Rosenberg and Smith	A Cultural Resources Survey for the San Bernardino County Nipton Cellular Tower Project, 2 Wheaton Springs Road, Baker, California.		X
1066300	2007	Smith; Drover; Alberts	A Class III Cultural Resources Inventory: AT&T Fiber Optic Cable Maintenance Project, Nipton Road to State Line Segment, San Bernardino County, California.		X
1066517	2008	Chambers Group, Inc.	A Class III Cultural Resources Inventory of Southern California Edison Eldorado-Ivanpah Transmission Project, San Bernardino County, California and Clark County, Nevada.		X

Previously Recorded Cultural Resources

The records search results indicated that 24 previously recorded cultural resources are within a 1-mile radius of the project APE (Table 3), none of which are within the project APE. These cultural resources consist of 18 historic sites, two prehistoric isolates, and four historic isolates. Many of the relatively abundant historic materials revealed by the records search appear to relate to mining activities in the Clark Mountain area (see Chapter 2), including prospects, claim markers, roads, and debris scatters.

Table 3. Previously Recorded Cultural Resources within 1 Mile of the Project APE

Primary Number (P-36-)	Permanent Trinomial (CA-SBR-)	Site Type	Site Constituents	Time Period	Date Recorded (or most recent update)	Location
009739	9739H	Site	Four rock alignments	Historic	1998	1-mile records search buffer
009740	9740H	Site	Mine, prospecting pits, debris	Historic	1998	1-mile records search buffer
010802	10802H	Site	Historic two-track road	Historic	2001	1-mile records search buffer
010804	10804	Site	Lakeview Service Station	Historic	2001	1-mile records search buffer
010805	10805H	Site	Two mining claim markers	Historic	2001	1-mile records search buffer
014496	12980H	Site	Nipton Road	Historic	2008	1-mile records search buffer
014498	12982	Site	Refuse scatter	Historic	2008	1-mile records search buffer
020713	20713	Site	Mining adit	Historic	2009	1-mile records search buffer
020714	20714	Site	Mining prospect	Historic	2009	1-mile records search buffer
020715	20715	Site	Rock cairn/mining claim marker	Historic	2009	1-mile records search buffer
021529	13835H	Site	Refuse scatter	Historic	2008	1-mile records search buffer
021536	13842H	Site	Refuse scatter	Historic	2008	1-mile records search buffer
021537	13843H	Site	Refuse scatter	Historic	2008	1-mile records search buffer
021538	13844H	Site	Refuse scatter	Historic	2008	1-mile records search buffer
021559	13864H	Site	Refuse scatter	Historic	2008	1-mile records search buffer
021560	13665H	Site	Refuse scatter	Historic	2008	1-mile records search buffer
021561	13866H	Site	Corral and fence line	Historic	2008	1-mile records search buffer
021566	13871H	Site	Refuse dump	Historic	2008	1-mile records search buffer
062826	blank	Isolate	Jasper biface	Prehistoric	1975	1-mile records search buffer
062827	blank	Isolate	Metate	Prehistoric	N/A	1-mile records search buffer

Primary Number (P-36-)	Permanent Trinomial (CA-SBR-)	Site Type	Site Constituents	Time Period	Date Recorded (or most recent update)	Location
063891		Isolate	Matchstick-filler can	Historic	1997	1-mile records search buffer
063892		Isolate	Two historic cans	Historic	1975	1-mile records search buffer
063893		Isolate	Matchstick-filler can	Historic	1997	1-mile records search buffer
063895		Isolate	Cone top beer can	Historic	1997	1-mile records search buffer

NATIVE AMERICAN CONTACT PROGRAM

A letter was sent to the Native American Heritage Commission (NAHC) on March 31, 2014, requesting a search of its Sacred Lands File and a list of Native American individuals and organizations that might have knowledge of or concerns with cultural resources within the study area. A response from the NAHC was received on April 2, 2014, indicating that no sacred sites are on file, but that the area is known to be culturally sensitive. Ten Native American representatives were identified by the NAHC. BLM will be conducting consultation with Native American groups independently of this contact.

CHAPTER 4
RESEARCH DESIGN AND FIELD METHODS

RESEARCH DESIGN

Presented below is a brief research design to provide a framework for analysis and assessment of the archaeological resources that may be affected by the proposed undertaking. Because no prehistoric resources were identified within the APE during the investigations, the discussion is limited to historic period research themes. Based on the nature of the identified cultural materials, the discussion focuses on themes related to mining, refuse disposal, and consumer behavior.

Mining

The first Americans to arrive in the Mojave Desert in substantial numbers were prospectors hunting for the next big gold or silver strike. Regionally, mining and prospecting activity was most intense in the mountains and high deserts of the Mojave, but small-scale mining has also been a consistent feature of the Mojave Desert for over 150 years. Local newspaper accounts and other historical references indicate that copper and silver mining, especially in the Clark Mountain range, was a modestly successful activity in the region from the end of the 19th century through the 20th century. Identifying prospecting and mining activities informs on the economic development of the Project vicinity and the Mojave Desert region as a whole, while mining activities during World War I and World War II inform on the war mobilization efforts at a regional and national level.

In the Project, site types and features associated with this research theme are transportation routes, historic camps, historic cairns, mining technology, and refuse scatters and dumps. To meet the significance criteria, such sites would need to have integrity and clear historic associations or contain important information that is not readily obtainable from archival sources or surface recordation.

The presence of archaeological materials associated with prospecting, assaying, and mining, and evidence of short- to long-term habitation by miners would be required to address this research issue on a site-by-site basis. The presence of an inventory of well-dated historic artifacts would be required to address the types of mining or the variety of mining techniques used in the area over time. Creating such a dataset would be challenging since it is likely that most of the older equipment is gone, with only an occasional part or piece of equipment remaining. Recovered artifacts would probably need to be compared with local collections or relevant documentation. Sufficiently large samples to determine technological change would thus have to come from historic documentation.

Within the survey area, the following data sets are considered relevant to addressing research questions related to mining:

- Presence of the metal or metals being mined, the site's geomorphology, and what technologies were employed to extract and process the metal.
- Presence of geographical and historical context of household, individual identities, ideology, ethnicity and ethnic relations, social geography and structure, economics, and technology.

The following research questions are applicable:

1. During what time period did the prospecting take place? What was the duration of occupation and mining activity?
2. Were the mining techniques or technologies used on the site common during the time period that the site was active?
3. Is there evidence of vernacular innovation? Under what conditions did this innovation occur?

Patterns of Refuse Disposal and Consumer Behavior

In rural/desert contexts, household refuse was often simply dumped on the surface in a deserted area accessible by car or pick-up truck. Refuse can also be associated with a dwelling that may no longer be present. Detecting the kinds of items purchased or owned by a population, and the ways in which these items were obtained, has been termed "consumer studies." Historical archaeologists have noted the development of a consumer-oriented culture within the United States during the late 19th century due to the increasingly wide availability of consumer goods (Spencer-Wood 1987). This trend continued into the 20th century and is discernible in both rural and urban contexts, although some researchers have noted different emphases on purchasing behavior (Van Wormer 1991). Cultural items from a recognizable historical context have potential for illuminating behavioral patterns and preferences of a residential population.

Within the survey area, the following data sets are considered relevant to addressing research questions related to historic research issues:

- Presence of sites containing foundations or other indications for the presence of early dwellings.
- Presence of intact trash deposits or dumps that can be associated with specific kinds of occupations, functions, or dwellings.
- Presence of trash deposits or dumps containing diagnostic artifacts that can be accurately associated with particular types of activities, time periods, or group affiliations such as farmers or railroad workers.

The following research questions are applicable:

1. What kinds of materials were disposed of in the trash dumps?
2. What does the documentary record indicate about the dates of occupation?
3. What can be determined about the socioeconomic unit responsible for the disposal?
4. Does the artifact assemblage reflect the range of artifacts expected to be consumed in a rural household?
5. Do the artifacts identified give any indication of the economic status of the household unit?
6. How do the types and numbers of artifacts compare with other known rural sites in San Bernardino County?
7. Is there evidence of food consumption?
8. Is there evidence of products consumed by specific age, gender, or ethnic group?
9. What can the archaeological deposits tell us about the daily life of the residents and their choice of available consumer goods?

SURVEY METHODOLOGY

BLM Permit

AECOM received a Fieldwork Authorization Request (FA-CA690-14-06) from the Needles Field Office under statewide BLM permit CA-12-22 for the May 6, 2014 survey. A new Fieldwork Authorization Request (FA-CA690-15-05) was received from the Needles Field Office for the June 1, 2015, survey.

Archaeological Pedestrian Survey

A Class III intensive pedestrian survey of the APE was conducted by qualified AECOM archaeologists using 10- to 15-meter transects. The surveyors used 7.5-minute USGS topographic maps and larger-scale aerial photographs, as well as hand-held submeter global positioning system (GPS) units loaded with shape files of the study area for orientation and to record resources and survey coverage.

Archaeological sites were defined as a cluster of three or more artifacts within an area measuring 30 meters by 30 meters. Isolates were categorized as two artifacts or less within 15 meters of each other, which are spatially discrete by a minimum of 15 meters from any other quantity of artifacts. Isolated finds can be historic or prehistoric and consist of single or small numbers of prehistoric or historic artifacts. When an archaeological site was encountered, the survey crew determined its location with a handheld GPS unit and, if previously recorded, with reference to existing site record forms. Previously recorded sites were checked against the existing documentation for any changes in site constituents, condition, or boundaries. Detailed information was recorded for both newly and previously recorded resources. Site recordation included photographic documentation (site overviews and detail shots, including diagnostic artifacts), site sketch maps as appropriate (recorded with submeter GPS units), artifact and feature descriptions, and environmental context. A noncollective strategy was employed. Newly discovered sites were recorded on the requisite Department of Parks and Recreation (DPR) forms.

Built Environment Reconnaissance Survey

Available aerial photographs and historic maps of the study area were reviewed to identify potential historic built environment resources. No built environment resources or structures were identified.

Documentation

Unrecorded archaeological resources identified during the survey were documented on appropriate DPR 523 forms. These included a Primary Form (Form 523A) and Location Map (Form 523J), at a minimum. More complex resources require an Archaeological Site Record (Form 523C) and a Sketch Map (Form 523K). Sketch maps include a site datum and features, artifacts concentrations, and other cultural elements. Resource locations were determined using a GPS unit. All completed DPR site forms are attached for BLM review and approval (Appendix B). Once approved by BLM, DPR forms will be sent to the SBAIC for filing and the assignment of permanent numbers in the state inventory system. Final DPR forms will be included in the final survey report.

CHAPTER 5
RESULTS AND RECOMMENDATIONS

Survey of the APE was conducted on May 6, 2014, and June 1, 2015, by AECOM archaeologists using 10-meter to 15-meter transects. Conditions during the pedestrian survey of the APE on May 6, 2014, were overcast and warm, with surface visibility of nearly 100%. The survey proceeded southwest from the northern end of the APE at I-15. The first 0.5 mile was found to be relatively undisturbed, with sparse creosote scrub, some apparent off-highway-vehicle use, and modern refuse distributed sparsely along the alignment. The topography undulated as several small east/west-trending washes crossed the APE before rising quickly and steeply to the tower site at the southwest end of the APE (Plate 1).

Plate 1. Overview of the APE, facing southwest

Conditions during the pedestrian survey of the APE on June 1, 2015, were clear, hot, and windy with surface visibility of nearly 100%. The survey proceeded southwest from the northern end of the APE at I-15. This portion of the survey began on the north side of I-15 and continued northeast up the hill to the proposed communication area. The survey was found relatively undisturbed, with sparse creosote scrub. The topography undulated as several small northwest/southeast-trending drainages crossed the APE before rising quickly and steeply to over 50% grade up to the tower site at the northeast end of the APE (Plate 2).

Plate 2. Overview of the proposed power alignment, facing southwest

FINDINGS

The field investigations on May 6, 2014, revealed two newly discovered sites consisting of a small refuse dump of historic-age soda, wine, and beer bottles (CA-SBR-17217H) and a large site consisting of a prospecting pit and related campsite (CA-SBR-17218H). These finds are depicted on a map in Appendix A (confidential) and discussed below. DPR site forms for the newly recorded sites are located in confidential Appendix B. No cultural resources were observed during the June 1, 2015, pedestrian survey.

CA-SBR-17217H

CA-SBR-17217H is a historic site located on a steep slope of the foothills of the Clark Mountain Range, facing southeast towards I-15. The site lies approximately 200 feet from the southbound lane of I-15 and measures 28 feet north/south by 36.6 feet east/west. CA-SBR-17217H consists of six 1950s-era complete or fragmented bottles including four soda bottles, one wine bottle, and one beer bottle. The first bottle is a complete soda bottle with a white and blue applied color label reading “Bireley’s NON-CARBONATED” on the front of the bottle near the neck and an embossed label that reads “Bireley’s” on the front of the body of the bottle (Plate 3). The makers mark on the bottle base is Owens Illinois and the year listed on the bottle is 1954. Bireley’s noncarbonated orange drinks were manufactured and sold in a bottle from 1939 until March of 1959, when the company switched from selling bottles to cans.

Plate 3. Bireley's bottle, plan view

The second bottle is a complete carbonated maltless beverage bottle with a white applied color label reading "WILSHIRE CLUB Beverages" on the front of the bottle near the neck and a red and white applied color label on the front of the body of the bottle reading "WILSHIRE CLUB Jr. Beverages" and "Globe Bottling Co. Los Angeles, California". The back of the bottle has a white applied color label reading "Drink Wilshire Club Beverages Your Favorite Flavor". The makers mark is Owen's Illinois and the year listed on the bottle is 1953. The third bottle is missing the neck, but is three-quarters complete and is a soda bottle. The bottle has a yellow and red applied color label on the front of the body of the bottle that reads "NEHI Beverages". This bottle was manufactured in Riverside, California, and has embossing on the base that is weather worn and illegible. Nehi manufactured soft drinks in America under this name from 1928 to 1955, when the company changed its name to Royal Crown Company. The fourth bottle is a smoky grey glass wine kickup bottle base and associated body fragments. Two of the body fragments have embossing that, if complete, would read "Federal Law Forbids Sale or Reuse of this Bottle". This marking was required on all liquor bottles sold within the United States that were made between 1935 and 1964. The neck and top of the bottle were also observed with an aluminum wrap. Two bottle bases and various bottle fragments were also observed at this site. One bottle base is similar to the Bireley's bottle base and has an Owen's Illinois makers mark, and a date of 1952. The other bottle base is amber-colored, stippled, and has a "Ball" makers mark in cursive writing. This base is likely from a beer beverage bottle. This site is fairly concentrated and appears to be a single use, temporary roadside picnic or camp. Vegetation in the surrounding area consists of creosote scrub, and disturbances include aeolian and water erosion along the hillside (Plate 4).

Plate 4. Overview of Site CA-SBR-17217H, facing east

CA-SBR-17217H does not have direct association with persons or events important to the past (Criteria A and B of the NRHP). As a single-use refuse scatter of bottles, there are no site components that represent a distinct style, type, or design (Criterion C). Based on *terminus post quem,* artifacts place the date of this site at 1953, but the artifacts on-site do not provide evidence of socioeconomic status or any additional information regarding the people who discarded the artifacts. CA-SBR-17217H is unlikely to yield any information important to the past beyond what has been recorded (Criterion D). It is therefore recommended not eligible for inclusion in the NRHP under any Criteria (A–D) based on site components.

CA-SBR-17218H

CA-SBR-17218H is a historic site consisting of two loci and a mining trail located at the base of the foothills of the Clark Mountain range approximately 1,400 feet northwest of I-15. The first locus measures approximately 372 feet east/west by 162 feet north/south and the second locus measures approximately 35 feet east/west by 20 feet north/south. An east/west-trending mining trail connects the two loci and also was recorded as extending farther east and west than the loci. The observed section of the trail measures approximately 1,800 feet long and is approximately 2 to 3 feet wide. The first locus appears to be a multi-use mining camp with an associated large refuse scatter dispersed across a sloping swale that drops off to drainages to the west, north, and east (Plate 5) before rising up westward to a hill where the second locus is located. Items observed in the refuse scatter appear related to prospecting ventures and include five tires, a 50-gallon drum, three 5-gallon drums, a car bumper with a California license plate dated “51”, associated car parts, a sluice trap with an associated capped water pipe, a concentration of milled lumber, coffee cans, fuel cans, approximately 25 sanitary cans, approximately five bi-metal cans, two meat tins, four rock push piles, an amber bottle, a wire strainer, and a cooking grill.

Plate 5. Overview of Locus 1 of Site CA-SBR-17218H, facing northeast

The amber bottle has embossing reading “No Deposit No Return” and “Not to be Refilled” with an Owens-Illinois makers mark dated to 1954. Bi-metal cans observed within the site boundary push the date of the site to around 1964. These pull-tab cans were originally created in 1962 by Iron City Beer and became more widely used by 1963, but the style of pull tab observed at the site places the date closer to 1964 due to the presence of “smile” beads (raised lines alongside the opening). The associated mining trail bisects the first locus lengthwise and continues west up the finger of a foothill to the second locus. The second locus consists of a prospecting pit measuring approximately 15 feet long by 10 feet wide by 9 feet deep with an associated tailings pile (Plate 6). This prospecting pit appears on a 1983 USGS topographic map but is not found on earlier 1972, 1963, or 1957 USGS topographic maps. Vegetation in the surrounding area consists of creosote scrub, and disturbances include aeolian and water erosion along the hillside. CA-SBR-17218H appears associated with the mid- to late 20th century mining in eastern California.

Plate 6. Prospecting pit in Site CA-SBR-17218H, facing northeast

CA-SBR-17218H appears associated with the mid- to late 20th century mining in eastern California, but the site does not have direct association with persons or events important to the past (Criteria A and B). There is no indication as to what was mined or prospected for at this site and there are no site components that represent a distinct style, type, or design (Criterion C). CA-SBR-17218H does not contain any new or better examples of resources found at other mining sites in the surrounding area and is, therefore, unlikely to yield any information important to mining beyond what has been recorded (Criterion D). Artifacts observed on-site and historic topographic maps place the date range for the site between 1954 and sometime between 1972 and 1983. Milled lumber throughout the site suggests some type of structure may have existed on-site, but any evidence of what this structure may have been has been destroyed by environmental and, possibly, human disturbances. The artifacts associated with the site are mostly related to automotive, food, or construction, but do not provide any indication of socioeconomic status or insight into the daily life of the miners in this area. Therefore, CA-SBR-17218H is recommended not eligible for inclusion in the NRHP under any Criteria (A–D) based on site components. No further work is recommended at this site.

SUMMARY AND CONCLUSIONS

The Class III surveys of the Nipton APE resulted in identification of two previously unrecorded resources: one small refuse dump of historic-age soda, wine, and beer bottles (CA-SBR-17217H) and a site consisting of a prospecting pit, related campsite, and mining trail that connect the two (CA-SBR-17218H). None of the newly recorded resources identified during the study are recommended as eligible for inclusion in the NRHP and no further work is recommended.

CHAPTER 6
REFERENCES CITED

Baksh, Michael, and Gay Hilliard

2005 *Ethnographic Overview for the Marine Corps Air Ground Combat Center, Twenty-nine Palms, CA*. Unpublished technical report on-file at Tierra Environmental Services.

Barnard, Edward S. (editor)

1977 *Story of the Great American West*. Pleasanton, New York: The Reader's Digest Association.

Bean, Lowell John, and Lisa Bourgeault

1989 *Indians of North America: The Cahuilla*. New York: Chelsea House Publishers.

Bean, Lowell J., and Sylvia Brakke Vane

1978 *Persistence and Power: A Study of Native American Peoples in the Sonoran Desert and Devers-Palo Verde High Voltage Transmission Line.* Report submitted to Southern California Edison Company. Cultural Systems Research, Menlo Park, California.

Bean, Lowell J., and Charles R. Smith

1978 Serrano. In *California*, edited by Robert F. Heizer, pp. 570–574. Handbook of North American Indians, Vol. 8, William G. Sturtevant, general editor. Washington, D.C.: Smithsonian Institution.

Beck, Warren A., and Ynez D. Haase

1974 *Historical Atlas of California*. Norman, Oklahoma: University of Oklahoma Press.

Benedict, Ruth

1924 A Brief Sketch of the Serrano Culture, *American Anthropologist* 26(3):366–392.

Bettinger, Robert L., and Martin A. Baumhoff

1982 The Numic Spread: Great Basin Cultures in Competition. *American Antiquity* 47(3):485–503.

Black, R. (translator)

1986 The Journal of Francisco Garcés. In *Back Door to California: The Story of the Mojave River Trail* by Clifford J. Walker. Barstow, California: Mojave River Valley Museum Association.

Bureau of Land Management

1978 Archaeological Sites of the California Desert Area (Owlshead, Amargosa, Kingston, Bitterwater Transect Forms, Stages 1-2). Unknown. Submitted to Bureau of Land Management. Unpublished Report on File at S.B. CO. Museum, 2024 Orange Tree Land, Redlands, CA 92374.

Cloudman, H. E, E. Huguenin, and F.J.H. Merrill

1919 *San Bernardino County*, California Mining Bureau Report 15, p. 865.

Coombs, Gary B., Richard McCarty, Tara Shepperson, and Sharon Dean

1979 *The Archaeology of the Western Mojave*. Prepared for U.S. Department of the Interior Bureau of Land Management. On file at AECOM San Diego.

Driver, Harold E.

1937 Cultural Element Distribution, VI: Southern Sierra Nevada. *University of California Anthropological Records* 1(2):53–154. Berkeley.

Eerkens, Jelmer W., Jeffrey R. Ferguson, Michael D. Glascock, Craig E. Skinner, and Sharon A. Waechter

2007 Reduction Strategies and Geochemical Characterization of Lithic Assemblages: A Comparison of Three Case Studies from Western North America. *American Antiquity* 72:585–597.

Kelly, Isabel T.

1934 Southern Paiute Bands, *American Anthropologist* 36(4):548–560.

Kelly, Isabel T., and Catherine S. Fowler

1986 Southern Paiute. In *Great Basin,* edited by Warren L. d'Azevedo, pp. 368–397. Handbook of North American Indians, Vol. 11. Washington, D.C.: Smithsonian Institution.

Kroeber, Alfred L.

1925 *Handbook of the Indians of California*. Washington, D.C.: Smithsonian Institution.

Laird, Carobeth

1976 *The Chemehuevis*. Banning, California: Malki Museum Press.

Moratto, M. J.

1984 *California Archaeology*. Orlando, Florida: Academic Press.

Norris, Frank, and Richard Carrico

1978 *A History of Land Use in the California Desert*. Prepared for U.S. Department of the Interior Bureau of Land Management. On file at AECOM San Diego.

Pourade, Richard F.
1960 *The History of San Diego: The Explorers*. San Diego: Union-Tribune Publishing Company.

1961 *The History of San Diego: The Time of the Bells*. San Diego: Union-Tribune Publishing Company.

Shackley, Steven M., Rebecca McCorkle Apple, Jan Wooley, and Robert E. Reynolds
1987 Cultural and Paleontological Resources Survey: US Sprint Fiber Optic Cable Project, Rialto, California to Las Vegas, Nevada. Dames & Moore. Submitted to U.S. Spring. Unpublished Report on File at S.B. CO. Museum, 2024 Orange Tree Lane, Redlands, CA 92374.

Sherer, Lorraine M.
1994 *Bitterness Road: The Mojave 1604 to 1860*. Menlo Park, California: Ballena Press.

Shumway, Gary L., Larry Vredenburgh, and Russell Hartill
1980 *Desert Fever: An Overview of Mining in the California Desert Conservation Area*. Prepared for the Bureau of Land Management.

Spencer-Wood, Suzanne
1987 Miller's Indices and Consumer Choice Profiles: Status-Related Behaviors and White Ceramics. In *Consumer Choice and Socio-Economic Status in Historical Archaeology*, edited by Suzanne Spencer-Wood, pp. 321–358. New York: Plenum Press.

Strong, William D.
1929 *Aboriginal Society in Southern California*. Berkeley: University of California Press.

Sutton, M. Q.
1988 *An Introduction to the Archaeology of the Western Mojave Desert, California*. Coyote Press Archives of California Prehistory No. 14.

1991 *Archaeological Investigations at Cantil, Fremont Valley, Western Mojave Desert, California*. Museum of Anthropology, California State University, Bakersfield, Occasional Papers in Anthropology 1.

1996 The Current Status of Archaeological Research in the Mojave Desert. *Journal of California and Great Basin Anthropology* 18(2):221–257.

Sutton, Mark Q., Mark E. Basgall, Jill K. Gardner, and Mark W. Allen
2007 Advances in the Understanding of Mojave Desert Prehistory. In *California Prehistory: Colonization, Culture, and Complexity*, edited by Terry L. Jones and Kathryn A. Klar. Lanham, Maryland: Altamira Press.

Van Wormer, Stephen R.

1991 *Even the Kitchen Sink: Archaeological Investigations of SDi-10,258, the 1908 to 1913 San Diego City Dump*. Prepared by RECON, San Diego. Prepared for W. Wolf Industries, San Diego.

Vredenburgh, Larry M.

1996 Early Mines of Southern Clark Mountain, Northern Mescal Range, and Ivanpah Mountains. *In* Punctuated Chaos, in the Northeastern Mojave Desert, edited by Robert E. Reynolds and Jennifer Reynolds. *San Bernardino County Museum Association Quarterly* 43 (1 and 2) 67–72.

Warren, C. N.

1984 The Desert Region. In *California Archaeology*, by Michael J. Moratto, pp. 339–430. New York: Academic Press.

1990 *Archaeological Investigations at Nelson Wash, Fort Irwin, California.* Fort Irwin Archaeological Project Research Report Number 23, Volumes I and II Interagency Archaeological Services, National Park Service Western Region. San Francisco, California.

Warren, C. N., and R. H. Crabtree

1986 Prehistory of the Southwestern Area. In *Great Basin*, edited by Warren d'Azevedo, pp. 183–193. Handbook of North American Indians, Vol. 11, William G. Sturtevant, general editor. Washington, D.C.: Smithsonian Institution.

Whipple, Amiel W., Thomas Ewbank, and William W. Turner

1855 Report Upon the Indian Tribes. Pt. 3 of the U.S. War Department Reports of Explorations and Surveys to Ascertain the Most Practical and Economical Route for a Railroad from the Mississippi River to the Pacific Ocean Made in 1853–1854, Volume 3. *U.S. Congress. Senate. 33d Cong., 2d sess., Senate Executive Do.* No. 78 (Serial No. 752). Washington, D.C.

SUPPLEMENTAL PROJECT STATISTICS REPORT

1. Project Name.	Cultural Resources Survey for the Interconnect Towers Nipton Project San Bernardino County, California	
2. BLM State Permit Number.	CA-12-22	
3. Field Authorization Number.	FA-CA690-14-06, FA-CA690-15-05	
4. Dates of Field Survey.	May 8, 2014, June 1, 2015	
5. Total acreage of lands surveyed at BLM Class II level.		0
Of Item 5 above:		
	A) Acreage of BLM lands surveyed	0
	B) Acreage of other lands surveyed (Private, State, Other Federal) List separately	0
6. Total acreage of lands surveyed at BLM Class III level.		37
Of Item 6 above:		
	A) Acreage of BLM lands surveyed	37
	B) Acreage of other lands surveyed (Private, State, Other Federal) List separately	0
7. Total number of cultural properties in project Area (of Potential Effect).		2
Of Item 7 above:		
	A) Total number of cultural properties for which site records were completed (newly recorded cultural properties).	2
	B) Number of new cultural properties on BLM lands	2
	C) Number of new cultural properties on other lands (Private, State, Other Federal)	0
8. Of the cultural properties located within the Area (of Potential Effect): [If properties are not located on BLM, place this number in parentheses ( ) after the number of BLM properties.]		
	A) Number of cultural properties that you are recommending as eligible for the National Register.	0
	B) Number of cultural properties you are a recommending as not eligible for the National Register.	2

Of Item 8A above:		
	a) Number of cultural properties that can/will be avoided.	0
	b) Number of cultural properties that will be affected.	0
	c) Number of cultural properties that you are recommending data recovery/mitigation.	0
	d) Number of cultural properties that were data recovered/mitigated.	0
Of Item 8B above:		
	a) Number of cultural properties that can/will be avoided.	0
	b) Number of cultural properties that will be affected.	2

APPENDIX A
RECORDS SEARCH AND
SURVEY RESULT MAPS

(*CONFIDENTIAL – SEPARATELY BOUND*)

APPENDIX B
DEPARTMENT OF PARKS AND RECREATION (DPR) FORMS

(*CONFIDENTIAL – SEPARATELY BOUND*)

Appendix J

Paleontological Resources Survey

Paleontological Resources Survey for the Interconnect Towers Nipton Project San Bernardino County, California

Prepared for:
InterConnect Towers, LLC
27762 Antonio Parkway, #471
Ladera Ranch, CA 92694

***Contact*:**
Tom Gammon
Telephone: (202) 255-7777

Prepared by:
AECOM
401 West A Street, Suite 1200
San Diego, California 92101

Author:
Joe Stewart, Ph.D.

November 2019

Keywords: USGS Quadrangle: Mineral Hill, 7.5-minute,
Paleontological Resources Survey, San Bernardino County, Bureau of Land Management

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EXECUTIVE SUMMARY

InterConnect Towers, LLC, proposes to construct a communication site and associated access road that would be located on public lands managed by the Bureau of Land Management (BLM), near Nipton, an unincorporated area of San Bernardino County, California. The Nipton Communication Site is located west of Interstate 15, commencing from the Nipton Road exit and terminating after 1.74 miles (9,234 feet) on the top of a hill at the proposed cellular tower location. BLM is overseeing this process in compliance with the National Environmental Policy Act.

Prior to commencing fieldwork, a records search was conducted by the Natural History Museum of Los Angeles County. AECOM also conducted a literature search. There are no known pertinent paleontological sites nearby. The area of potential effects (APE) consists of the communication site, staging area, the access road alignment, and a 50-foot buffer around these features. Survey of the APE was conducted on October 23, 2019, by AECOM paleontologists using 10- to 15-meter transects. Conditions during the pedestrian survey of the approximately 26-acre APE were clear and warm with surface visibility of nearly 100%.

No paleontological resources were identified during the October 23, 2019, pedestrian survey and no substantial excavations are planned for the project. Therefore, no further work is recommended for this project. If potential paleontological resources are incidentally discovered during construction of the project, all ground disturbance shall immediately cease within a 25-foot radius of the discovery until a qualified paleontologist can mobilize to the site to examine the discovery, evaluate its significance, and make further recommendations as appropriate.

INTRODUCTION

This report documents the results of a paleontological survey conducted in support of the Interconnect Towers Nipton Project, San Bernardino, County, California. The survey was conducted in compliance with California and federal laws and regulations that afford protection to paleontological resources, including the California Environmental Quality Act, the National Environmental Policy Act, and the Paleontological Resources Preservation Act. The survey was also conducted in accordance with the Society of Vertebrate Paleontology's (SVP) 2010 guidance for the assessment and treatment of paleontological resources.

PROJECT DESCRIPTION

InterConnect Towers, LLC, proposes to construct a communication site and associated access road that would be located on public lands managed by the Bureau of Land Management (BLM), near Nipton, an unincorporated area of San Bernardino County, California (Figure 1). The Nipton Communication Site, hereafter referred to as the study area or project, would be located on land managed by BLM, adjacent to Interstate 15 (I-15) approximately 10 miles southwest of the California-Nevada state line, immediately west of the junction of I-15 and Nipton Road. More specifically, the proposed communication tower would be located in the northeast quarter of Section 34, Township 16 North, Range 14 East, as depicted on the Mineral Hill, California U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle (Figure 2). Elevation ranges from 1,050 to 1,350 meters.

The project includes the following elements:

- A 17,248-square-foot communication site that includes a single three-legged, 196-foot freestanding, self-supporting lattice communication tower with cabinets to house equipment; three 21-foot by 80-foot solar arrays; and up to three 35-kilowatt backup generators with up to three 2,000-gallon propane tanks.
- A new access road approximately 8,904 feet in length starting from Nipton Road and ending at the project site. The new access road includes five 25-foot by 100-foot passing lanes at intervals along the roadway.
- An 80-foot by 100-foot staging area in a previously disturbed area adjacent to the I-15/Nipton Road interchange.

Areas of new, permanent disturbance would include the communication site and the new access road discussed above. All new disturbances would be considered permanent in nature given the sensitivity of desert ecosystems to ground-disturbing activities. Areas of new disturbance would total approximately 5.8 acres.

The staging area would be adjacent to the I-15/Nipton Road interchange and is currently used for vehicle parking and vehicle turnaround purposes; therefore, this area is considered already disturbed. The existing access road segment is also already disturbed. Use of these areas would not be a part of the new disturbance area, since the areas are already disturbed and would not require additional improvement or expansion. The previously disturbed area total is 0.3 acre.

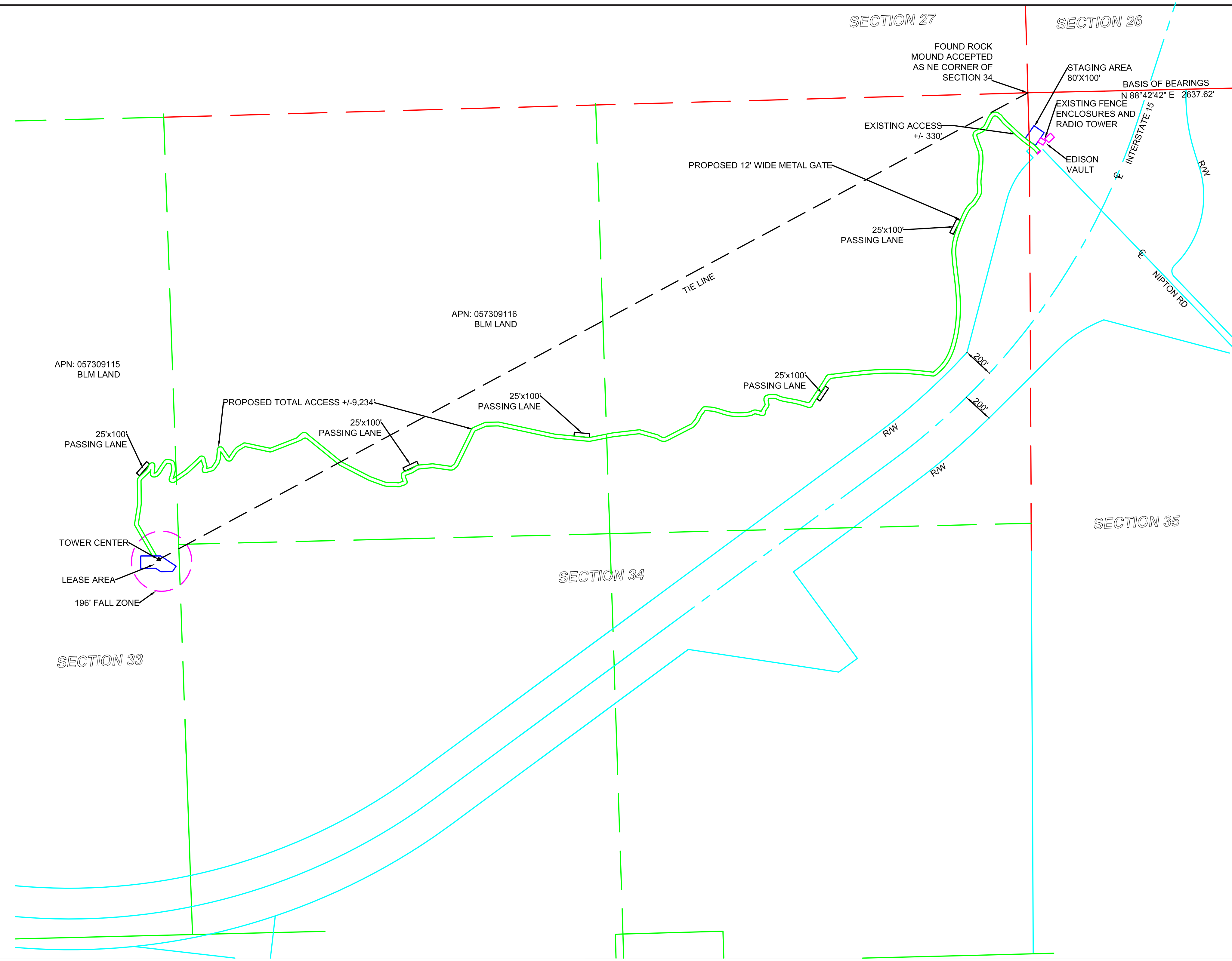
Source: ESRI 2012; SANGIS 2012

25 12.5 0 25 Miles

Scale: 1:1,584,000; 1 inch = 25 miles

Figure 1
Regional Location Map

Path: \\ussdg1fp001.na.aecomnet.com\DATA\projects_6053\60534139_ICT_Towers\900-CAD-GIS\Nipton\920 GIS\map_docs\mxd\Paleo\Fig1_Regional_Map_Nipton.mxd, 11/15/2019



Source: LEJA Surveying Corps

Not to Scale

Figure 2

Communication Site and Access Road Alignment

AREA OF POTENTIAL EFFECTS

The project area of potential effects (APE) consists of approximately 25.6 acres. This includes the communication site, the staging area, the new access road segment, and the existing access road segment (Figure 2). The APE also consists of a buffer of 50 feet around the communication site, staging area, and on either side of the access road alignment.

PROJECT PERSONNEL

Joe Stewart, Ph.D., served as principal investigator, directed the fieldwork, and authored this report (see Appendix A for resumé). Kyle Ports participated in all the fieldwork and operated the global positioning system (GPS) devices.

REPORT ORGANIZATION

This report consists of an introduction that includes the project description and background; the project setting; records and literature search; field methods; a results and recommendations section; a summary and conclusions section, and literature cited.

PROJECT SETTING

The project lies within the Mojave Desert physiographic region. The Mojave Desert is situated between the subtropical Sonoran Desert to the south and the cold temperature Great Basin to the north. The Mojave Desert is characterized by extreme variations in daily temperatures and more arid conditions than other American desert regions. Freezing temperatures occur during the winter, particularly in higher-elevation regions. Summers tend to be hot, dry, and windy. Precipitation in the region is highly variable from one year to the next, but typically ranges between 3 to 5 inches per year. Most precipitation falls in the winter, but the region also experiences rare, intense summer thunderstorms. It is during these rare flood events that some of the most dramatic changes take place on the desert landscape.

The Mojave has a typical mountain-and-basin topography with sparse vegetation. A large portion of the study area is marked by creosote bush (*Larrea tridentata*), which is the dominant plant species of the Mojave Desert (Warren 1984). Lower elevations are dominated by creosote bush, and higher elevations contain yuccas and agaves and then pinion-juniper habitats (Warren 1984). Plant communities within proximity of springs, marshes, and streambeds produce tules, cattails, and various grass species (Warren 1984).

Large fauna species are rare in the Mojave Desert, with the most common being mule deer (*Odocoileus hemionus*) and coyote (*Canis latrans*); rabbits, rodents, reptiles, and birds are more common. Rabbit species found in the Mojave include black-tailed jackrabbit (*Lepus californicus*) and desert cottontail (*Sylvilagus audubonii*). Rodent species include various pocket mice (*Perognathus* spp.), whitetail antelope squirrel (*Ammospermophilus leucurus*), and kangaroo rat (*Dipodomys* spp.). Reptile species include desert tortoise (*Gopherus agassizii*), desert iguana (*Dipsosaurus dorsalis*), common king snake (*Lampropeltis californiae*), and Mojave rattlesnake (*Crotalus scutulatus*). More than 300 species of birds are found in the Mojave Desert. Species more common to the open desert are prairie falcon (*Falco mexicanus*), burrowing owl (*Athene cunicularia*), roadrunner (*Geococcyx californianus*), and horned lark (*Eremophilia alpestris*) (Warren 1984).

The project APE is located within Ivanpah Valley on the foothills of the Clark Mountain Range. The majority of the study area falls on the fingers of the Clark Mountains and some is at the base in alluvial fans. Vegetation in this area largely consists of creosote bush, with a small amount of yucca and multiple species of cacti.

The geologic mapping being used here is that by Miller (2012) at a scale of 1:100,000. The project lies within two unnamed ephemeral drainages. The trail to the site starts at the alluvial fan deposit off-ramp/on-ramp midpoint for the southbound I-15 (Figure 3). The sediments there are mapped as Qya + Qaa – young alluvial fan deposits plus active alluvial fan deposits. As the trail turns south, it enters Qha/mr – abundant hillslope deposit (Holocene and Pleistocene) less than 50% bedrock (metamorphic rocks). As it nears I-15, it turns west and then partway up the slope it passes into sediments mapped as Qia – intermediate alluvial fan deposits (late to middle Pleistocene). It soon passes back into the Qha/mr and continues thus to the summit.

RECORDS SEARCH AND LITERATURE SEARCH

This section outlines the results of the paleontological records search conducted to obtain existing information on paleontological resource locality within and/or adjacent to the APE and of the paleontological literature search.

RECORDS SEARCH

AECOM requested a paleontological records search from the Natural History Museum of Los Angeles County (LACM) on September 12, 2019. Sam McLeod, PhD, replied with a report on September 26, 2019. That report is included as Appendix B. Dr. McLeod reported that the LACM does not have any vertebrate fossil localities that occur within the proposed project area boundaries, but that they do have localities at some distance from sedimentary deposits similar to those that may occur at depth in the proposed project area.

Dr. McLeod stated that in most of the proposed project area, the more elevated terrain has bedrock and decomposed surface material of Precambrian metamorphic rocks that will not contain recognizable fossils. In the middle and northeastern portions of the proposed project area there are surface deposits of younger Quaternary Alluvium, derived as alluvial fan deposits from the more elevated adjacent terrain. These deposits typically do not contain significant vertebrate fossils and the LACM has no fossil vertebrate localities anywhere nearby from these types of deposits.

The records search report discusses fossils from Quaternary lacustrine deposits northwest of the project area. These, however, are not relevant to the project footprint, as it is at least 250 meters above the nearest playa deposits.

Dr. McLeod advised that excavations in the Precambrian metamorphic rocks exposed in the proposed project area, or if encountered at depth, will not uncover any recognizable vertebrate fossils. Shallow excavations in the younger Quaternary alluvial fan deposits exposed in portions of the proposed project area are unlikely to

Source: Miller, 2012.

1 0.5 0 1 Mile

Figure 3
Survey Boundary Map
Overlaid on Geologic Map

encounter significant vertebrate fossils in the uppermost layers. Deeper excavation in the Quaternary Alluvium, however, possibly may uncover significant fossil vertebrate remains. He also advised that any substantial excavations in the sedimentary deposits in the proposed project area, therefore, should be monitored closely to quickly and professionally recover any fossil remains while not impeding development. He recommended that sediment samples from the proposed project area should also be collected and processed to determine the small fossil potential of the site. Any fossils collected should be placed in an accredited scientific institution for the benefit of current and future generations.

Dr. McLeod provided the caveat that the records search covers only the vertebrate paleontology records of the LACM. It is not intended to be a thorough paleontological survey of the proposed project area covering other institutional records, a literature survey, or any potential on-site survey.

LITERATURE SEARCH

There is an extensive record of Pleistocene vertebrate fossils in the desert areas of California (Jefferson 1991 a, 1991b). One source of vertebrate fossils in such environments has recently been revealed in an unusual type of deposit: fossil soils (paleosols). Stewart et al. (2012) and Raum et al. (2014) documented this phenomenon in Riverside County. More recently, similar deposits in San Bernardino County have produced Pleistocene vertebrate faunas (Stewart 2013; Stewart and Hakel 2016, 2017). At many of the sites in these publications and reports, fossils were found in deposits that were mapped as being of Holocene age. The conventional approach to surficial and near-surface Holocene and Pleistocene deposits is that the surficial sediments are of Holocene age, but that Pleistocene sediments will be encountered somewhere below the surface. That scenario assumes an aggrading sedimentary context. The reality in many desert situations is that the context is degrading. Wind and rain have been removing the fine sediments from many desert floors and alluvial fans, leaving residual large objects and exposing Pleistocene fine-grained sediments at the surface (Stewart et al. 2012). Some of the sediments within the project footprint are mapped as alluvial fans, indicating that residual bones and Pleistocene sediments could be present at or near the surface.

FIELD METHODS

The field survey was conducted under a BLM Fieldwork Authorization (FA-CA690-14-06) issued by the Needles Field Office under statewide BLM permit CA-20-02P.

A pedestrian survey of the APE was conducted on October 23, 2019, by a qualified AECOM paleontologist (Joe Stewart) and monitor (Kyle Ports) using 10- to 15-meter transects. The surveyors used 7.5-minute USGS topographic maps and larger-scale aerial photographs, as well as hand-held submeter GPS units loaded with shapefiles of the study area for orientation and to record resources and survey coverage.

RESULTS AND RECOMMENDATIONS

The staging area adjacent to the southbound I-15 on- and off-ramp is mapped as young alluvial fan deposits (Qya) and active alluvial fan deposits (Qaa). Much of that area has been used as a parking lot and is somewhat disturbed. Miller (2012) indicates that Qaa sediments are of latest Holocene age; therefore, they are too young to produce significant paleontological resources as defined by SVP (2010). He lists Qya deposits as being of

Holocene and latest Pleistocene age. These are old enough to produce significant paleontological resources as defined by SVP (2010). Some cemented horizons in the Qya deposits were observed during the October 23, 2019, survey.

The Qia deposits (of late to middle Pleistocene age according to Miller [2012]) certainly are old enough to produce significant paleontological resources. Miller states that the carbonate morphology of this deposit can be at least to stage II (continuous pebble coatings). The areas observed during the pedestrian survey had coarse gravel and larger clasts.

Miller (2012) did not assign an age to the Qha/mr sediments. They were generally coarse on the upper half of the route, with many cobble and larger clasts. There were small areas of silt at some places on this surface, but they did not appear large enough to produce paleontological resources. On the lower part, a bit north of where the route turns west, the clasts are not as large, and some cemented layers were observed. These layers exhibited at least stage II carbonate morphology (Bull 1991). In only one site were trace fossils seen; these were vertical burrows or root voids passing down into loose, uncemented sands and gravels (Figure 4).

As suspected, some limited and some extensive deposits of pedogenic carbonates were encountered in calcic soils. However, they were moderately to heavily cemented and did not show indications of biological activity (bioturbation), and the steep terrain precludes the likelihood of areas where deflation or prolonged weathering could expose enclosed fossils. The drainage ditch that separates the interstate highway from the project reveals some stage IV carbonate morphology where a more or less continuous sheet of calcium carbonate can be seen.

Given these findings, monitoring of the road and communication site on this project for paleontological resources is not warranted. If potential paleontological resources are incidentally discovered during construction of the project, all ground disturbance shall immediately cease within a 25-foot radius of the discovery until a qualified paleontologist can mobilize to the site to examine the discovery, evaluate its significance, and make further recommendations as appropriate.

SUMMARY AND CONCLUSIONS

The paleontological resource surveys of the Nipton APE resulted in the detection of no paleontological resources, and the sediments encountered are judged to have little paleontological potential. If potential paleontological resources are incidentally discovered during construction of the project, all ground disturbance shall immediately cease within a 25-foot radius of the discovery until a qualified paleontologist can mobilize to the site to examine the discovery, evaluate its significance, and make further recommendations as appropriate.

Source:

Figure 4

Cemented Sand Layer in Sediments Mapped as Qha/mr and Showing A Cemented Burrow or Root Void (Arrow) Descending Through Uncemented Sand Layer (Removed Earlier).

LITERATURE CITED

Bull, W. B. 1991. *Geomorphic Responses to Climatic Change*. Oxford University Press, Oxford. 326 pp.

Jefferson, G. T. 1991a. *A Catalogue of Late Quaternary Vertebrates from California, Part One, Nonmarine Lower Vertebrate and Avian Taxa*. Natural History Museum of Los Angeles County Technical Reports, no. 5, 60 pp.

Jefferson, G. T. 1991b. *A Catalogue of Late Quaternary Vertebrates from California, Part Two, Mammals*. Natural History Museum of Los Angeles County Technical Reports, no. 7, 129 pp.

Miller, D. 2012. Surficial geologic map of the Ivanpah 30' x 60' quadrangle, San Bernardino County, California, and Clark County, Nevada. USGS Scientific Investigation Map 2306.

Raum, J., G. L. Aron, and R. E. Reynolds. 2014. Vertebrate Fossils from Desert Center, Chuckwalla Valley, California. *California State University Desert Symposium Proceedings* 2014:68–70.

Society of Vertebrate Paleontology (SVP). 2010. *Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources*. Electronic document: http://vertpaleo.org/PDFS/8f/8fe02e8f-11a9-43b7-9953-cdcfaf4d69e3.pdf. Accessed 2019.

Stewart, J. D. 2013. *Paleontological Resources Technical report: Proposed Calico Mineral Exploration Project, San Bernardino County, CA*, 24 pp. Prepared for Bureau of Land Management, Barstow Field Office, 2601 Barstow Road, Barstow, CA 92311. Prepared by URS, 4225 Executive Square, Suite 1600, La Jolla, CA 92037.

Stewart, J. D., and M. E., Hakel. 2016. Pleistocene Paleosol Developed on Ancestral Mojave River Sediments Near Hinkley, California. *PaleoBios 33 Supplement*:15.

Stewart, J. D., and M. E., Hakel. 2017. First Record of Vertebrate Fossils in the Searles Basin in Another Desert Paleosol. *California State University Symposium Procee*dings 2017:341.

Stewart, J. D., M. Williams, M. Hakel, and S. Musick. 2012. Was it washed in? New Evidence for the Genesis of Pleistocene Fossil Vertebrate Remains in the Mojave Desert of Southern California. *California State University Desert Symposium Proceedings 2012*:140–143.

Warren, C. N. 1984. The Desert Region. In *California Archaeology*, by Michael J. Moratto, pp. 339–430. New York: Academic Press.

APPENDIX A

RESUME OF JOE STEWART

AECOM

Joe D. Stewart, PhD
Principal Paleontologist

Areas of Expertise

NEPA and CEQA Compliance
Project Management
Principal Investigator
Paleontological Management and Treatment

Education

MA, Systematics & Ecology, University of Kansas, 1979
PhD, Systematics & Ecology, University of Kansas, 1984

Years of Experience

With AECOM: 11
With Other Firms: 4

Registration/Certifications

Certified Paleontologist, Orange and Riverside counties, California
Research Associate, Natural History Museum of Los Angeles County
Hazardous Waste Operations and Emergency Response 40 Hr. General Site Worker
Certified paleontologist in the counties of Orange and Riverside
California BLM Permit

Professional Societies/Affiliates

Society of Vertebrate Paleontology

Joe Stewart is a vertebrate paleontologist with over 40 years of experience in paleontology and 30 years of experience in the geology and paleontology of California, particularly in Merced, Fresno, Kern, Santa Barbara, Los Angeles, Orange, San Bernardino, Riverside, Imperial, and San Diego counties. Joe has been involved in the permitting or construction of more than ten power plants, and has directed the paleontological monitoring and mitigation program for Path 15, a major transmission line project. He is also a certified paleontologist for the Counties of Orange and Riverside. His publications include 40 peer-reviewed articles in books and journals. His research specialties are fossil fishes and Pleistocene vertebrate faunas.

Project Specific Experience

Recurrent Energy Crimson Project, 2016. Supervised paleontological survey and wrote preliminary findings report.

Puente Power Project, 2014-2015: Supervised paleontological survey and wrote the Paleontological Resources section for the AFC.

SR-91 Corridor Improvement Project, 2013-present: Wrote Paleontological Mitigation Plan and supervised paleontological monitoring and mitigation of construction activities.

Devore I-15/I-215 Interchange Improvement Project, 2012-2015: Supervised paleontological monitoring and mitigation.

BrightSource Sonoran West Solar Project, 2012-2013: Supervised paleontological survey on BLM and private lands and wrote final report.

BrightSource Rio Mesa Solar Project, 2011-2013: Supervised paleontological survey on BLM and private lands. Wrote the Paleontological Resources section for the AFC.

Pio Pico Energy Center, 2010-2011: Supervised paleontological survey and wrote the Paleontological Resources section for the AFC.

Mesquite Nevada Replacement General Aviation Airport, 2009: Wrote the paleontological Resource Assessment for the Federal Aviation Administration.

Starwood Power-Midway, LLC Peaking Project Construction, 2008-2009: Wrote mitigation plan for paleontological resources, oversaw monitoring for paleontological resources, and wrote final report.

I-805 Managed Lanes South Project, 2008-2009: Directed paleontological survey of 11.4-mile long project area in San Diego, National City, and Chula Vista and wrote the Paleontological Resource Assessment for SANDAG.

I-805 North Corridor Project, 2008: Directed paleontological survey of 4.4-mile long project area in San Diego and wrote the Paleontological Resource Assessment for SANDAG.

Calnev Pipeline Project, 2008-present: Directed paleontological survey of 234-mile long project area in San Bernardino County, California and Clark County, Nevada and wrote the paleontological assessment.

Imperial Valley Solar Application for Certification, 2008-present: Directed paleontological pedestrian survey of project area in San Bernardino County and wrote the paleontological resource section of the AFC.

San Joaquin One and Two Application for Certification, 2008: Directed paleontological pedestrian survey of project area in Fresno County and wrote the paleontological resource section of the AFC.

Willow Pass Generating Station Application for Certification, 2008-present: Participated in paleontological pedestrian survey of project area in Contra Costa County and wrote the paleontological resource section of the AFC.

Marsh Landing Generating Station Application for Certification, 2008-present: Participated in paleontological pedestrian survey of project area in Contra Costa County and wrote the paleontological resource section of the AFC. Am serving as Paleontological Resource Specialist for construction.

Calico Solar Application for Certification, 2008-present: Participated in paleontological pedestrian survey of project area, edited the paleontology section of the AFC, and am serving as Paleontological Resource Specialist.

IID Niland Gas Turbine Plant Phase III project construction, 2007-2008: Served as Paleontological Resource Specialist Oversaw the work of the paleontological resource monitors, made numerous site visits, and will write final report on paleontological resources.

Carrizo Energy Solar Farm (Ausra) Application for Certification, 2007: Participated in paleontological pedestrian survey of project area and edited the paleontology section of the AFC.

Starwood Power-Midway, LLC Peaking Project Application for Certification, 2007: Participated in the responses to the CEC Provisional Staff Assessments.

BNSF Cajon Main Third Track Summit to Keenbrook permitting, 2007: Participated in the writing, editing, and production of the Paleontologic Resources Monitoring and Mitigation Plan and the Paleontological Resource Assessment.

Path 15 500-kV Power Transmission Line between Los Banos and Gates substations, 2003-2005: Supervised paleontological resource monitoring, excavations, specimen preparation, specimen identification, and report writing for 80-mile power line.

Publications

Stewart, J. D., and M. E. Hakel. 2019. The first Pleistocene paleosol vertebrate fossils in Ridgecrest, Kern County, CA. Desert Symposium Proceedings 2019:204-205.

Stewart, J. D., and M. E. Hakel. 2018. Surgeon fish fossils as paleoclimatic indicators in California Neogene sediments. Paleobios 35 Supplement: 15-16.

Stewart, J. D., and M. E. Hakel. 2017. First record of vertebrate fossils in the Searles Basin: in another desert paleosol. California State University Desert Symposium Proceedings 2017:341.

Stewart, J. D., and M. E. Hakel. 2016. Pleistocene paleosol developed on ancestral Mojave River sediments near Hinkley, California. Paleobios 33 Supplement: 15

Stewart, J. D., and M. E. Hakel. 2015. Remanié *Desmostylus* fossils in the Tulare Formation. PaleoBios 32 Supplement: 15-16.

Smith, G. R., J. D. Stewart, and N. E. Carpenter. 2013. Fossil and Recent mountain suckers, *Pantosteus*, and significance of introgression in catostomin fishes of western United States. Occasional Papers of the Museum of Zoology, University of Michigan 743:1-39.

Smith, G. R., R. E. Reynolds, and J. D. Stewart. 2013. Hydrographic significance of fishes from the Early Pliocene White Narrows Beds, Clark County, Nevada. 2013 California State University Desert Symposium Proceedings 2013:171-180.

Friedman, M., K. Shimada, M. J. Everhart, K. J. Irwin, B. S. Grandstaff, and J. D. Stewart. 2013. Geographic and stratigraphic distribution of the late Cretaceous suspension feeding bony fish *Bonnerichthys gladius* (Teleostei, Pachycormiformes). Journal of Vertebrate Paleontology 33:35-47.

Stewart, J. D., M. Williams, M. Hakel, and S. Musick. 2012. Was it washed in? New evidence for the genesis of Pleistocene fossil vertebrate remains in the Mojave Desert of southern California. California State University Desert Symposium Proceedings 2012:140-143.

Cook, T. D., M. G. Newbrey, A. M Murray, M. V. Wilson, K. Shimada, G. T. Takeuchi, and J. D. Stewart. 2011. A partial skeleton of the Late Cretaceous lamniform shark, *Archaeolamna kopingensis*, from the Pierre Shale of western Kansas, U.S.A. Journal of Vertebrate Paleontology 31:8-21.

Bell, M. A., J. D. Stewart, and J. Park. 2009. The world's oldest fossil threespine stickleback. Copeia 2009:256-265.

Tseng, J.Z., X. Wang, and J.D. Stewart. 2009. A new otter-like immigrant mustelid (Carnivora, Mammamlia) from the middle Miocene Temblor Formation of Central California. PaleoBios 29:13-23.

Kelly, T.S., and J. D. Stewart. 2008. New records of Middle and Late Miocene Perissodactyla and Artiodactyla from the western border of the San Joaquin Valley, Diablo Range, Fresno County, California. Los Angeles County Museum of Natural History Contributions in Science 516:1-29.

Tseng, Z., X. Wang, and J. D. Stewart. 2007. Tough New World. Discovery of an unusual immigrant mustelid with crushing dentition from the middle Miocene of coastal California. Journal of Verterate Paleontology 27:160A.

Stewart, J. D. and M. Hakel. 2006. Ichthyofauna of the Mowry Shale (Early Cenomanian) of Wyoming. New Mexico Museum of Natural History & Science Bulletin 35:161-163.

Stewart, J. D., E. Zaborsky, and M. Hakel. 2006. A new Middle Miocene terrestrial fauna from the Temblor Formation of Central California. New Mexico Museum of Natural History & Science Bulletin 34:40.

Hakel, M., and J.D. Stewart. 2003. A nearly complete skeleton of *Pachyrizodus caninus*. Journal of Vertebrate Paleontology 23:58A.

Stewart, J. D. 2003. Quantifiable change in the *Isurus hastalis* populations in Middle and Late Miocene rocks of California. Journal of Vertebrate Paleontology 23:101A.

Stewart, J. D., and F. Perry. 2002. The first paleomagnetic framework for the *Isurus hastalis – Carcharodon* transition in the Pacific Basin: the Purisima Formation, Central California. Journal of Vertebrate Paleontology 22:111A.

Hakel, M., and J. D. Stewart. 2002. First fossil Molidae (Actinopterygii: Tetraodontiformes) in western North America. Journal of Vertebrate Paleontology 22:62A.

Geist, N. R., S. Carpenter, and J. D. Stewart. 2002. Chemical and morphological analysis of soft tissue preservation in a mosasaur. Journal of Vertebrate Paleontology 22:75A.

Stewart, J. D., and V. Friedman. 2001, Oldest American records of Saurodontidae (Teleostei: Ichthyodectiformes). Journal of Vertebrate Paleontology 21:104A.

Stewart, J. D. 2000. Late Miocene ontogenetic series of true *Carcharodon* teeth. Journal of Vertebrate Paleontology 20:71A.

Martin, L. D., and J. D. Stewart. 1999. Implantation and replacement of bird teeth. Smithsonian Contributions to Paleobiology 89:295-300.

Stewart, J. D., and R. Raschke. 1999. Correlation of stratigraphic position with *Isurus-Carcharodon* tooth serration size in the Capistrano Formation and its implication for the ancestry of Carcharodon carcharias. Journal of Vertebrate Paleontology 19:78A.

Stewart, J. D. 1999. A new genus of Saurodontidae (Teleostei: Ichthyodectiformes) from the Upper Cretaceous rocks of the Western Interior of North America. P. 335-360 in: G. Arratia (ed.) Mesozoic Fishes – Systematics and the Fossil Record. Verlag Dr. Friedrich Pfeil, Munich. 576 p.

Fielitz, C., J. D. Stewart, and J. Wiffern. 1999. *Aethocephalichthys hyrainarhinos* n. gen. and n. sp., a new and enigmatic Late Cretaceous actinopterygian from North America and New Zealand. P. 95-106 in: G. Arratia (ed.) Mesozoic Fishes – Systematics and the Fossil Record.

Barnes, L. G., M. Berkhoff, D. P. Domning, S. K. Jarvis, S. A. McLeod, E. D. Mitchell, R. E. Raschke, J. D. Stewart, C. C. Swift, and H. W. Thomas. 1999. The Middle Miocene Sharktooth Hill local fauna and paleoecology of the Sharktooth Hill Bonebed, Kern County, California. Paleobios 19:2A.

Stewart, J. D., and F. Govean. 1998. The first Cenozoic record of *Symphurus* (Pleuronectiformes: Cynoglossidae) and the first North American Cenozoic cynoglossid fosils. Journal of Vertebrate Paleontology 18:79A-80A.

Stewart, J. D., and S. B. Hunter. 1997. *Deprandus lestes* Jordan is a synonym of Thyrsocles velox (Jordan) (Teleostei: Perciformes) and is not an eel. Journal of Vertebrate Paleontology 17:79A.

Cumbaa, S. L., T. T. Tokaryk, C. Collom, J. D. Stewart, T. S. Ercit, and R. G. Day. 1997. A Cenomanian age bond bed of marine origin, Saskatchewan, Canada. Journal of Vertebrate Paleontology 17:40A.

Schwimmer, D. R., J. D. Stewart, and G. D. Williams. 1997. Xiphactinus vetus and the distribution of *Xiphactinus* species in the eastern United States. Journal of Vertebrate Paleontology 17:610-615.

Stewart, J. D. 1997. Nuevos peces del Miocene Tario de la Formación Almejas de Isla Cedros, Baja California, México. [New late Miocene fishes from the Almejas Formation of Cedros Island, Baja California, Mexico.] Abstract, Memorias de la IV Réunion International sobre Geologia de la Peninsula de Baja California, Ensenada, Baja California, México, 6-9 April, 1997.

Schwimmer, D. R., J. D. Stewart, and G. D. Williams. 1997. Scavenging by sharks of the genus *Squalicorax* in the late Cretaceous of North America. Palaios 12:71-83.

Stewart, J. D. 1996. Cretaceous acanthomorphs of North America. P. 383-394 in: Arratia, G., and G. Viohl (eds,), Mesozoic Fishes – Systematics and Palaeoecology, Verlag Dr. Friedrich Pfeil, Munich. 576 p.

Stewart, J. D. 1996. The validity of *Saurodon pygmaeus* Loomis 1900 (Teleostei: Ichthyodectiformes) and its relationship to other Ichthyodectiformes. Journal of Vertebrate Paleontology 16(3):67A.

Feige, S. F., and J. D. Stewart. 1996. Preliminary findings concerning increase in size through time of the clupeiform teleost, *Xyne grex*. San Bernardino County Museum Association Quarterly 43:149.

Stewart, J. D., and J. E. Martin. 1996. Osteichthyes of the Turonian deposits in the Ortonville-Milbank Granite Quarries, Grant County, South Dakota. Geological Society of America Abstracts With Programs 28(4):39.

Schwimmer, D. R., J. D. Stewart, and G. D. Williams. 1995. Evidences of scavenging by selachian genus *Squalicorax* in the Late Cretaceous of North America. Geological Society of America Abstracts with Programs 2:A368.

Stewart, J. D. 1995. Confirmation of pomatomid affinities of *Pseudoseriola* David (Teleostei: Percifrormes). Journal of Vertebrate Paleontology 15:54A-55A.

Everhart, M. J., P. A. Everhart, and J. D. Stewart. 1995. Notes on the biostratigraphy of a small coelacanth from the Smoky Hill Member of the Niobrara Chalk (Upper Cretaceous) of western Kansas. Abstracts, Kansas Academy of Science 14:18.

Alexander, C. K., S. Feige, D. Foley, E. Topping, D. K. Valdez, and J. D. Stewart. 1995. Temporal trends in fossil guitarfish *Rhinobatos* teeth from Upper Cretaceous rocks of the U. S. Western Interior. Journal of Student Research 1:99.

Stewart, J. D, S. A. Bilbey, D. J. Chure, and S. K. Madsen. 1994. Vertebrate fauna of the Mowry Shale (Cenomanian) in northeastern Utah. Journal of Vertebrate Paleontology 14:47A.

Schwimmer, D. R., J. D. Stewart, and D. Williams. 1994. Giant fossil coelacanths from the Late Cretaceous in the Eastern United States. Geology 22:503-506.

Stewart, J. D., and G. L. Bell, Jr. 1994. North America's oldest mosasaurs are teleosts. Los Angeles County Museum of Natural History Contributions in Science 441:1-9.

Hunter, S. B., and J. D. Stewart. 1994. Resurrection of *Sarda stocki* David, 1943. Paleobios 16:9.

Stewart, J. D., and J. E. Martin. 1993. Late Cretaceous selachians and associated marine vertebrates from the Dakota Rose Granite Quarry, Grant County, South Dakota. Proceedings of the South Dakota Academy of Sciences 72:241-248.

Stewart, J. D., and J. E. Martin. 1993. A snowshoe hare, *Lepus americanus*, from the Lange Ferguson Clovis Kill Site, Shannon County, South Dakota. Current Research in the Pleistocene 10:110-112.

Stewart, J. D. 1993. A skeleton of *Platecarpus* sp. (Lacertilia: Mosasauridae) with stomach contents and extensive integument. Journal of Vertebrate Paleontology 13:58A-59A.

Stewart, J. D. 1993. The case of the sword-swallowing shark. Terra 31:42-43.

AECOM

Stewart, J. D., and M. Roeder. 1993. Razorback sucker (*Xyrauchen*) fossils from the Anza Borrego Desert and the Ancestral Colorado River. Special Publication of the San Bernardino County Museum Association 93:94-96.

Stewart, J. D., and F. J. Aranda-Manteca. 1993. Nuevos teleosteos del Miembro Los Indios de la Formacion Rosarito Beach, Baja California)new teleosts from the Los Indios member of the Rosarito Beach Formation, Baja California). II Reunion Internacional de Geologia de la Peninsula de Baja California, p. 79.

Barradas, H., and J. D. Stewart. 1993. Posible contenido estomacal de un pinipedo del Mioceno Medio de la Mision, Baja California, México (Possible Middle Miocene pinniped gut contents from La Mision, Baja California, Mexico). II Reunion Internacional de Geologia de la Peninsula de Baja California, p. 24-25.

Stewart, J. D. 1992. First Mississippi records of *Holocentrites ovalis* (Beryciformes: Holocentridae), and confirmation of its myripristin affinities. Journal of Vertebrate Paleontology 12:53A.

Schwimmer, D. R., J. D. Stewart, and D. Williams. 1992. Late Cretaceous Xiphactinus fossils in eastern United States are not necessarily X. audax. Journal of Vertebrate Paleontology 12:51A.

Stewart, J. D., and J. M. Harris. 1992. Acquisitions. Terra 30:44-45.

Schwimmer, D. R., J. D. Stewart, and D. Williams. 1991. Upper Cretaceous coelacanths in eastern Alabama: suggestion of a Gondwanan-Eastern Gulf lineage. Abstract, Geological Society of America Abstracts with Programs 23:A169.

Stewart, J. D., P. A. Everhart, and M. J. Everhart. 1991. Small coelacanths from Upper Cretaceous rocks of Kansas. Abstract, Journal of Vertebrate Paleontology 11:56A.

Stewart, J. D. 1991. Fossil teeth tell part of the story. Terra 30:34-35.

Espinosa-Arrubarena, L. G. Barnes, S. P. Applegate, S. A. McLeod, F. J. Aranda-Manteca, and J. D. Stewart. 1991. Depredadores y mamiferos marinos: la evidencia del registro fosil. Programa y Resumenes, Abstracts, XVI Reunion Internacional para el Estudio de los Mamiferos Marinos, Nuevo Vallarta, Nayarit, México, p. 5

Stewart, J. D. 1990. Niobrara Formation symbiotic fish in inoceramid bivalves, p. 31-41 in: S. C. Bennett (ed.), Niobrara Chalk Excursion Guidebook. Kansas Geological Survey, Lawrence.

Stewart, J. D. 1990. Niobrara Formation vertebrate stratigraphy. P. 19-30 in: S. C. Bennett (ed.), Niobrara Chalk Excursion Guidebook. Kansas Geological Survey, Lawrence.

Stewart, J. D., C. Bennett, and R. J. Zakrzewski. 1990. Road log from Lawrence to the type area of the Niobrara Chalk, October 9-10, 1990. p. 3-12 in: S. C. Bennt (ed), Niobrara Chalk Excursion Guidebook. Kansas Geological Survey, Lawrence.

Stewart, J. D. 1990. Niobara Formation vertebrate biostratigraphy. Journal of Vertebrate Paleontology 10:44A.

Stewart, J. D. 1990. Niobara Formation symbiotic fish in inoceramid bivalves. Journal of Vertebrate Paleontology 10:44-44A.

Stearley, R. F., and J. D. Stewart. 1990. Phylogenetic significance of *Onchorhynchus rastrosus*. Journal of Vertebrate Paleontology 10:43A.

Schwimmer, D., J. D. Stewart, and G. D. Williams. 1990. A giant Upper Cretaceous coelacanth form eastern Alabama. Journal of Vertebrate Paleontology 10:41A.

Stewart, J. D., and K. Carpenter. 1990. Examples of vertebrate predation on cephalopods in the Late Cretaceous of the Western Interior. p. 203-207 in: A. J. Boucot (ed.), Evolutionary paleobiology of behavior and evolution. Elsevier.

Stewart, J. D. 1990. Preliminary account of Halecostome-Inoceramid commensalism in the Upper Cretaceous of Kansas. p. 51-57 in: A. J. Boucot (ed.), Evolutionary paleobiology of behavior and evolution. Elsevier.

Stewart, J. D. 1989. Paleontology and paleoecology of the 1987 excavation of the North Cove Site, 25HN164. p. 63-106 in: M. J. Adair (ed.), Archaeological investigations at the North Cove Site, Harlan County Lake, Harlan County Nebraska. Report submitted to U. S. Army Corps of Engineers, Kansas City District, CACW41-86-0167, Modification P00003.

Stewart, J. D., and G. Bell, Jr. 1989. The earliest North American mosasaur records are not mosasaurs. Journal of Vertebrate Paleontology 9:39A.

Coney, C. C., and J. D. Stewart. 1989. Comparative shell morphometrics in some related species of fossil and Recent *Gastrocopta* (Pulmonata: Pupillidae). The Western Society of Malacologists Annual Report 22:10.

Anonymous. 1989. The fossil fish that almost got away. Terra 27(5-6):48.

Whistler. D. W., and J. D. Stewart. 1989. A Late Pleistocene (Rancholabrean) assemblage from the northwestern Mojave Desert. San Bernardino County Museum Quarterly 36:67-68.

Stewart, J. D. 1988. Paleoecology and the first North American West Coast record of the shark genus *Ptychodus.* Journal of Vertebrate Paleontology 8:27.

Stewart, J. D. 1988. Stratigraphic distribution of Cretaceous *Protosphyraena* in Kansas and Alabama. Fort Hays Studies, third series, Science series, no 10:80-94.

Stewart, J. D. 1987. Paleontology and paleoecology of the North Cove Site, 25HN164. p. 298-335 in: M. J. Adair and K. L. Brown (eds.), Prehistoric and Historic Cultural Resources of Selected Sites at Harlan County Lake, Harlan County, Nebraska. Report submitted to U.S. Army Corps of Engineers, Kansas City District.

Stewart, J. D. 1987. Late Cretaceous fish-pelecypod symbiosis. Ningxia Geology 1:14-17.

Stewart, J. D. 1987. Late Wisconsinan biota and artifacts from the Kansas-Nebraska border. Journal of Vertebrate Paleontology 7:27A.

Wells, P. V., and J. D. Stewart. 1987. Cordilleran-boreal taiga and fauna on the Central Great Plains of North America, 14,000-18,000 years ago. American Midland Naturalist 118:94-106.

Stewart, J. D. 1987. Latitudinal effects in Wisconsinan mammalian faunas of the Plains. p. 153-158 in: W. C. Johnson (ed.), Quaternary environments of Kansas. Kansas Geological Guidebook Series 5.

Wells, P. V., and J. D. Stewart. 1987. Spruce charcoal, conifer macrofossils, and landsnail and small-vertebrate faunas in Wisconsinan sediments on the High Plains of Kansas. p. 129-140 in: W. C. Johnson (ed.), Quaternary environments of Kansas. Kansas Geological Guidebook Series 5.

Martin, L. D., W. V. Koenigswald, and J. D. Stewart. 1986. Pleistocene *Phenacomys* from Kansas and the fossil history of the genus. Transactions of the Nebraska Academy of Science 14:35-39.

Johnson, W. C., G. G. Fredlund, P. V. Wells, J. D. Stewart, and W. Dort Jr. 1986. Late Wiconsinan biogeography of south central Nebraska: the North Cove site. American Quaternary Association – Program and Abstract of the ninth biennial meeting, p. 89.

Cross, F. B., R. L. Mayden, and J. D. Stewart. 1986. Fishes in the western Mississippi drainage. P. 363-412 in: C. H. Hocutt and E. O. Wiley, (eds.), Zoogeography of North American Freshwater Fishes. Wiley and Sons, New York.

Dort, W. Jr., W. C. Johnson, G. G. Fredlund, R. A. Rogers, L. D. Martin, J. D. Stewart, and P. V. Wells. 1985. Evidence for an open conifer woodland in the Central Great Plains during the Late Wisconsin glacial maximum. Abstract, Canadian Quaternary Association Abstracts, p. 23. Lethbridge.

Johnson, W. C., L. D. Martin, W. Dort, Jr., C. J. Sorensen, R. A. Rogers, and J. D. Stewart. 1985. Evidence for a pine parkland in Central and Western Kansas and adjacent Nebraska during Mid- and Late-Wisconsinan time. TER-QUA Symposium Series 1:197.

Martin, L. D., and J. D. Stewart. 1985. Homologies in the avian tarsus. Nature 315:159.

Stewart, J. D. 1984. The montane vole in the Late Pleistocene of the Plains. Annual Plains Conference, Programs and Abstracts p.41-42.

Stewart, J. D. 1984. Taxonomy, paleoecology, and stratigraphy of the halecostsome-inoceramid associations of the North American Upper Cretaceous epicontinental seaways. Ph.D. dissertation, University of Kansas, Lawrence, 201 p.

Stewart, J. D., and L. D. Martin. 1984. Bird teeth and avian origins. One hundred second stated meeting of the American Ornithologists' Union: Abstracts no. 95.

Martin, L. D., and J. D. Stewart. 1984. The avian pretibial bone and the relationship between ratites and carinates. One hundred second stated meeting of the American Ornithologists' Union: Abstracts no. 13.

Stewart, J. D. 1984. Snowshoe hare, *Lepus americanus*, from the Peoria Loess of Kansas. Abstracts, Kansas Academy of Science 3:39.

Stewart, J. D., and R. A. Rogers. 1984. Analysis of pollen from the Trapshoot local fauna quarry (Rancholabrean) of Kansas. American Midland Naturalis 112:198-200.

Schultze, H.-P., J. D. Stewart, A. M. Neuner, and P. M. Coldiron. 1982. Type and figured specimens of fossil vertebrates in the collection of the University of Kansas Museum of Natural History. Part I. Fossil Fishes. Miscellaneous Publications of the University of Kansas Museum of Natural History No. 73, 53 p.

Martin, L. D., and J. D. Stewart. 1982. An ichthyornithiform bird from the Campanian of Canada. Canadian Journal of Earth Sciences 19:324-327.

Stewart, J. D. 1982. Actinopterygian – pelecypod commensalism in Kansas Cretaceous deposits. Abstracts, Kansas Academy of Science 1:52-53.

Wiley, E. O., and J. D. Stewart. 1981. *Urenchelys abditus*, the first undoubted eel from the Cretaceous of North America (Teleostei: Anguilliformes). Journal of Vertebrate Paleontology 1:43-47.

Stewart, J. D. 1980. Reevaluation of the phylogenetic position of the Ptychodontidae. Transactions of the Kansas Academy of Science 83:154.

Martin, L. D., J. D. Stewart, and K. N. Whetstone. 1980. The origin of birds: structure of the tarsus and teeth. The Auk 97:86-93.

Stewart. J. D. 1979. Paleontology and paleoecology of the Trapshoot local fauna, Rooks County, Kansas. M.A. thesis, University of Kansas, Lawrence. 146 p.

Stewart, J. D. 1979. A new Late Blancan local fauna from Rooks County, Kansas. Transactions of the Kansas Academy of Science 82:100.

Stewart, J. D. 1979. Biostratigraphic distribution of species of *Protosphyraena* (Osteichthyes: Actinopterygii) in the Niobrara and Pierre formations of Kansas. Proceedings of the Nebraska Academy of Sciences and Affiliated Societies 1979:51-52.

Stewart, J. D. 1978. Mammals of the Trapshoot local fauna, Late Pleistocene of Rooks County, Kansas. Proceedings of the Nebraska Academy of Sciences and Affiliated Societies 1978:45-46.

Stewart, J. D. 1978. Earliest record of the Toxochelyidae. Transactions of the Kansas Academy of Sciences 81:9-16.

Stewart, J. D. 1978. Enterospirae (fossil intestines) from the Upper Cretaceous Niobrara Formation of western Kansas. Kansas University, Paleontological Contributions paper 89:9-16.

Wiley, E. O., and J. D. Stewart. 1977. A gar (*Lepisosteus* sp.) from the marine Cretaceous Niobrara Formation of western Kansas. Copeia 1977:761-762.

Martin, L. D., and J. D. Stewart. 1977. Oldest (Turonian) mosasaurs from Kansas Journal of Paleontology 51:973-975.

Martin, L. D., and J. D. Stewart. 1977. Teeth in *Ichthyornis* (Class: Aves). Science 195:1331-1332.

Stewart, J. D. 1976. Teuthids of the North American Late Cretaceous. Transactions of the Kansas Academy of Science 79:94.

Chronology

URS Corporation, Principal Paleontologist, San Diego, California, 2007-Present.

PCR Services Corporation, Principal Paleontologist, Irvine, California, 2005-2007.

Jones and Stokes, Project Paleontologist, Sacramento, California, 2003-2005.

Natural History Museum of Los Angeles County, California, Assistant Curator of Vertebrate Paleontology, 1985-2003.

Contact Information

Joe Stewart
AECOM
401 West A Street, Suite 1200
San Diego, CA 92101
Phone: (626) 710.7817
Fax: (619) 610.7601
joe.stewart@aecom.com

APPENDIX B

RECORDS SEARCH REPORT FROM THE NATURAL HISTORY MUSEUM OF LOS ANGELES COUNTY

Natural History Museum
of Los Angeles County
900 Exposition Boulevard
Los Angeles, CA 90007

tel 213.763.DINO
www.nhm.org

NATURAL
HISTORY
MUSEUM
LOS ANGELES COUNTY

Vertebrate Paleontology Section
Telephone: (213) 763-3325

e-mail: smcleod@nhm.org

26 September 2019

AECOM
401 West A Street, Suite 1200
San Diego, CA 92101

Attn: J.D. Stewart, Ph.D., Paleontologist

re: Paleontological resources for the proposed ICT Nipton Project, AECOM Project # 60534139 task 003, in the Clark Mountain Range, San Bernardino County, project area

Dear J.D.:

I have conducted a thorough search of our paleontology collection records for the locality and specimen data for the proposed ICT Nipton Project, AECOM Project # 60534139 task 003, in the Clark Mountain Range, San Bernardino County, project area as outlined on the portion of the Mineral Hills USGS topographic quadrangle map that you sent to me via e-mail on 12 September 2019. We do not have any vertebrate fossil localities that occur within the proposed project area boundaries, but we do have localities at some distance from sedimentary deposits similar to those that may occur at depth in the proposed project area.

Most of the proposed project area, the more elevated terrain, has bedrock and decomposed surface material of Precambrian metamorphic rocks that will not contain recognizable fossils. In the middle and northeastern portions of the proposed project area there are surface deposits of younger Quaternary Alluvium, derived as coarse alluvial fan deposits the more elevated adjacent terrain. These deposits typically do not contain significant vertebrate fossils and we have no fossil vertebrate localities anywhere nearby from these types of deposits. Just to the east, however, there are Quaternary deposits of the Ivanpah Lake dry lake bed and in previous wetter time the lake may have extended into some portion of the proposed project area. Our closest vertebrate fossil localities from similar Quaternary lacustrine deposits, LACM 1209-1210, 3772, 5088-5089, 6593, 6805, 7104-7113, and 7132, occur northwest of the proposed project area near Tecopa and have produced an extensive fossil fauna including mastodon, *Mammut*, mammoth, *Mammuthus*, rhinoceros, Rhinocerotidae, horse, *Equus*, pronghorn antelope, Antilocapridae, and camels, *Camelops* and *Capricamelus gettyi*. The short-legged ("goat-like") camel *Capricamelus gettyi* was named in the scientific literature by D.P. Whistler and S.D. Webb (2005. Contributions in Science, Natural History Museum of Los Angeles County, 503:1-40) based on specimens from the Tecopa lake beds.

Excavations in the Precambrian metamorphic rocks exposed in the proposed project area, or if encountered at depth, will not uncover any recognizable vertebrate fossils. Shallow excavations in the younger Quaternary alluvial fan deposits exposed in portions of the proposed project area are unlikely to encounter significant vertebrate fossils in the uppermost layers. Deeper excavation in the Quaternary Alluvium, however, possibly may uncover significant fossil vertebrate remains. Any substantial excavations in the sedimentary deposits in the proposed project area, therefore, should be monitored closely to quickly and professionally recover any fossil remains while not impeding development. Also, sediment samples from the proposed project area should also be collected and processed to determine the small fossil potential of the site. Any fossils collected should be placed in an accredited scientific institution for the benefit of current and future generations.

This records search covers only the vertebrate paleontology records of the Natural History Museum of Los Angeles County. It is not intended to be a thorough paleontological survey of the proposed project area covering other institutional records, a literature survey, or any potential on-site survey.

Sincerely,

Samuel A. McLeod

Samuel A. McLeod, Ph.D.
Vertebrate Paleontology

enclosure: invoice