United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Barstow Field Office
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In Reply Refer To:
(3031) P
CA-680.33

April 1, 2010

Memorandum

To: Field Office Supervisor, Fish and Wildlife Service, Ventura Field Office, 2493 Portola Road, Suite B, Ventura CA 93003

From: Roxie C. Trost, Barstow Field Manager, Barstow Field Office Nicky Quickmeier, Acting

Subject: Formal Consultation on the Calico Solar Power Generating Facility, San Bernardino County, California

The Bureau of Land Management (BLM), Barstow Field Office, wishes to initiate formal Endangered Species Act consultation, pursuant to 50 CFR 402.14, for the Calico Solar Power Generating Facility (Project) proposed by Tessera Solar. The BLM has determined that the project may affect, and is likely to adversely affect, the threatened desert tortoise (*Gopherus agassizii*). This project is not within designated critical habitat for the desert tortoise.

The proposed Project is located on 8,230 acres of land managed by the BLM approximately 37 miles east of the city of Barstow, and north of Interstate 40 in San Bernardino County, California. The Cady Mountain Wilderness Study Area is located north of the Project site. The BLM-designated Pisgah Crater Area of Critical Environmental Concern is located directly adjacent to the southeastern boundary of the Project. The Ord-Roadman Desert Wildlife Management Area is located adjacent to the southwestern boundary of the proposed Project. Several underground and above-ground utilities traverse the Biological Assessment area as does Burlington Northern Santa Fe railroad tracks. A transmission corridor runs along the eastern Biological Assessment area boundary. Undeveloped land extends west of the Biological Assessment area.

The proposed Project includes the construction, operation, maintenance, and decommissioning of an 850-megawatt solar power generating facility and its ancillary systems. The facility would be constructed in to two phases: Phase 1 would be 275 MW and covers approximately 2,320 acres; Phase 2 would be 575 MW and covers approximately 5,910 acres. The Project also involves the construction of a connection from the proposed onsite Calico substation to the existing Pisgah substation.

A Biological Assessment for the Project is provided in the enclosed CD. We have discussed this request with Ashleigh Blackford of your staff. If you have any questions, contact Chris Otahal at (760) 252-6033 or cotahal@blm.gov.

Enclosure:
CD containing Biological Assessment for the Calico Solar Power Generating Facility

cc: Amy Fesnock, BLM State Office
Larry LaPre, BLM California District Office
Tonya More, CDFG

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08-AFC-13
DATE APR 01 2010
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BIOLOGICAL ASSESSMENT FOR THE CALICO SOLAR SOLAR POWER GENERATING FACILITY, SAN BERNARDINO COUNTY, CALIFORNIA

Prepared for

U.S. FISH AND WILDLIFE SERVICE
AND BUREAU OF LAND MANAGEMENT
Barstow Field Office
2601 Barstow Road
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April 1, 2010

URS

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ACEC	Area of Critical Environmental Concern
AFC	Application for Certification
Afy	acre-feet per year
BA	Biological Assessment
BLM	Bureau of Land Management
BMP	Best Management Practices
BNSF	Burlington Northern Santa Fe
CAISO	California Independent System Operator
CDCA	California Desert Conservation Area
CDFG	California Department of Fish and Game
CNDDB	California Natural Diversity Database
dBA	A-weighted decibel
DCH	Designated Critical Habitat
DESCP	Drainage, Erosion and Sediment Control Plan
DWMA	Desert Wildlife Management Areas
ESA	Endangered Species Act
FESA	Federal Endangered Species Act
I-40	Interstate 40
kV	kilovolt
L_{eq}	Equivalent Sound Level
MOU	Memorandum of Understanding
mph	miles per hour
MW	megawatts
MWMA	Mojave Weed Management Area
NAP	Not a Part
NEPA	National Environmental Policy Act
OHV	off-highway vehicle
PCH	Proposed Critical Habitat
POD	Plan of Development
Project	Calico Solar Project
ROW	Right-of-Way
SCE	Southern California Edison
SES	Stirling Energy Systems
SIS	System Impact Study
URS	URS Corporation
URTD	upper respiratory tract disease
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WEMO	West Mojave Plan
WSA	Cady Mountain Wilderness Study Area

Executive Summary

This Biological Assessment (BA) has been prepared for Stirling Energy Systems' (SES) Calico Solar Project in support of a request from the Bureau of Land Management (BLM) for formal consultation with the U.S. Fish and Wildlife Service (USFWS) under Section 7 of the Federal Endangered Species Act (ESA) regarding the issuance of a Right-of-Way (ROW) grant for the Calico Solar Project (Project). The proposed Project includes the construction, operation, maintenance, and decommissioning of an 850-megawatt (MW) solar power generating facility and its ancillary systems. The facility would be constructed according to two phases: Phase 1 would be 275 MW and covers approximately 2,320 acres; Phase 2 would be 575 MW and covers approximately 5,910 acres. The Project also involves the interrelated construction of a connection from the onsite Calico substation to the Pisgah substation. Upgrades to the Pisgah substation and the Pisgah-Lugo transmission lines are separate projects proposed by Southern California Edison (SCE) that will serve a variety of energy and communication needs in the vicinity. The Project is located on 8,230 acres of land managed by the BLM approximately 37 miles east of Barstow in San Bernardino County in southern California (Figure 1). For the purposes of this BA, a 1,000-foot radius buffer was also included in the Project assessment boundary to account for potential offsite impacts. The sum of the Project boundary, 1,000-foot buffer, and Not a Part (NAP) areas is herein referred to as the "Biological Assessment area."

The following Federally listed species are known to occur, or have the potential to occur in the Project Biological Assessment Area:

Species	Listing Status	Critical Habitat within the Biological Assessment Area	Effects Determination
Desert Tortoise (*Gopherus agassizii*)	Threatened	No	May affect, likely to adversely affect

Desert tortoise are widely distributed in the deserts of California, southern Nevada, extreme southwestern Utah, western and southern Arizona, and throughout most of Sonora, Mexico. They typically have overlapping home ranges averaging between 5-131 acres, which additionally can fluctuate in size on a year-to-year basis based on several factors such as sex, rainfall, availability of resources, and others factors. The focused desert tortoise surveys were conducted using the survey design to estimate the population of desert tortoise on-site. Five live desert tortoises and one active burrow were detected within sample plots during the focused desert tortoise surveys. No designated critical habitat (DCH) or proposed critical habitat (PCH) is within the Biological Assessment area.

The implementation of the Calico Solar Project is likely to have an adverse effect on the desert tortoise. Take would occur in the form of harassment, potential mortality, and loss of occupied habitat. Implementation of the Translocation Plan, installation of exclusion fencing, and implementation of other conservation measures are intended to minimize direct mortality of tortoise. Mitigation is proposed to offset impacts to occupied habitat. Based on the amount of suitable habitat that would be impacted and estimated population derived from focused desert tortoise surveys conducted in the Project Biological Assessment area, approximately 36 to 66 desert tortoise (USFWS Pre-project Survey Protocol estimate of 66 individuals with a 95 percent confidence range of 30 to 145 individuals) and 8,230 acres of occupied tortoise habitat may be affected by the proposed Project.

SECTION 1 PROJECT DESCRIPTION

This Biological Assessment (BA) has been prepared to evaluate the potential effects of the Calico Solar Project (Project) on Federally listed species that are known to or have the potential to occur within the Project area, and on proposed critical habitat (PCH) or designated critical habitat (DCH) within the entire Biological Assessment area (defined in Section 1.2) pursuant to Section 7 of the Federal Endangered Species Act (ESA). The proposed Federal action will potentially affect one Federal listed species – desert tortoise (*Gopherus agassizii*). Potential effects on this species and DCH are evaluated in accordance with the requirements set forth under Section 7 of the ESA (16 United States Code [U.S.C.] 1536). No DCH or PCH occurs within the Biological Assessment area.

The effects of the Project within the Biological Assessment area on desert tortoise and its DCH include consideration of and implementation of the mitigation measures to avoid and/or reduce the environmental effects from the development, operation, and maintenance of the Project. The conservation measures proposed by the Applicant that will avoid or minimize take of desert tortoise and modification of DCH are presented in Section 4.

1.1 PROJECT LOCATION

The proposed federal action is the issuance of a Right-of-Way (ROW) grant for the Project. The Project consists of a solar-powered electric generating facility located in a relatively undeveloped area of San Bernardino County, California, approximately 37 miles east of Barstow, California and north of Interstate 40 (I-40) (Figure 1). The Project is located on Bureau of Land Management (BLM) land under management of the BLM Barstow Field Office. The area where the Project would be constructed is primarily open, relatively undeveloped land within the Mojave Desert between approximately 1,810 and 3,050 feet (550 and 930 meters) above mean sea level. The Cady Mountain Wilderness Study Area (WSA) is located north of the Project site. The BLM-designated Pisgah Crater Area of Critical Environmental Concern (ACEC) is located directly adjacent to the southeastern boundary of the Project. The Ord-Roadman Desert Wildlife Management Area (DWMA) is located adjacent to the southwestern boundary of the proposed Project. Several underground and above-ground utilities traverse the Biological Assessment area as does Burlington Northern Santa Fe (BNSF) railroad tracks. A transmission corridor runs along the eastern Biological Assessment area boundary. Undeveloped land extends west of the Biological Assessment area.

1.2 DEFINITION OF BIOLOGICAL ASSESSMENT AREA

The proposed Project is located on approximately 8,230 acres of land managed by the BLM. For the purposes of this BA, a 1,000-foot radius buffer was also implemented around the Project boundary and studied to account for potential offsite impacts (Figure 2). The sum of the two areas is herein referred to as the "Biological Assessment area." There are also portions of the Project site that are within the Biological Assessment area, but are Not a Part (NAP) of the POD. These locations are displayed on the attached figures as NAP. Although the results of surveys in these areas are noted in this report, they are not included as part of the Biological Assessment area. Additional desktop evaluations 10 miles beyond the Project boundary were conducted along with consideration of cumulative effects of other projects in the region. The original Biological Assessment area included a large section of land east of the

transmission line that was in the BLM ACEC and biological surveys were conducted in this additional area. This land east of the transmission line within the ACEC is not part of the currently proposed Project. The Project includes an access road within BNSF ROW that will be used for construction access prior to completion of a bridge spanning the railroad which should occur by approximately October of 2011. BNSF ROW will also be used to access the western-most portion of site and by trucks delivering water from the BNSF rail siding to the Main Services Complex, should the Project require rail delivery of water prior to completion of a waterline which should occur by approximately June of 2011 (Figure 3).

1.3 PROPOSED ACTION

The Calico Solar Project includes the construction, operation, maintenance, and decommissioning of up to 850 megawatts (MW) of capacity by a solar power generating facility and its ancillary systems in two phases (the first phase would be developed for 275MW and the second for 575MW). The Project will consist of approximately 34,000 SunCatchers. It is estimated that an average of approximately 400 and a high of 750 construction jobs and 180 long-term labor jobs will be required. Construction is tentatively scheduled to occur over an approximate three-year period beginning in 2010 through 2012 for Phase 1 and between 2013 and 2015 for Phase 2, assuming SCE completes the full transmission build-out necessary for Phase 2 by 12/31/13.

Approval of the Project ROW Grant Application (Form 299, Applications CACA 49539 and 49537) will result in the issuance of a ROW Grant Permit for use of federal lands administered by the BLM. The Project would require a plan amendment to the 1980 California Desert Conservation Area (CDCA) Plan.

An approved interconnection letter from California Independent System Operator (CAISO) has been issued for the Project. The associated System Impact Study (SIS) is located in Appendix H of the Application for Certification (AFC). The SIS indicates that additional upgrades to the SCE Lugo-Pisgah No. 2 Transmission Line and upgrades at the SCE Pisgah Substation will be required for the full build out of the 850MW Project, although the exact parameters of that project are as of yet undefined. These upgrades are designed to serve a variety of projects in the area. Supplemental studies performed by SCE and CAISO indicate that capacity is available on the existing transmission system to accommodate less than the 850MW Project.

An on-site substation (*i.e.,* Calico Solar Substation [approximately 15 acres]) will be constructed to deliver the electrical power generated by the Project to the SCE Pisgah Substation (Figure 3). Approximately twelve to fifteen 220 kilovolt (kV) transmission line structures (90 to 110 feet tall), would be required to make the interconnection from the Calico Solar Substation to the SCE Pisgah Substation. All of these structures would be constructed within the Project site.

The Project will include a centrally located Main Services Complex (37.6 acres) that includes three SunCatcher assembly buildings, administrative offices, operations control room, maintenance facilities, and a water treatment complex including a water treatment structure, raw water storage tank, demineralized water storage tank, basins, and potable water tank (Figure 3). Adjacent to the Main Services Complex, a 15-acre temporary construction laydown area will be developed.

The SunCatchers themselves will be installed in sets of two. Each set of two SunCatchers will have an approximately 10-foot-wide graded access road between them. The access road will be treated with

polymeric stablizers to bind the soil together to prevent dust. The area occupied by the SunCatchers will not be graded, but the vegetation will be trimmed to three inches and allowed to regenerate. SunCatchers will be installed in two steps. The base will be vibrated into place without the need for extra grading or disturbance. Once the base is installed, the actual SunCatcher unit will be installed onto the base. The combined width of the two SunCatchers and associated maintenance road is approximately 150 feet. Approximately 40 to 80 feet will be left intact and generally undisturbed between each alternate row, except for brush trimming as may be required to reduce fire hazard and shading of SunCatchers.

Long-term permanent access would be provided by a bridge over the BSNF railroad along a route north of I-40 (Figure 3). Equipment may be transported during construction via trucks and/or rail car (through the construction of a siding), that would be located on the north side of BNSF railroad and east of an existing route or as authorized by BNSF.

In addition to the access roads serving the Project, access roads will be provided from the BNSF ROW north, and along the eastern boundary to the detention basins in the northeastern portion of the Project site (Figure 3). These access roads will be outside of the Project fenceline in order to allow access to the proposed bighorn sheep guzzler north of the Project site.

Water for the Project will be provided by groundwater from a well located within the Cadiz basin. The water will be brought onsite either through the railroad or by trucks. The expected average water consumption for the Project during construction is approximately 136 acre-feet per year (afy). Under normal operation (inclusive of mirror cleaning, dust control, and potable water usage), approximately 20 afy of water will be required. Local wells are currently being tested as a back-up water supply.

1.3.1 Best Management Practices (BMPs)

The Project will be designed to minimize ground disturbances and resulting environmental effects wherever practicable. The number of roadways will be kept to a minimum, and roadways will be specifically located to provide main routes for quick access to the site for construction, maintenance, and operations. Access from the main roads to the individual SunCatchers will be on access roads treated with polymeric stabilizers between alternate rows of SunCatchers. The roadways will have a low-flow, unpaved swale or roadway dip as needed to convey nuisance runoff to existing and /or proposed drainage swales, and utilize low-flow culverts when necessary. Culverts will be installed in a limited number of locations, as necessary, for crossing of flood flow areas (specific locations and needs for culverts are unknown at this time).

Brush trimming will occur along roads and around each group of SunCatchers (an approximately 150 foot wide area). After brush has been trimmed, blading for maintenance roadways will be utilized between alternating rows of SunCatchers. There will not be grading to produce additional roads from these maintenance roads to individual SunCatchers, as vehicles will just drive on the trimmed vegetation to access SunCatchers; however, ground disturbance is likely to develop over time with repeated use. The maintenance roads will be treated with a polymeric stabilizer to bind the soil together to control dust issues.

The Project site will be developed utilizing the existing land features without major grading operations. Offsite flows will be accepted and conveyed through the site, with discharge follwing the existing

drainage patterns. Detention basins along the northern Project site boundary will intercept offsite flows from the Cady Mountains (Figure 3). The detention basins will also provide for peak runoff attenuation of the surface flows, thus protecting the Project site from flooding, sediment deposition and scour. The treated roadways will have a low-flow, unpaved swale or roadway dip, as needed, to convey runoff to proposed channels/swales. The treated roads will utilize low flow culverts where necessary. Localized channel grading will occur on a limited basis to improve channel function in the vicinity of the BNSF railway ROW to control the surface runoff. In addition, a channel will be constructed along the northeastern portion of the site to direct potential 100-year flooding away from the Main Services Complex building site. It is unknown at this time specifically how many culverts will be necessary or where they will be located.

1.3.2 Avoidance, Minimization, Mitigation, and Monitoring

The following section summarizes mandatory avoidance and minimization measures being proposed by the Applicant to avoid and/or compensate for the potential impacts of the proposed Project. These mitigation measures may be modified and/or supplemented based on discussions with the various permitting agencies (*i.e.,* during the consultation process with United States Fish and Wildlife Service [USFWS] and California Department of Fish and Game [CDFG], or during the National Environmental Policy Act [NEPA] process with BLM).

1.3.3 Construction Monitoring and Vegetation Clearing

Calico Solar will provide mitigation construction monitoring by USFWS and BLM approved qualified biologists. The biologists will be given authority to supervise the functions listed below.

- Erosion and sedimentation control, as outlined in the Draft Drainage, Erosion and Sediment Control Plan (DESCP), submitted in August 2009, will be implemented during Project construction to retain sediment on-site and to prevent violations of water quality standards (URS 2009a).
- Diversion ditches and/or berms will be constructed as necessary to divert runoff from off-site areas around the construction site.
- Awareness training for desert tortoise, Mojave fringed-toed lizard, and other special status resources will be provided to all construction crews and operations staff.
- A biologist will monitor the construction activities daily during the initial site disturbance (including installation of permanent desert tortoise exclusion fencing) and at weekly intervals after all tortoises have been removed from the site. Exclusionary fencing will be checked monthly and after any substantial rain event to ensure that they are effective barriers for tortoise.
- Implement the weed management plan that is consistent with the Mojave Weed Management Area (MWMA) Memorandum of Understanding (MOU), which includes prevention, control, and eradication of weeds and invasive plant species, and educating the public about weed control in the region (DMG 2002a). The MOU identifies a priority list of invasive species to control in the Mojave.

1.3.4 Focused Mitigation for Desert Tortoise

The following conservation measures will be performed by the Applicant.

- A Desert Tortoise Translocation Plan shall be developed by Calico Solar, and must be approved by BLM and the wildlife agencies, and be completed and approved by USFWS prior to issuance of a Biological Opinion. This plan will include the following details at a minimum: translocation protocol; disease testing of individuals that will be translocated greater than five kilometers; translocation habitat assessment and suitability; assessment of desert tortoise population and health in the area receiving translocated tortoise. Pre-construction surveys will be conducted to test desert tortoises that will be translocated greater than five kilometers from the boundary of the Project. Testing will entail bloodwork to determine whether any desert tortoises suffer from upper respiratory tract disease (URTD) and will include radio tagging each desert tortoise found to aid in relocation during pre-construction surveys.
- A temporary exclusionary fence will be constructed around the construction area in occupied desert tortoise habitat, pre-construction clearance surveys to remove tortoise from the construction area will be conducted , and roving biological monitors that will monitor the various construction crews in the active construction areas will be assigned. Biological monitoring would also occur during access road improvements in occupied desert tortoise habitat.
- A permanent perimeter fence will be designed to preclude tortoise from re-entering the site. After installation, all tortoises shall be removed from the area contained by the fencing. If the permanent fence is installed prior to construction, there will be no need for the temporary exclusion fence.
- Mitigation for permanent impacts to desert tortoise habitat would occur through an acreage-based compensatory mitigation formula as required by the BLM approved West Mojave Plan that was developed in consultation with CEC and CDFG. The West Mojave Plan determined that a ratio of 1:1 will provide compensatory mitigation. The formula includes payment into a habitat conservation fund at a rate of $770 per acre plus a 15 percent acquisition and 17.1 percent overhead fee. The CDFG may require additional mitigation which is still to be determined, pending discussions between CDFG and the Applicant.
- A biological monitor must be present during maintenance activities if occurring in occupied desert tortoise habitat located outside of the perimeter fence. Pre-maintenance clearance surveys followed by exclusionary fencing may also be required in occupied desert tortoise habitat, if the maintenance action requires ground or vegetation disturbance.
- Speed limits within the Project site will be restricted to less than 25 miles per hour (mph) during construction and in areas surrounding the Project Site during operation of the Project.
- Lighting will be focused in toward the project site and downward to avoid lighting habitats beyond the project perimeter fencing.
- Monitoring for the presence of ravens and other potential human subsidized predators of special status wildlife will be conducted and a control plan will be implemented if predator densities substantially increase in the vicinity of the facility. A raven control plan is being developed (plan must be approved by the wildlife agencies prior to the initiation of construction activities) to

minimize the potential of the Project in attracting ravens to the area. Best Management Practices (BMPs) will be instituted to minimize the subsidization of ravens. BMPs to discourage the presence of ravens onsite include trash management, elimination of available water sources, designing structures to discourage potential nest sites, use of hazing to discourage raven presence, and active monitoring of the site for presence of ravens.

- Kiosks or similar facilities with educational information on desert tortoise, ravens, trash, and impacts on desert tortoise, and the Calico Solar Project shall be installed at rest stops on I-40 near the AFC Assessment Area.
- A Weed Management Plan, which must be approved by the wildlife agencies (CDFG, USFWS and BLM), will be implemented prior to the initiation of ground disturbing activities. Mitigation measures in the Weed Management Plan include: worker awareness training; limiting ground disturbance to designated areas only; maintenance of vehicle wash and inspection stations and close monitoring of materials brought onto the site to minimize the potential for weed introduction; re-establishment of native vegetation in disturbed areas to prevent weeds from colonizing newly disturbed areas; and, regularly scheduled monitoring to quickly detect new infestations of weeds, coupled with rapid implementation of control measures to prevent further infiltration.
- The exclusion fencing at the northern boundary of the Project will be moved south of the detention basins. This will create a wider east-west movement corridor with greater distance between the Project site and the Cady Mountains. The basins will be constructed such that desert tortoise may move into, out of, and across the basins without risk of being trapped.

1.4 CONSULTATION HISTORY

Early informal consultation between the BLM and USFWS started on this proposed project in early 2007. The early discussions concerned the development of protocols for biological surveys. Between 2007 and the present, many e-mail and phone conversations have ensued. Below are listed the major milestones associated with this consultation process.

August 18, 2008: The BLM Barstow Field Office sent the USFWS Ventura Field Office an e-mail relating to the protocols used during the data collection for the development of the Biological Technical Report.

August 19, 2008: The USFWS Ventura Field Office sent a response e-mail to the BLM Barstow Field Office regarding the protocol discussion e-mail.

August 27, 2009: BLM District Office sent letter to USFWS Ventura Field Office requesting a species list for the proposed Project.

September 21, 2009: BLM District Office received species list for the proposed Project from the USFWS Ventura Field Office.

October 8, 2009: First meeting between BLM, CDFG, USFWS and Project proponent regarding potential mitigation measures for the proposed Project.

December 10, 2009: Second meeting between BLM, CDFG, USFWS and Project applicant regarding potential mitigation measures for the proposed Project.

January 28, 2010: Meeting between BLM, CDFG, USFWS and Project applicant regarding development of the draft Desert Tortoise Translocation Plan.

March 29, 2010: Meeting between BLM, CDFG, and USFWS to discuss translocation receptor sites.

April 1, 2010: Meeting between BLM, USFWS, and Project Applicant to discuss translocation receptor sites.

SECTION 2 DESCRIPTION OF LISTED SPECIES

Only one federally listed wildlife species was detected in the Biological Assessment area or immediate vicinity during field surveys: desert tortoise. Section 2.1 lists details of the implemented desert tortoise protocol survey methods and associated results. A listing of other special management status species known from the Project vicinity can be found in the Solar One Biotechnical Report (URS 2009b).

No federally listed plant species were found, or are expected to occur within the Biological Assessment area. A complete list of all plant species detected during the 2007 and 2008 surveys, and a listing of other special management status species known from the Project vicinity can be found in the Solar One Biotechnical Report (URS 2009b).

No Designated Critical Habitat for any listed plant or animal species occurs on site, though Designated Critical Habitat for the desert tortoise occurs directly adjacent to the southwestern edge of the Biological Assessment area.

2.1 DESERT TORTOISE

2.1.1 Literature/Database Search and Species Consultation

A search of the California Natural Diversity Database (CNDDB 2008) within a 10-mile radius of the Project boundary revealed several previously documented desert tortoises occurring approximately 4.5 miles south of the Project boundary (Figure 4). A literature search was also conducted which yielded relevant information pertaining to desert tortoise within the Biological Assessment area. Experts, authors, and consultation with appropriate agencies (including USFWS, CDFG, and BLM) are cited below in Sections 2.1.2 – 2.1.5.

2.1.2 Species Account

Regulatory Status: Federal: USFWS: Threatened; State: CDFG: Threatened

Desert tortoise is widely distributed in the deserts of California, southern Nevada, extreme southwestern Utah, western and southern Arizona, and throughout most of Sonora, Mexico. Desert tortoise populations are declining because of various factors including the spread of a fatal respiratory disease, increases in raven populations that prey on juvenile tortoises, and habitat loss and degradation because of various extensive and intensive land uses. Only the Mojave population of desert tortoise is Federal- and State-listed as threatened. Typical tortoise habitat consists of firm but not hard ground - usually soft sandy loams and loamy sands - to allow for burrow construction (Karl 1983). Desert tortoise primarily occurs in four subpopulations in the West Mojave Desert (Ord-Rodman, Superior-Cronese, Fremont-Kramer, and Joshua Tree DWMAs). Outside of these DWMAs, tortoises tend to occur in at much lower densities. This species is mostly found in creosote bush scrub, with lower densities occurring in Joshua tree woodland and saltbush scrub. The topography where this species is typically found includes flats, low valleys, bajadas, and low hills between 2,000 and 3,300 feet and occasionally above 4,100 feet.

The diet of desert tortoise consists mainly of annual plants and grasses, but also perennial plants such as cacti and native forbs when available, certain non-native plant species are also eaten (West Mojave

Planning Team 1999). Desert tortoise are most active when plants are available for forage or when pooled water is available for drinking, usually from March through early June and again between September and early November (Marlow 1979). They typically have overlapping home ranges averaging between 5-131 acres, which additionally can fluctuate in size on a year-to-year basis based on several factors such as sex, rainfall, availability of resources, and others factors (Berry 1986, Duda 1999, CDFG 2000). Individuals commonly traverse 1,500-2,600 feet/day within their home range, and males have been recorded traveling up to 0.62 miles within their home range. Mojave desert tortoises are also known to disperse more extended distances (1.9 miles in 16 days and 4.5 miles in 15 months; Berry 1986).

2.1.3 Protocol Survey Methods

Desert tortoise surveys were conducted in the Biological Assessment area and additional areas from May 15, 2007 through May 31, 2007 and from April 1, 2008 through May 7, 2008. No areas were surveyed for tortoise twice. The area north of the railroad was surveyed in 2007 for approximately 664 field hours, while the area between the railroad and I-40 was surveyed in 2008 for approximately 496 field hours (Figure 5). The Biological Assessment area is part of the larger Tessera Assessment Area (Figure 2). The northwest portion of theCalico Solar Assessment Area, northwest of the Biological Assessment area discussed in this report, is not a part of the currently proposed Project; however, this area was surveyed in conjunction with the surveys for the proposed Project. The land east of the transmission line within the BLM ACEC was also surveyed, but is currently not part of the proposed Project (Figure 2). The total area surveyed extends east and west of the Calico Solar Project Site as shown on Figure 5, and this survey area is referred to herein as the Total Desert Tortoise Survey Area (Figure 6). The Total Desert Tortoise Survey Area encompasses the Tessera Assessment Area, of which Calico Solar is a part of, and also the BLM ACEC to the southwest. Sample plot surveys were conducted according to the USFWS Field Survey Protocol for a Non-federal Action that may occur within the range of desert tortoise (USFWS 1992).

In lieu of the standard 100 percent survey of the entire Project Area plus zones of influence called for in protocol desert tortoise surveys, a sub-sampling approach that was approved by the BLM and USFWS was used. The sub-sampling approach was implemented because 100 percent coverage over such a large area was deemed impractical. The Total Desert Tortoise Survey Area was divided into 240-acre grid cells, and a sub-sample plot 80 acres in size (an area that one trained biologist can adequately survey in a single day) was established within each 240-acre grid cell (Figures 5-7). Each pair of biologists surveyed two 80-acre sample plots each day, walking transects ten meters apart, according to USFWS protocol. This approach resulted in 100 percent coverage of 33 percent of the total area, with sub-sampling areas uniformly distributed across the Total Desert Tortoise Survey Area. Incidental observations of desert tortoises and desert tortoise sign were also noted during the course of other field efforts, but these observations are not included in the population estimates because the observations were not made during the protocol surveys. Incidental observations include observations made during vegetation surveys and other work, such as monitoring for the geotechnical work in 2009 and burrowing owl surveys in 2010 (Figure 6). Figure 7 depicts desert tortoise data gathered during focused surveys only and does not include incidental observations. The sample plots included a 1000-foot perimeter buffer area beyond the actual Project site boundary as required by CEC guidelines, though surveys extended beyond this amount in areas east and west of the Project limits. Selection of the sample plots was spatially even with plot locations sited without bias toward habitat type or elevation (Figures 6 and 7). The sampling design also

allows for estimation of the total population of desert tortoise within the survey area. Biologists conducting desert tortoise surveys were trained in the desert tortoise transect survey protocol.

Locations of tortoise sign, burrows, and live tortoises within each sample plot were recorded with consumer-grade global positioning system (GPS) units (approximate 10-foot accuracy). Photographs of live desert tortoises were taken and data including condition of its burrow, if present, and habitat the tortoise was found in were recorded for each tortoise sighting. No tortoises were directly handled and care was taken to avoid disturbing detected tortoises. Incidental observations of tortoises and tortoise sign were also recorded during all field efforts, but these observations were not included in the calculations for population estimates. Specific protocol survey methods can be found in the Solar One Biotechnical Report (URS 2009b).

2.1.4 Protocol Survey Results

All observations of desert tortoise sign in the Total Desert Tortoise Survey Area are shown on Figure 6. Observations made during focused desert tortoise surveys and incidental observations made during all biological surveys conducted in 2007 and 2008 were noted. Additional incidental observations made in 2009 (Terracon geotechnical work) and 2010 (URS burrowing owl surveys) are also included on Figure 6. The 2009 incidental observations include six (four onsite, one in NAP Area A, and one west of the project site) live desert tortoise, while the 2010 incidental observations include two live desert tortoise and 10 active burrows, all located north of the BNSF railroad. Carcasses, scat, and burrows were also observed during these incidental surveys. No desert tortoise have been observed south of the BNSF railroad tracks during any surveys of the project site; however, two potential desert tortoise burrows were observed south of the BNSF railroad tracks in 2009, while approximately 30 burrows and three carcasses were observed during burrowing owl surveys in 2010. Incidental observations must be considered differently from the focused desert tortoise survey results because they may include repeat counts of individuals, burrows, and/or sign. A summary of observations made during both focused desert tortoise surveys and incidental observations from all surveys is provided in Table 1, and this compares to the data portrayed in Figure 6. However, this data is not valid for determining population estimates on-site, because it includes the incidental observations that may include repeat counts and were not part of a sampling design for estimation of populations.

The focused desert tortoise surveys were conducted using the survey design to estimate the population of desert tortoise on-site. Five live desert tortoises and one active burrow were detected within sample plots during the focused desert tortoise surveys (Table 2, Figure 7). An additional six live desert tortoise were detected in NAP Area A during the focused desert tortoise surveys, with all the detections occurring in the northern half of NAP Area A (Table 2, Figure 7).

Based on sample plot coverage (33 percent) and using tortoise detection rates of 55 percent (between 55 and 68 percent; Nussear *et. al.,* 2008) on the low end, and 100 percent detection on the high end, the Project area likely supports between 18 to 33 desert tortoise (Table 3). Calico Solar NAP Area A also potentially supports a population of 18 to 33 individuals (Table 3), with the individuals there clustered toward the northern half of NAP Area A. The total number of desert tortoise estimated to occur within the Biological Assessment area is approximately 36 to 66. Using the USFWS Pre-project Survey Protocol (USFWS 2009), the number of desert tortoise estimated to occur on the Calico Solar project site, the

1,000-foot buffer, and NAPs is 87 individuals with a 95 percent confidence range of 31 to 246 individuals. For planning purposes, up to 100 desert tortoise are likely to be impacted and expected to be translocated. Protocol surveys consisting of transects 10m apart will be conducted over 100 percent of the site in spring of 2010 to get a current estimate of the number of desert tortoise that will be impacted and require translocation.

A total of 43 desert tortoise and active burrows (28 live tortoise and 15 active burrows) were detected during focused surveys within the Total Desert Tortoise Survey Area, which includes the Biological Assessment area, remainder of the Tessera Assessment Area and BLM ACEC. Using the same assumptions as above, the Total Desert Tortoise Survey Area supports an estimated population of 129 to 235 tortoises (Table 4). Using these population estimates, the Total Desert Tortoise Survey Area potentially supports a desert tortoise population density of 2.4 to 4.3 tortoises per square mile (Table 4) (USFWS protocol estimate of 5 tortoise per square mile). The CDFG desert tortoise species account states that typical desert tortoise densities are 9.2 tortoises per square mile in the eastern Mojave Desert and 2,600 tortoises per square mile in the western Mojave Desert (CDFG 2000). Additionally, a 10-year research project conducted by the BLM estimated desert tortoise densities in the California Mojave Desert from 21-467 tortoise per square mile (8-184 tortoise per square kilometer) (Berry 1986). The estimated density of desert tortoise within the Total Desert Tortoise Survey Area ranges from 2.4 to 4.3 desert tortoise per square mile, which is substantially lower than these densities reported by the CDFG and BLM (USFWS 2008).

The distribution of tortoise and tortoise sign in the Biological Assessment area, as well as throughout the entire Total Desert Tortoise Survey Area, was not random and tended to be concentrated in the north-central portion of the Biological Assessment area (Figures 6 through 8). The portion of the Biological Assessment area between the BNSF railroad and I-40 had no tortoise or tortoise sign detected. I-40 and the BNSF railroad appear to form barriers to desert tortoise movement across either feature, with movement only possible through several culverts and bridges that provide opportunity for passage under these barriers. Based on the lack of sign, these existing barriers to desert tortoise movement appear to prevent desert tortoise from readily occupying and persisting in the area between the railroad and the highway.

2.1.5 Critical Habitat

The Biological Assessment area is not included within any DCH for listed species (Figure 4); however, the southwest corner of the Project site is north of, and adjacent to, DCH for desert tortoise that is located south of I-40 (Figure 4). Project activities are not anticipated to impact desert tortoise DCH.

SECTION 3 ENVIRONMENTAL BASELINE

3.1 BIOLOGICAL SETTING

The Project is located within the Mojave Desert in an area approximately 37 miles east of Barstow, California. The Mojave Desert is the transitional area between the hotter Sonoran Desert to the south and the cooler and higher elevation Great Basin Desert to the north. The Mojave Desert is within the rain shadow of the Transverse and Sierra Nevada mountain ranges, and is defined by a specific combination of latitude, elevation, geology, and indicator plant species.

The Mojave Desert is the driest desert in the continental United States with average precipitation ranging from 2.2 to 2.5 inches per year falling primarily between October and March, and temperatures ranging from 40 to 110 degrees Fahrenheit. Perennial rivers and streams are rare, with the Mojave River being the most prominent drainage feature in the greater region, although it is distant from the Project site. Elevations in the Mojave Desert range from below sea level at Death Valley, to an elevation of 7,929 feet. Plant communities in the region vary with topography, geology, elevation, and precipitation. These communities include pinyon-pine forests and frost-tolerant species above 5,500 feet, where local average precipitation may be as much as 10 inches per year (some of which falls as snow); Joshua tree woodland in the range of 4,000 to 6,000 feet; mixed desert shrub communities in the middle elevation regions and along the mountain range fronts; and creosote bush and other drought-tolerant species in the lower elevation regions where rainfall averages less than 2.5 inches per year (USGS 2004).

Vegetation across the Project site is dominated by Mojave creosote bush scrub through the rolling terrain, with less common and site-specific conditions allowing for saltbush scrub in the southwestern portion of the Project site (Figure 2). Developments in this area include the BNSF railroad, a maintained north-south dirt access road for the existing transmission line on the eastern border of the assessment area connecting to the existing Pisgah substation south of the site, and several east-west dirt roads that cross the site. The past land uses within the assessment area include a history of cattle grazing and limited mining. Currently, there is evidence of disturbance from off-highway vehicle (OHV) activities.

3.2 VEGETATION COMMUNITIES PRESENT

Vegetation in the Biological Assessment area is composed primarily of Mojave Desert creosote bush scrub with a smaller area of desert saltbush scrub as defined by the Holland (1986) classification of plant communities. Disturbed areas are associated with dirt roads and trails, areas adjacent to railroads and the interstate highway, along underground pipeline routes, and cleared areas from past land uses (*e.g.,* mining).

The Biological Assessment area supports two distinct vegetation communities. These vegetation communities were digitized and are displayed on aerial photographic maps (Figure 2). Each habitat description follows the Holland vegetation classification (Holland 1986). Table 5 - *Vegetation Communities Occurring within the Calico Solar Biological Assessment area* shows the estimated acreages of existing vegetation communities for areas within the Biological Assessment area.

3.2.1.1 Developed

Developed lands (Holland Code 12000) include roads, built structures, and associated infrastructure. Within the Biological Assessment area, these included dirt roads, transmission lines, underground gas pipelines, railroads, and any other built environments. Developed areas (which include paved roads, highway, railroad, and the transmission line) occurred in approximately 24.0 acres of the Project footprint, and 330.5 acres of the 1,000-foot buffer of the Project.

3.2.1.2 Desert Saltbush Scrub

Desert saltbush scrub (Holland Code 36110) is a low, sparse mixture of micophyllous shrubs and occasional succulent species. Stands of shrubs are usually spaced widely and are strongly dominated by desert saltbush (*Atriplex polycarpa*). Other species include white burrobush (*Hymenoclea salsola*), and inkweed (*Suaeda moquinii*). This habitat usually forms on fine-textured, poorly draining soils with high alkalinity and salinity, usually surrounding playas on elevated ground. Desert saltbush scrub is only found in the southwestern corner of the Project footprint (237.3 acres) in association with small patches of Mojave creosote bush scrub. In addition, approximately 289.1 acres of desert saltbush scrub occurs in the 1,000-foot buffer of the Project.

3.2.1.3 Mojave Creosote Bush Scrub

Mojave creosote bush scrub (Holland Code 34100) is a community dominated by creosote bush (*Larrea tridentata*) and white bur-sage (*Ambrosia dumosa*). Shrubs are typically widely spaced with bare ground between them. A diverse annual herb layer may flower in late March and April with sufficient winter rains. Other common plant species in this habitat include desert senna (*Senna armata*), Nevada ephedra (*Ephedra nevadensis*), white burrobush, encelia (*Encelia* spp.), ratany (*Krameria* spp.), and various cactus species (*e.g., Opuntia* spp.). This plant community is usually found on well-drained secondary soils with very low water-holding capacity on slopes, fans, and valleys. This vegetation type makes up the majority of the acreage within the Project footprint boundaries (7,812.5 acres undisturbed and 88.6 acres disturbed). Approximately 1,769.6 acres of undisturbed and 140.0 acres of disturbed Mojave creosote bush scrub occur within the 1,000-foot buffer.

3.2.1.4 Un-Vegetated Habitat

Un-vegetated habitat (Holland Code 13000) occurs on steep rocky slopes that dominate the northeastern boundary of the Project. Little vegetation is associated with this rocky habitat. A total of 67.6 acres of the un-vegetated habitat occurs along the northern boundary of the Project footprint, with an additional 134.8 acres within the 1,000-foot buffer.

3.3 WILDLIFE CORRIDORS

A wildlife corridor is defined as a linear landscape feature that allows animal movement between two patches of habitat or between occupied habitat and geographically discrete resources (*e.g.,* water). To function effectively, a corridor must accomplish two basic functions. First, it must effectively link two or more large patches of habitat. The corridor must conduct animals through the landscape to areas of suitable habitat without excessive risk of directing them to unsuitable areas where risk of mortality may

be very high. Second, the corridor must be suitable to the focal target species so that they will use the corridor frequently enough to achieve the desired demographic and genetic exchange between populations. Presence of wildlife corridors allow an exchange of individuals between populations, lowering inbreeding within populations, increasing effective population size, and facilitating re-establishment of populations that have been decimated or eliminated because of random events.

Focal species are those species that naturally occur in low densities and that may be unwilling or unable to cross extensive areas of development or otherwise unfavorable habitat. Animals have a natural aversion to situations or physical settings they perceive to be dangerous and will often shy away from situations in which they are exposed without cover or escape routes. The presence of disturbance outside of the animal's normal experience is also a situation that is often avoided by animals. In the Mojave Desert, potential focal species for wildlife movement assessment could include desert tortoise, mountain lion (*Felis concolor*), coyote, bighorn sheep (*Ovis canadensis nelsoni*), bobcat, and kit fox.

Generally, the Project site and surrounding vicinity is unrestricted and conducive to live-in habitat and movement of wildlife throughout the area, with uniform habitat composition throughout the area. Movement in the east-west direction is currently unconstrained. The primary constraints to wildlife movement are in the north-south direction. The existing BNSF railroad and I-40 run east-west across the lower one-third of the bajada that contains the Project site. I-40 adjacent to the Project site is fenced; however, tortoise exclusion fencing is not used, allowing animals to potentially move across the freeway. The BNSF railroad is not fenced, although the railroad is elevated several feet above surrounding grade, creating constraints to wildlife movement, especially for smaller terrestrial species such as reptiles and small mammals. Although animals can choose to cross over these features at any point, the only safe locations for general wildlife movement across both of these features are through existing culverts and railroad trestles (Figure 10). The majority of these features are large enough for large mammals to pass through, with the exception of a series of small pipes that run under I-40 at the far southwestern corner of the Project site. Regardless of the few culverts and bridges, north-south wildlife movement is greatly restricted by these existing landscape features.

Additionally, the Applicant will expand the east-west corridor remaining on the north side of the Project after Project implementation. The Applicant will move the Project exclusionary fencing south so that it is located below detention basins to be constructed on the northern edge of the Project. The detention basins would be constructed in a manner to allow animal movement in to, out of, and across the basins. This is anticipated to provide a wider animal movement corridor by increasing the distance between the Project and the Cady Mountains than was initially proposed.

3.4 SPECIAL MANAGEMENT AREAS

Figure 9 illustrates the additional management areas within the vicinity of the Biological Assessment area. North of the Project Area, the BLM has proposed an area for designation as wilderness (Cady Mountains Wilderness Study Area). The Project is also located within the planning area of the West Mojave Coordinated Management Plan (West Mojave Plan or WEMO, BLM 2006). WEMO designates a total of four DWMAs, each of which focuses on the protection and conservation of desert tortoise, Mohave ground squirrel (*Spermophilus mohavensis*), and other State- or Federal- listed special status

species that share their habitats. The Biological Assessment area is adjacent to the Ord-Rodman DWMA, but is not within it. The Pisgah ACEC is immediately to the southeast of the Project site (Figure 9).

SECTION 4 EFFECTS OF THE ACTION

4.1 IMPACTS ON DESERT TORTOISE

Impacts resulting from the implementation of the Project include:

- Estimate of incidental take;
- Loss of occupied desert tortoise habitat;
- Constriction of movement corridors;
- Disturbance from vibration during construction that could affect tortoise in burrows near the boundary;
- Potential for dust during construction to negatively affect adjacent intact vegetation, and therefore affect desert tortoise habitat;
- Potential for partial loss of habitat within desert tortoise territories along the Project boundary;
- Potential noise and lighting effects on tortoise behavior;
- Edge effects of the Calico Solar Project on desert tortoises occupying NAP Area A and the 1000-foot buffer;
- Introduction of weeds that may increase on the Project site and in the buffer area during construction and operation, and therefore affect desert tortoise habitat; and
- Potential increases in ravens and other predators of desert tortoise occupying adjacent lands as a result of perches provided by the SunCatcher structures, transmission towers, and perimeter fencing.

4.1.1 Estimate of Incidental Take

A federal take of a species listed pursuant to the Federal Endangered Species Act (FESA) is defined as "Take – to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct" (50 CFR 17.3). An estimated 18-33 desert tortoise occur within the Project area, and up to an additional 18 to 33 desert tortoise in NAP Area A (or between 31 and 246 total tortoises in the entire Biological Assessment area using 2009 USFWS protocol calculations). For planning purposes, construction of the Project may result in a federal take of up to 100 desert tortoise through harassment, direct mortality, and impacts on desert tortoise habitat. Desert tortoise exclusion fencing will be installed prior to construction and desert tortoise will be excluded (translocated) via clearance surveys before the construction phase of the Project. Translocation of desert tortoise can potentially represent take via harassment and/or mortality, as there is a possibility for tortoises to be killed or injured as a result of this process.

4.1.2 Loss of Occupied Habitat

The current Project description includes the installation of permanent desert tortoise exclusion fencing along the entire Project boundary. Approximately 8,230 acres of occupied desert tortoise habitat would be excluded as a result of the Project.

Construction equipment will not operate beyond the fenced Project boundary, other than on roads designated open by BLM. Roads that are not designated as open by BLM that may exist are not to be used. A map of BLM designated open routes is found in Figure 11. Therefore, temporary disturbance of NAP Area A or other areas beyond the Project boundary by equipment operation will not occur.

4.1.3 Constriction of Movement Corridors

Movement through the Project site north of the railroad is expected to be mostly in the east-west directions, and mostly along the lands in the northern half of the Project site and beyond up to the mountains, where tortoise densities are greater. East-west movement of tortoises in NAP Area A will be restricted, as the Project extends along the east, west, and south sides of NAP Area A; however, east-west movement is still possible north of the Project site. Movement corridors are not necessarily areas where animals spend most of their time (preferred habitat), but are merely areas that they periodically used to move between areas of preferred habitat. The area north of the Project site is not being proposed as desert tortoise live-in habitat, but rather as an area available as a movement corridor. The Project will not prevent east-west movement because sufficient lands north of the Project site will remain open to desert tortoise and these areas also tend to have the greatest concentrations of desert tortoise (Figure 8). Although tortoise movement may be constrained with the addition of the Calico Solar Project, significant impacts on desert tortoise movement at the landscape level are not expected to result from this project, as there is ample room north of the Project for tortoise movement. The mountainous terrain to the north of the Project may not be suitable habitat for desert tortoise occupation; however, it does allow tortoise to move in and east-west direction. The United States Geological Survey (USGS) modeled desert tortoise habitat was used to predict potential movement corridors (Figure 12).

No desert tortoise or desert tortoise sign was detected in the area between the BNSF railroad and I-40 during focused or incidental surveys in 2007 or 2008. In 2009, two class four (inactive potential desert tortoise) burrows were incidentally detected between the BNSF railroad and I-40. One of these burrows is located onsite, just south of the BNSF railroad, while the other burrow is located in the BLM ACEC area to the southeast of the Project site (Figure 6). According to the USFWS desert tortoise protocol (USFWS 1992), class four burrows are defined as burrows in a deteriorated condition that may potentially be desert tortoise burrows, but which cannot be confirmed as being desert tortoise burrows. In addition to the two potential burrows observed in 2009, three carapasses and approximately 30 potential desert tortoise burrows were detected between the BNSF railroad tracks and I-40 in 2010 during burrowing owl surveys (Figure 6). No desert tortoises were observed in this area during either of these surveys.

The absence of desert tortoise observations between the BNSF railroad and I-40 after two years of focused desert tortoise surveys (and incidental surveys), suggests that the area between the BNSF railroad and I-40 has not recently been utilized by desert tortoise. Potential desert tortoise habitat exists in the area between the BNSF railroad and I-40, and desert tortoise can access this area through existing culverts and

trestles; however, the absence of observed desert tortoise individuals in this area leads to the expectation that desert tortoise do not prefer this area. Desert tortoise are not expected to effectively colonize or persist within the area between the BNSF railroad and I-40 because these linear features act as an access filter, deterring individual desert tortoise movement into this area. Based on this information, it is likely that the movement of desert tortoise from north to south between the mountains and the lands south of I-40 is likely constrained by the BNSF railroad and I-40.

4.1.4 Vibration

Equipment that will cause surface disturbance and otherwise operate during construction will be limited to what would be needed to develop dirt roads that are generally at existing landform grades, equipment to install the SunCatcher pedestals and the actual SunCatchers, equipment to install cables, and equipment to construct the few buildings that are part of the Project plan. This equipment will cause limited vibration in the ground near them; however, the potential effects of such short-term (just a few minutes at a time) ground vibration are unlikely to be noticeable farther than a few tens of feet beyond the source of the vibration. As the Project site will be enclosed in exclusion fencing, little or no effects of ground vibration that could affect existing burrows are expected to extend beyond the Project boundary, especially into NAP Area A. Activity during operations will be substantially less than during Project construction, such that no adverse effects from ground vibration on desert tortoise are expected to occur during Project operations.

4.1.5 Dust

The Project plan also does not include the wholesale grading of the entire site; however, SunCatcher maintenance roads will be installed between every other row of SunCatchers. Construction activities and operational vehicle traffic on the roads within the Project could generate dust that would affect vegetation adjacent to the Project site in the short-term, although long-term adverse effects on vegetation are not expected to occur. In the short-term, dust may settle on leaves of plants affecting their ability to photosynthesize and uptake nutrient and water; however, any dust that settles is likely to be washed away during rainstorms. These roads will not be paved, but will be treated with polymeric stabilizers to control dust impacts.

4.1.6 Partial Loss of Desert Tortoise Territories

The linear extent of the Project footprint (length of exclusion fence) is approximately 32.2 miles (Figure 3). A total of approximately four miles of this amount occurs along either side of the BNSF railroad. Because the site is completely fenced, there is likely to be a partial loss of occupied territories along the Project boundary, notably the estimated 18-33 desert tortoise that occupy NAP Area A. Estimated desert tortoise density onsite is low (2.4 to 4.3 desert tortoise per square mile; USFWS protocol estimates 5 tortoise per square mile), with all desert tortoise observations occurring well north of the BNSF railroad. It is unknown how many desert tortoises exist outside of the surveyed area; however, partial territory loss is anticipated to affect additional individuals outside the Biological Assessment area, including a minimum of three tortoises observed in the 1000-ft buffer.

4.1.7 Noise and Lighting

The existing noise conditions at the Project site vary with the distance from I-40 and the adjacent railroad. Current ambient noise levels near the Project site vary from the mid 40s to nearly 80 dBA L_{eq}. The main sources of noise currently found onsite are from vehicular traffic on I-40 and railroad activity. The highest level of current ambient noise is expected to center along these two sources, fading to the low range with increased distance from these sources. Construction activities will generate noise that will vary from 48 to 76 dBA L_{eq} that would extend into the 1000-foot buffer area for construction activities directly adjacent to the Project boundary. Project operation will generate noise of 63 to 70 dBA L_{eq}. The source of noise during Project operation will primarily be the SunCatchers themselves. The SunCatchers are spread evenly throughout the majority of the site aside from large portions in the northern end where the detention/infiltration basins will be located. The amount of noise generated by the Project is not a significant change from existing conditions nearest the freeway and railroad, but does represent an increase of approximately 20 dBA L_{eq} farthest away from the two sources near northern boundary of the Project. Tortoise near the foothills of the Cady Mountains, north of the Project site, would experience an increase in sound levels, which may affect their behavior and use of the area to the north of the site, although studies indicate noise effects may be less than adverse (Bowles *et al.* 1999). The level of disturbance experienced by an individual species would be dependent on the level of habituation possessed by individual species. Species observed in the Project vicinity are also considered tolerant of noise and would not be substantially affected by temporary construction noise. Species remaining onsite during Project operation are expected to adapt to the new noise levels. The potential effects on wildlife from noise are considered less than significant because of the temporary nature (construction) of the highest noise events, and slightly increased levels above ambient conditions during operation, some of which are within the noise levels currently found on-site.

Effects of lighting are expected to be minimal along the project perimeter. Lighting will be minimized to the extent practicable and limited to meeting safety/security requirements. Lighting will be focused in toward the Project site and downward to avoid lighting habitats beyond the Project perimeter fencing.

4.1.8 Edge Effects

An additional 18 to 33 desert tortoise are estimated to occur within NAP Area A (Figure 7 and Table 4) and will likely be affected by the adjacent construction and operation of the Project with partial loss of territories. Project construction will not occur in this area, although construction will occur up to the boundary on three sides of NAP Area A. The NAP Area A is a contiguous parcel of land bounded by the Project site on the east, west and south sides. It is approximately one mile wide from east to west and two miles long from north to south (approximately 1,280 acres in size). The estimated 18 to 33 desert tortoise in NAP Area A were detected in the northern half of this area.

Three live desert tortoises and one active burrow were incidentally detected outside of the associated survey plots in the 1000-foot buffer near the existing transmission line ROW. Impacts resulting from the Project may potentially affect tortoise occurring in the 1,000-foot buffer area surrounding the site, as well as desert tortoise occurring outside of the 1,000-foot buffer. Specifically, the entire buffer area contains 2,664 acres of land, a portion of which is already impacted by existing development, such as the BNSF railroad and I-40 to the south, and the existing transmission line along the eastern boundary. Impacts in

the buffer areas as a result of the Project may affect approximately 2,198 acres of suitable habitat. Impacts may also potentially extend into suitable habitat beyond the 1,000-foot buffer area.

The overall distribution of desert tortoise in the entire Biological Assessment area is toward the north-central portion of the Project site and that distribution is expected to continue northward on the plains of the bajada up to the foothills of the northern bounding mountains. After Project implementation, the movement of desert tortoise from NAP Area A would be northward due to Project constraints in the east, west, and southern sides. The proposed Project already includes placement of exclusionary fencing along the Project boundary during construction and for the life of the Project, such that effects on desert tortoise in NAP Area A moving into the Project area would be eliminated.

4.1.9 Introduction of Weeds

Introduction of weeds will be controlled via the wildlife agency approved weed management plan and will prevent the spread/colonization of weed onsite and off-site.

The existing study area, including the Project area and surrounding lands is not currently infested with weed species, although several non-native plant species occur throughout the general area. Areas that are adjacent to the Project boundary, such as NAP Area A, already support these non-native plant species. There is some potential that non-native plant species densities may increase within the Project boundary in areas of surface land disturbance and shading, namely Sahara mustard. In addition to planned ground disturbance, each SunCatcher unit will be periodically washed with approximately 14 gallons of water. Although the majority of the water is expected to evaporate, the introduction of a minimal amount of water under the SunCatchers may occur. This could potentially contribute to the establishment and spread of non-native species onsite. A weed management plan will be implemented to address potential issues stemming from planned ground disturbance and SunCatcher wash water. The goal of this plan would be to minimize potential effects from weeds within the Project boundary and adjacent lands, as well as to avoid adverse effects on desert tortoise forage habitat off-site. Given the preparation of a weed management plan to address effects of potential weed issues, it is unlikely that these issues would result in substantial increases in non-native species such that adjacent lands beyond the Project boundaries would be at substantial risk from weeds. With implementation of a weed management plan as discussed in Section 1.3.4 no adverse effects on desert tortoise from weeds within the Project boundary or in adjacent lands are expected to occur.

4.1.10 Attraction of Human Subsidized Predators

Substantial development within the desert often attracts ravens and coyotes at higher densities than in areas of undeveloped desert landscapes (Boarman *et al.,* 2006). Ravens may be attracted to the SunCatchers and perimeter fencing and transmission lines as perches, as well as to other facilities for the Project. Boarman *et al.* (2006) demonstrate that ravens are primarily attracted to areas with human influence that provide supplemental nesting, food or water resources. There will not be increased sources of food or water for ravens at the SunCatchers. There is some potential for increased sources of food or water at the few buildings onsite where people will concentrate; however, a wildlife agency approved raven management plan must be developed prior to the initiation of construction activities which will eliminate potential raven related impacts to desert tortoise. Education regarding control of food/trash

sources and minimization of water resources are the main focus of the plan. Ravens may also be attracted to potential detention basins (Figure 3); however, these features will only have water in them after rainstorms and are not intended to be inundated for long periods of time. Ravens may also be attracted to a waste water treatment pond that may or may not be included in the final Project design plans. If included, covering the pond may be an option to prevent raven use. Operation and maintenance of the facility could allow for predator densities to increase because of the potentially increased presence of limited resources (*e.g.*, freshwater, nest sites, food resources) that is currently absent from the site and these potential impacts would be eliminated by: eliminating sources of water that is attractive to ravens, such as designing evaporation ponds/detention basins that only hold water for a maximum of a few days; designing structures to eliminate locations where ravens can build nests, or installing measures to prevent nesting in structures; limiting the creation of trash and keeping the site trash free; using hazing to deter raven occupation of the site (with approval from the wildlife agencies only); routine monitoring of the site for ravens to identify occupation and formulate adaptive strategies to deter further occupation; and education of workers to follow these measures.

The effect of attracting human subsidized predators could extend to the adjacent lands within the assessment buffer and beyond. This impact is potentially significant. A raven control plan will be created by the client and approved by the wildlife agencies (CDFG, USFWS and BLM) prior to the initiation of ground disturbing activities. At a minimum, this plan will describe methods for adaptive management to control potential adverse effects from ravens and contain the above measures to mitigate this potential impact.

4.2 CUMULATIVE EFFECTS

Under the ESA, other federal actions, such as those occurring on BLM lands, are not subject to cumulative effects analysis because their effects are accounted for through Section 7 consultations under the ESA. No known tribal, state, local government, or commercial projects are reasonably certain to occur in the future within a 10-mile vicinity of the Calico Solar Project. Non-federal activities that occur on federal land, specifically the maintenance of power transmission lines, are subject to federal ESA requirements and, therefore, would not contribute to cumulative effects. The Calico Solar Project is not expected to result in significant cumulative effects on desert tortoise.

The proposed Project is consistent with the Biological Opinion issued for the West Mojave Plan, because the Project area is outside areas conserved under the plan, the mitigation ratio for this area is 1:1 as proposed, with the cost per acre defined by the West Mojave Plan, and construction BMPs required by the plan will be implemented.

SECTION 5 DETERMINATION OF EFFECT

The implementation of the Calico Solar Project is likely to have an adverse effect on the desert tortoise. Take would occur in the form of harassment, potential mortality, and loss of occupied habitat. Implementation of the Translocation Plan and exclusion fencing is intended to minimize direct mortality of tortoise. Based on the amount of suitable habitat that would be impacted and estimated population estimates based on focused desert tortoise surveys conducted in the Project Biological Assessment area, approximately 36 to 66 desert tortoise (USFWS Pre-project Survey Protocol estimate of 87 individuals with a 95 percent confidence range of 31 to 246 individuals) and 8,230 acres of potential tortoise habitat may be affected by the proposed Project.

SECTION 6 REFERENCES

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Table 1
All Desert Tortoise and Desert Tortoise Sign Detected within the Calico Solar Biological Assessment area

	Focus Survey Detections in Biological Assessment area	Incidental Detections in Biological Assessment area[1]	Focus Survey Detections in NAP Area A	Incidental Detections in NAP Area A[1]
Live Desert Tortoise	5	19	6	5
Active Tortoise Burrow	1	18	0	0
Inactive Tortoise Burrow [2]	8	208	0	0
Tortoise Carcass	1	67	0	1
Tortoise Scat	1	17	0	0
Tortoise Drinking Pan	0	1	0	0
Tortoise Pallet	0	5	0	0
Total	16	89	6	6

[1] Numbers listed may include repeat counts of the same tortoise or sign.
[2] This total does not include the class four potential tortoise burrow found in the AFC Assessment Area south of the BNSF railroad.

Table 2
Desert Tortoise Detected within the Calico Solar Biological Assessment area During Focused Desert Tortoise Surveys

	Focus Survey Detections in Biological Assessment Area	Focus Survey Detections in NAP Area A
Live Desert Tortoise	5	6
Active Tortoise Burrow	1	0
Total Tortoise Detected	**6**	**6**

Table 3
Desert Tortoise Population Estimates within the Calico Solar Biological Assessment Area (Project Area and NAP Areas) Based on Results of Focused Desert Tortoise Surveys

	Biological Assessment Area			NAP Area		
Assumed Detection Rate	**100%***	**55%***	**68%***	**100%***	**55%***	**68%***
Population Estimate	18	33	27	18	33	27

* Detection rates based on 100% rate and rates described in Nussear et al 2008.

Table 4
Desert Tortoise Population Density Estimates within the Total Desert Tortoise Survey Area

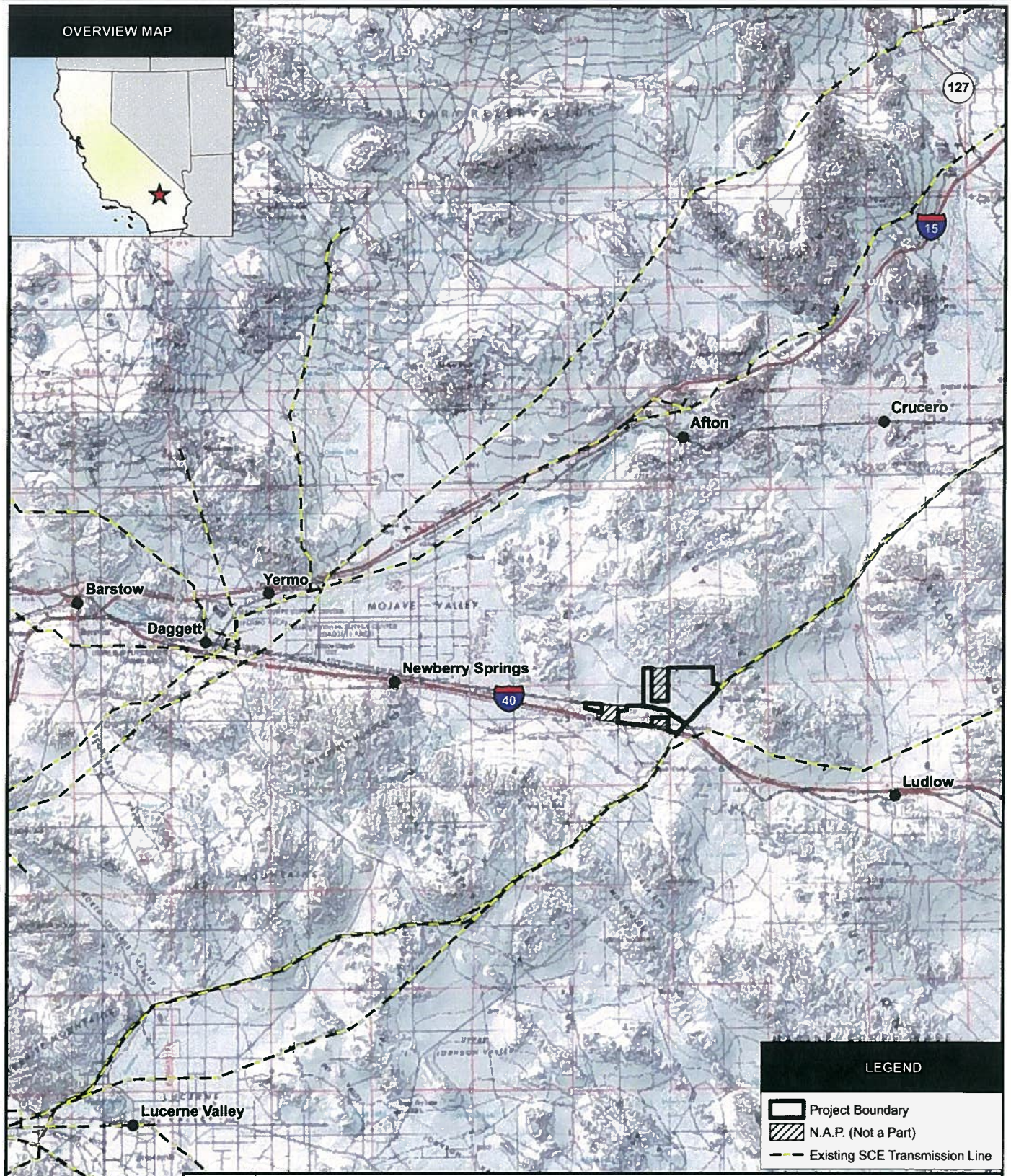
	Total Desert Tortoise Survey Area		
Assumed Detection Rate	**100%[1]**	**55%[1]**	**68%[1]**
Population Estimate	129	235	190
Desert Tortoise Density[2] (per square mile)	2.4	4.3	3.5

[1] Detection rates based on 100% rate and rates described in Nussear et al. 2008

[2] Density is calculated by dividing tortoise population estimates of the Total Desert Tortoise Survey Area by total square miles of the entire survey area of 34,800 acres (240 acres x 145 240-acre survey cells) or 54.4 square miles. This is greater than the combined SES Assessment and BLM ACEC areas because of the nature of the grid system of survey cells utilized.

Table 5
Vegetation Communities Occurring within the Calico Solar Biological Assessment Area

Community Name	Holland Code	Project Boundary Acreage	1000-foot Buffer Acreage
Developed	12000	24.0	330.5
Desert Saltbush Scrub	36110	237.3	289.1
Disturbed Mojave Creosote Bush Scrub	34100	88.6	139.9
Mojave Creosote Bush Scrub	34100	7812.5	1769.6
Un-Vegetated Habitat	13000	67.6	134.8
Total		8,230.0	2,663.9



SOURCES:
Huitt-Zollars, Inc (site plan Feb. 2010);
POWERmap, www.powermap.platts.com 2009 Platts, A Division of The McGraw-Hill Companies (T-Lines, Substations); ESRI (roads, overview);
USGS (7.5' quads various dates).

GENERAL VICINITY MAP
CALICO SOLAR PROJECT

URS

4 0 4 8 Miles
SCALE: 1" = 8 Miles(1:506,880)
SCALE CORRECT WHEN PRINTED AT 8.5X11

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PM: AL	PROJ. NO: 27658189.70002	

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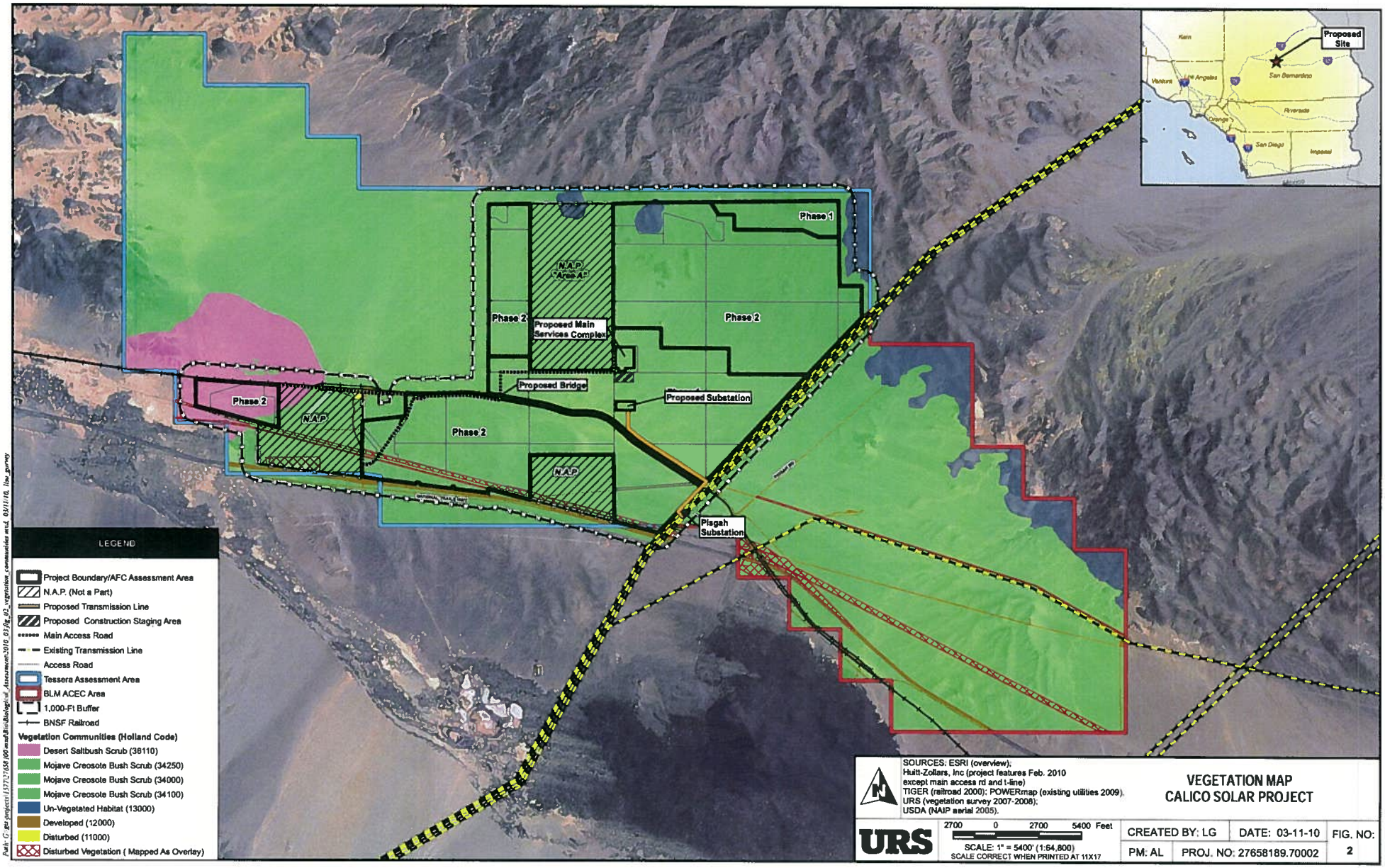
Phase 1
Phase 2
Phase 2
Phase 2
Phase 2
N.A.P. "Area A"
N.A.P.
N.A.P.
Proposed Main Services Complex
Proposed Bridge
Proposed Substation
Pisgah Substation
Proposed Site
Kern
Ventura
Los Angeles
San Bernardino
Riverside
Orange
San Diego
Imperial
LEGEND
Project Boundary/AFC Assessment Area
N.A.P. (Not a Part)
Proposed Transmission Line
Proposed Construction Staging Area
Main Access Road
Existing Transmission Line
Access Road
Tessera Assessment Area
BLM ACEC Area
1,000-Ft Buffer
BNSF Railroad
Vegetation Communities (Holland Code)
Desert Saltbush Scrub (36110)
Mojave Creosote Bush Scrub (34250)
Mojave Creosote Bush Scrub (34000)
Mojave Creosote Bush Scrub (34100)
Un-Vegetated Habitat (13000)
Developed (12000)
Disturbed (11000)
Disturbed Vegetation (Mapped As Overlay)
SOURCES: ESRI (overview);
Huitt-Zollars, Inc (project features Feb. 2010
except main access rd and t-line)
TIGER (railroad 2000); POWERmap (existing utilities 2009).
URS (vegetation survey 2007-2008);
USDA (NAIP aerial 2005).
VEGETATION MAP
CALICO SOLAR PROJECT
URS
2700 0 2700 5400 Feet
SCALE: 1" = 5400' (1:64,800)
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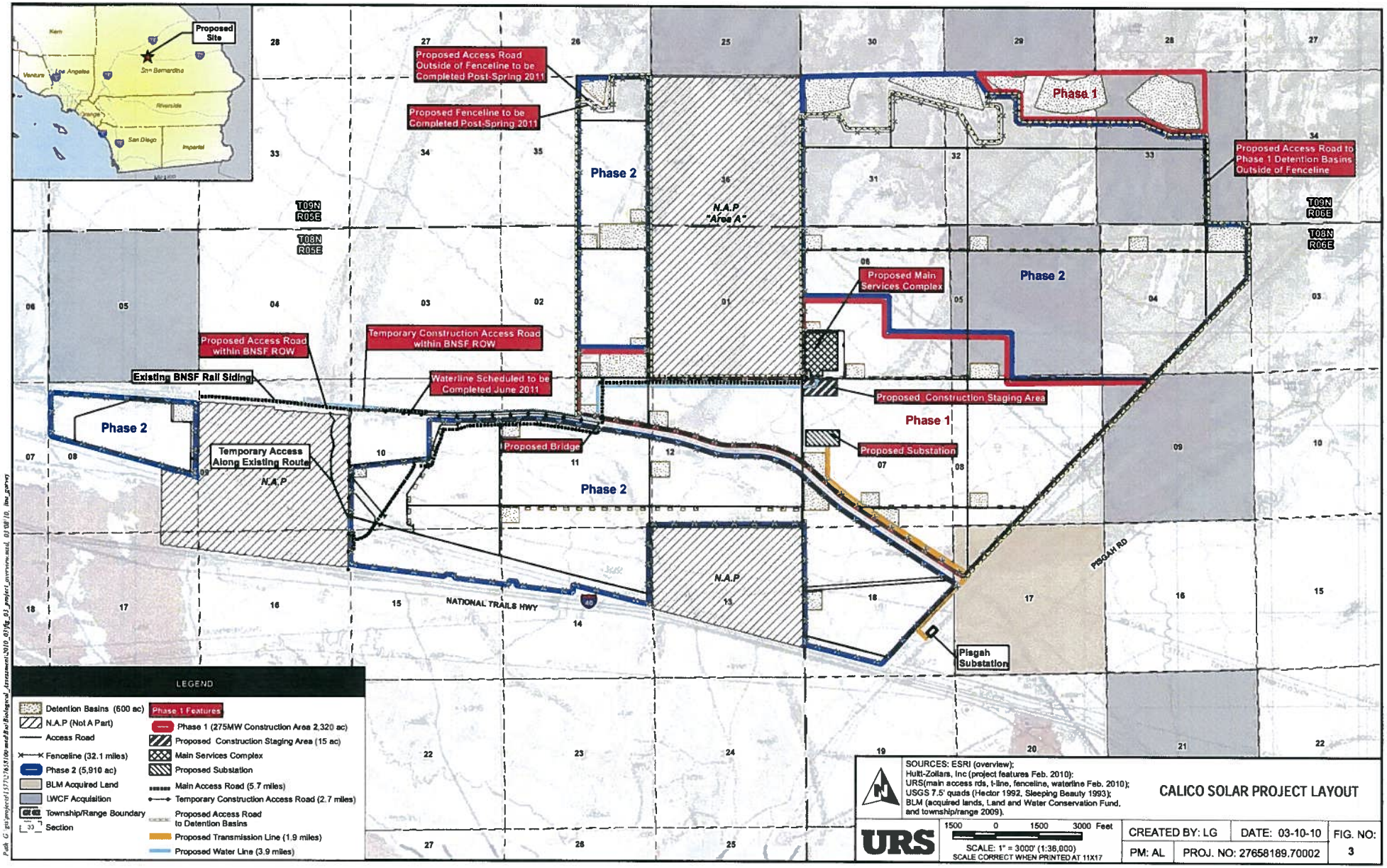
DATE: 03-11-10
FIG. NO: 2
PM: AL
PROJ. NO: 27658189.70002


Proposed Site
Kern
Ventura
Los Angeles
San Bernardino
Riverside
Orange
San Diego
Imperial
Proposed Access Road Outside of Fenceline to be Completed Post-Spring 2011
Proposed Fenceline to be Completed Post-Spring 2011
Phase 1
Proposed Access Road to Phase 1 Detention Basins Outside of Fenceline
Phase 2
N.A.P "Area A"
T09N R05E
T08N R05E
T09N R06E
T08N R06E
Proposed Main Services Complex
Phase 2
Proposed Access Road within BNSF ROW
Temporary Construction Access Road within BNSF ROW
Existing BNSF Rail Siding
Waterline Scheduled to be Completed June 2011
Proposed Construction Staging Area
Phase 1
Phase 2
Temporary Access Along Existing Route
N.A.P
Proposed Bridge
Proposed Substation
Phase 2
N.A.P
NATIONAL TRAILS HWY
PISGAH RD
Pisgah Substation
LEGEND
Detention Basins (600 ac)
N.A.P (Not A Part)
Access Road
Fenceline (32.1 miles)
Phase 2 (5,910 ac)
BLM Acquired Land
LWCF Acquisition
Township/Range Boundary
Section
Phase 1 Features
Phase 1 (275MW Construction Area 2,320 ac)
Proposed Construction Staging Area (15 ac)
Main Services Complex
Proposed Substation
Main Access Road (5.7 miles)
Temporary Construction Access Road (2.7 miles)
Proposed Access Road to Detention Basins
Proposed Transmission Line (1.9 miles)
Proposed Water Line (3.9 miles)
SOURCES: ESRI (overview); Hulti-Zollars, Inc (project features Feb. 2010); URS(main access rds, l-line, fenceline, waterline Feb. 2010); USGS 7.5' quads (Hector 1992, Sleeping Beauty 1993); BLM (acquired lands, Land and Water Conservation Fund, and township/range 2009).
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SCALE CORRECT WHEN PRINTED AT 11X17
URS
CALICO SOLAR PROJECT LAYOUT
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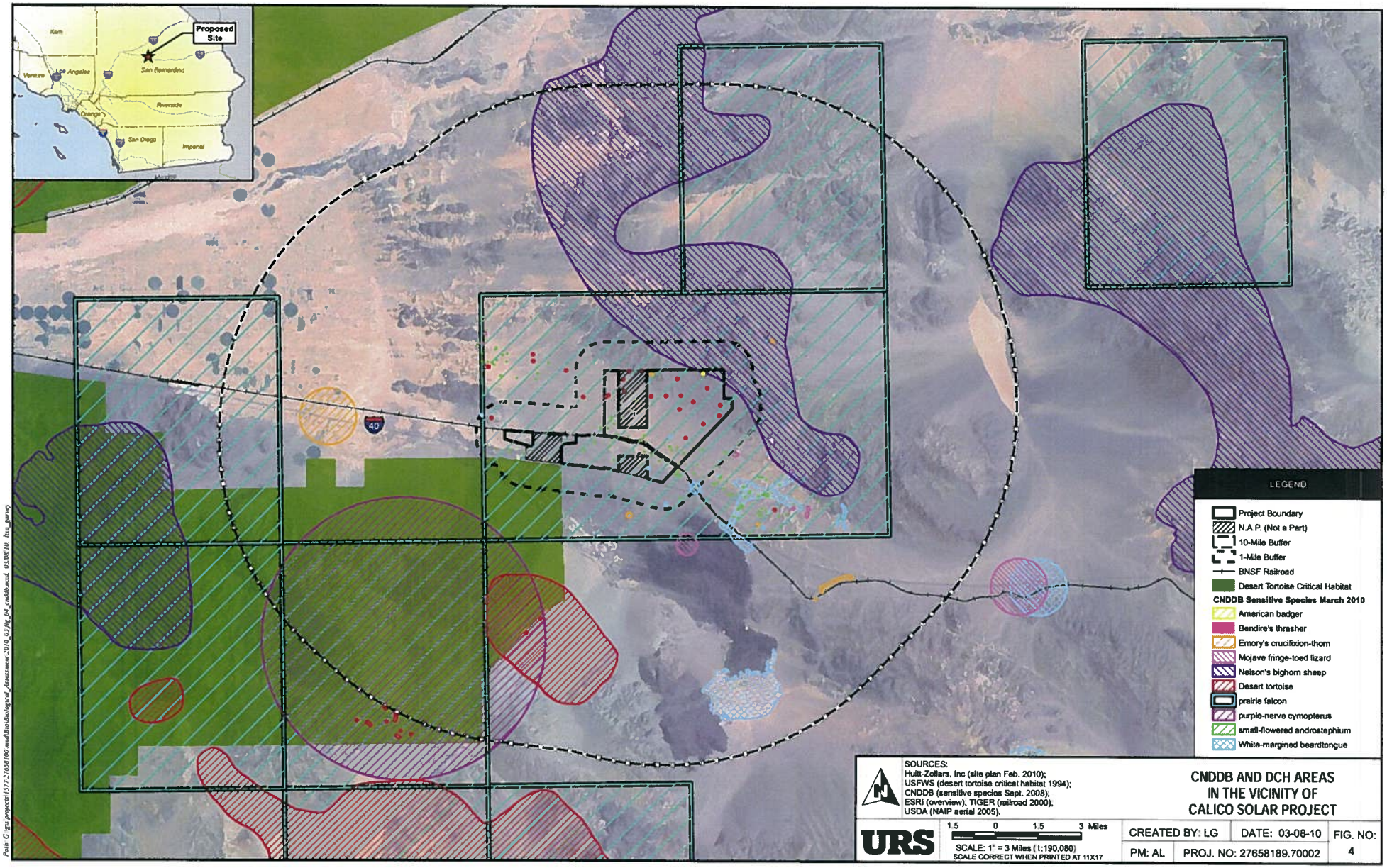
DATE: 03-10-10
FIG. NO: 3
PM: AL
PROJ. NO: 27658189.70002


Proposed Site
Kern
Ventura
Los Angeles
San Bernardino
Riverside
Orange
San Diego
Imperial
Mexico
40
LEGEND
Project Boundary
N.A.P. (Not a Part)
10-Mile Buffer
1-Mile Buffer
BNSF Railroad
Desert Tortoise Critical Habitat
CNDDB Sensitive Species March 2010
American badger
Bendire's thrasher
Emory's crucifixion-thorn
Mojave fringe-toed lizard
Nelson's bighorn sheep
Desert tortoise
prairie falcon
purple-nerve cymopterus
small-flowered androstephium
White-margined beardtongue
SOURCES:
Huitt-Zollars, Inc (site plan Feb. 2010);
USFWS (desert tortoise critical habitat 1994);
CNDDB (sensitive species Sept. 2008);
ESRI (overview), TIGER (railroad 2000);
USDA (NAIP aerial 2005).
1.5 0 1.5 3 Miles
SCALE: 1" = 3 Miles (1:190,080)
SCALE CORRECT WHEN PRINTED AT 11X17
URS
CNDDB AND DCH AREAS
IN THE VICINITY OF
CALICO SOLAR PROJECT
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DATE: 03-08-10
FIG. NO:
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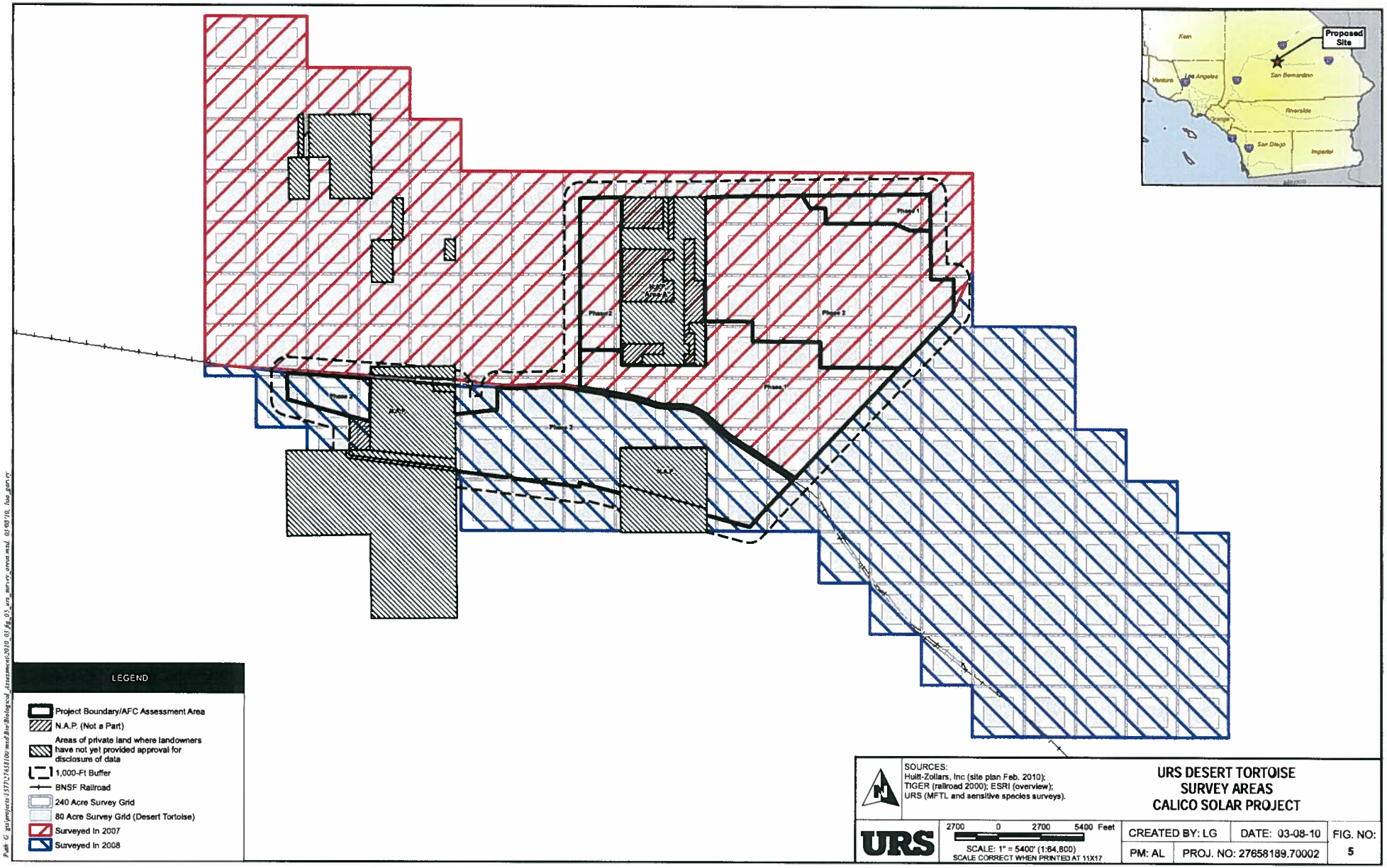
PROJ. NO: 27658189.70002



SOURCES:
Hulit-Zollars, Inc (site plan Feb. 2010);
TIGER (railroad 2000); ESRI (overview);
URS (MFTL and sensitive species surveys).

URS DESERT TORTOISE SURVEY AREAS CALICO SOLAR PROJECT

URS

2700 0 2700 5400 Feet
SCALE: 1" = 5400' (1:64,800)
SCALE CORRECT WHEN PRINTED AT 11X17

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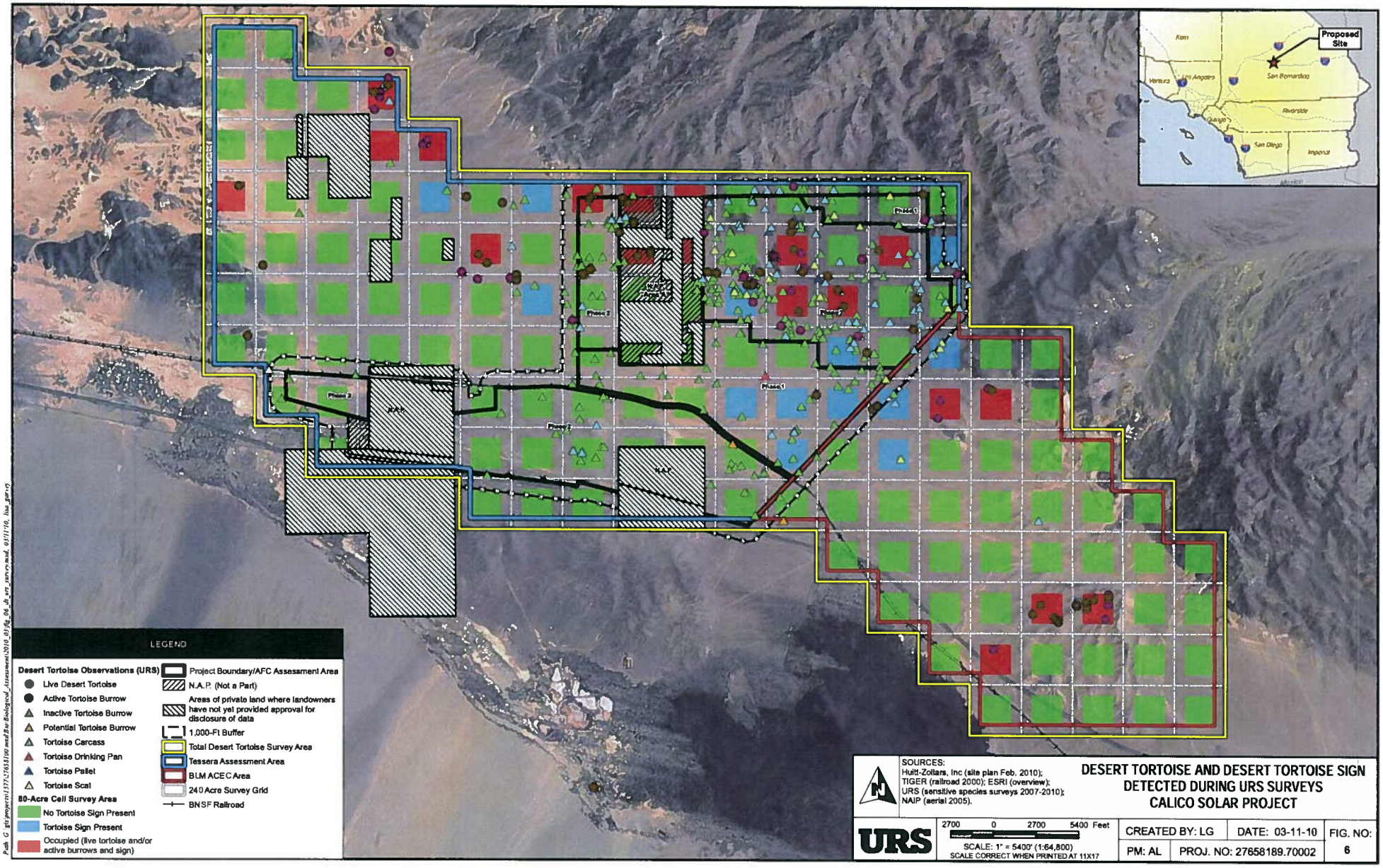
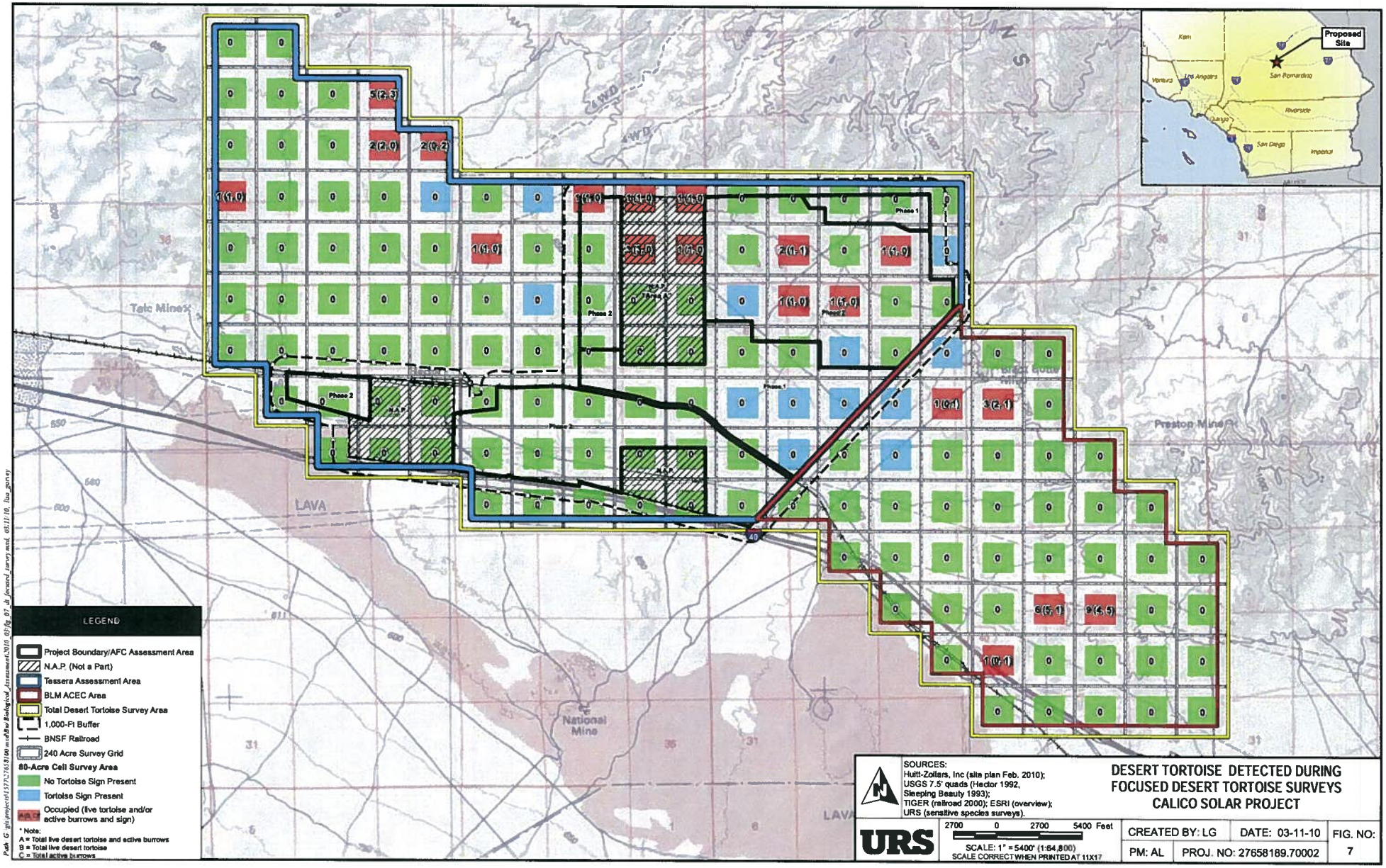


DESERT TORTOISE AND DESERT TORTOISE SIGN DETECTED DURING URS SURVEYS CALICO SOLAR PROJECT



SOURCES:
Huitt-Zollars, Inc (site plan Feb. 2010);
USGS 7.5' quads (Hector 1992, Sleeping Beauty 1993);
TIGER (railroad 2000); ESRI (overview);
URS (sensitive species surveys).

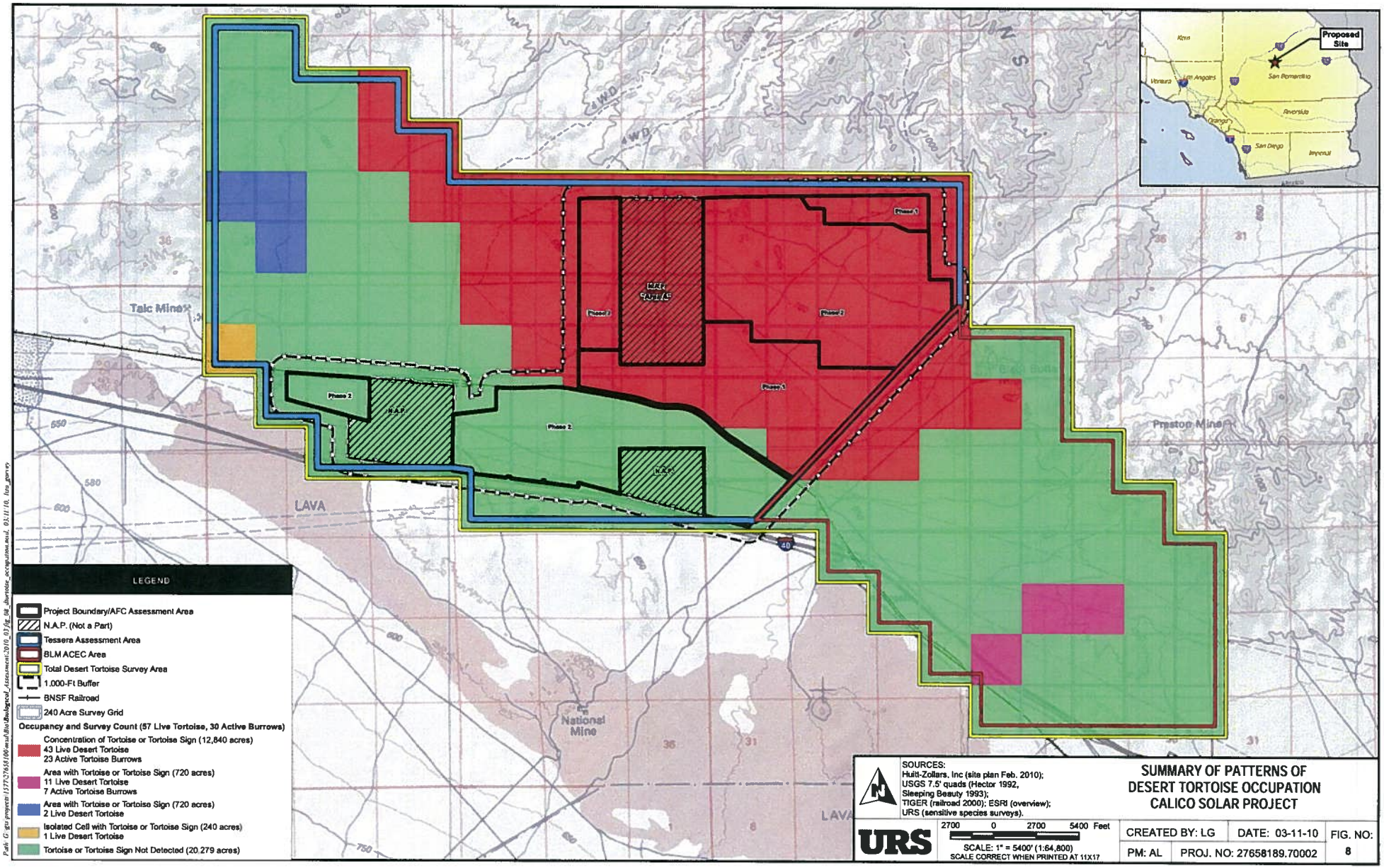
DESERT TORTOISE DETECTED DURING FOCUSED DESERT TORTOISE SURVEYS CALICO SOLAR PROJECT

URS

2700 0 2700 5400 Feet

SCALE: 1" = 5400' (1:64,800)
SCALE CORRECT WHEN PRINTED AT 11X17

CREATED BY: LG	DATE: 03-11-10	FIG. NO:
PM: AL	PROJ. NO: 27658189.70002	7


Proposed Site
Kern
Ventura
Los Angeles
San Bernardino
Riverside
Orange
San Diego
Imperial
Talc Mine
Preston Mine
LAVA
National Mine
N.A.P.
Phase 1
Phase 2
LEGEND
Project Boundary/AFC Assessment Area
N.A.P. (Not a Part)
Tessera Assessment Area
BLM ACEC Area
Total Desert Tortoise Survey Area
1,000-Ft Buffer
BNSF Railroad
240 Acre Survey Grid
Occupancy and Survey Count (57 Live Tortoise, 30 Active Burrows)
Concentration of Tortoise or Tortoise Sign (12,840 acres)
43 Live Desert Tortoise
23 Active Tortoise Burrows
Area with Tortoise or Tortoise Sign (720 acres)
11 Live Desert Tortoise
7 Active Tortoise Burrows
Area with Tortoise or Tortoise Sign (720 acres)
2 Live Desert Tortoise
Isolated Cell with Tortoise or Tortoise Sign (240 acres)
1 Live Desert Tortoise
Tortoise or Tortoise Sign Not Detected (20,279 acres)
SOURCES:
Hulit-Zollars, Inc (site plan Feb. 2010);
USGS 7.5' quads (Hector 1992, Sleeping Beauty 1993);
TIGER (railroad 2000); ESRI (overview);
URS (sensitive species surveys).
URS
2700 0 2700 5400 Feet
SCALE: 1" = 5400' (1:64,800)
SCALE CORRECT WHEN PRINTED AT 11X17
SUMMARY OF PATTERNS OF
DESERT TORTOISE OCCUPATION
CALICO SOLAR PROJECT
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DATE: 03-11-10
FIG. NO: 8
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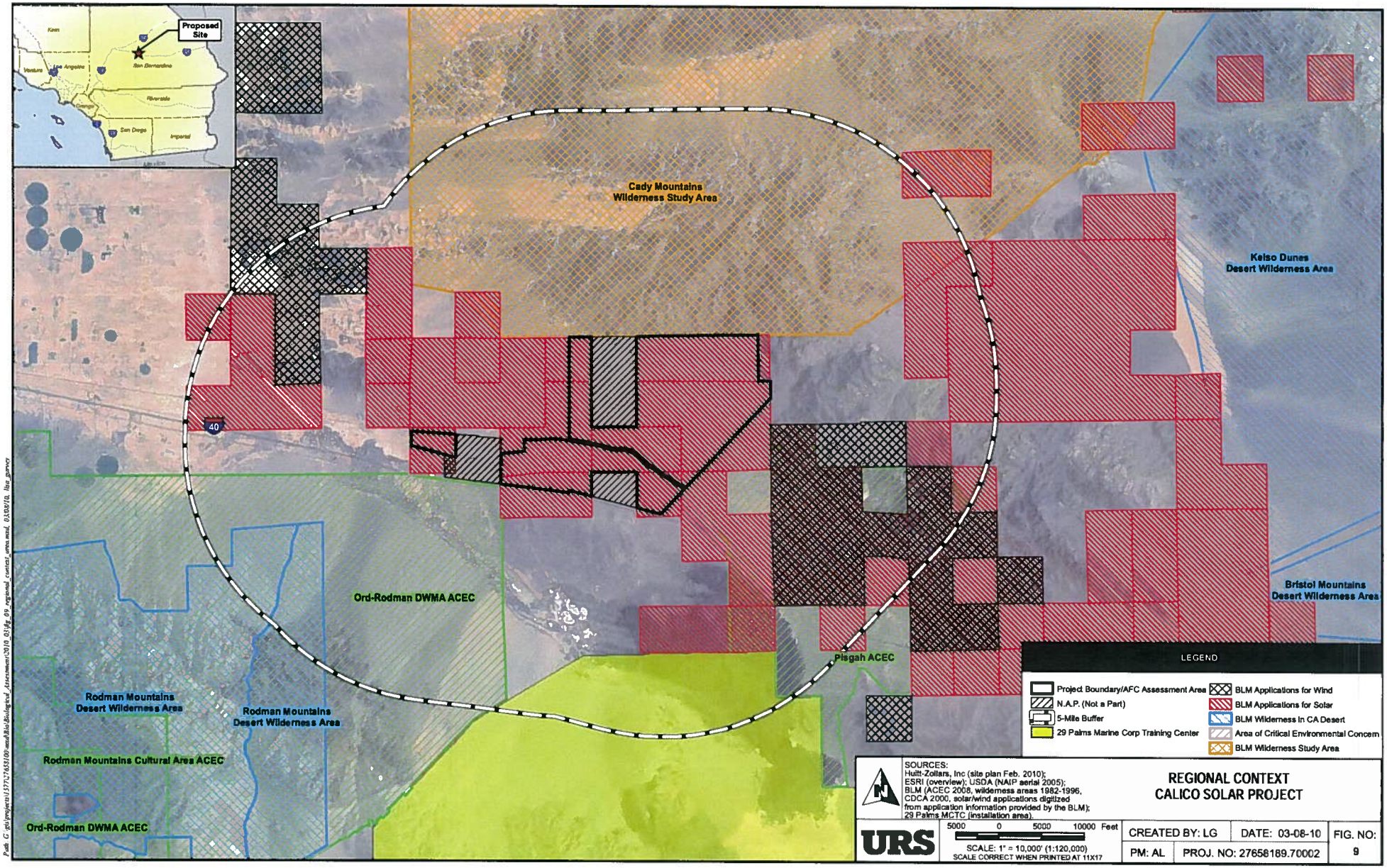
PROJ. NO: 27658189.70002


Proposed Site
Kern
Ventura
Los Angeles
San Bernardino
Riverside
Orange
San Diego
Imperial
Cady Mountains Wilderness Study Area
Kelso Dunes Desert Wilderness Area
Bristol Mountains Desert Wilderness Area
Ord-Rodman DWMA ACEC
Pisgah ACEC
Rodman Mountains Desert Wilderness Area
Rodman Mountains Desert Wilderness Area
Rodman Mountains Cultural Area ACEC
Ord-Rodman DWMA ACEC
40
LEGEND
Project Boundary/AFC Assessment Area
N.A.P. (Not a Part)
5-Mile Buffer
29 Palms Marine Corp Training Center
BLM Applications for Wind
BLM Applications for Solar
BLM Wilderness in CA Desert
Area of Critical Environmental Concern
BLM Wilderness Study Area
SOURCES:
Hulitt-Zollars, Inc (site plan Feb. 2010);
ESRI (overview); USDA (NAIP aerial 2005);
BLM (ACEC 2008, wilderness areas 1982-1996,
CDCA 2000, solar/wind applications digitized
from application information provided by the BLM);
29 Palms MCTC (installation area).
REGIONAL CONTEXT
CALICO SOLAR PROJECT
URS
5000 0 5000 10000 Feet
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9
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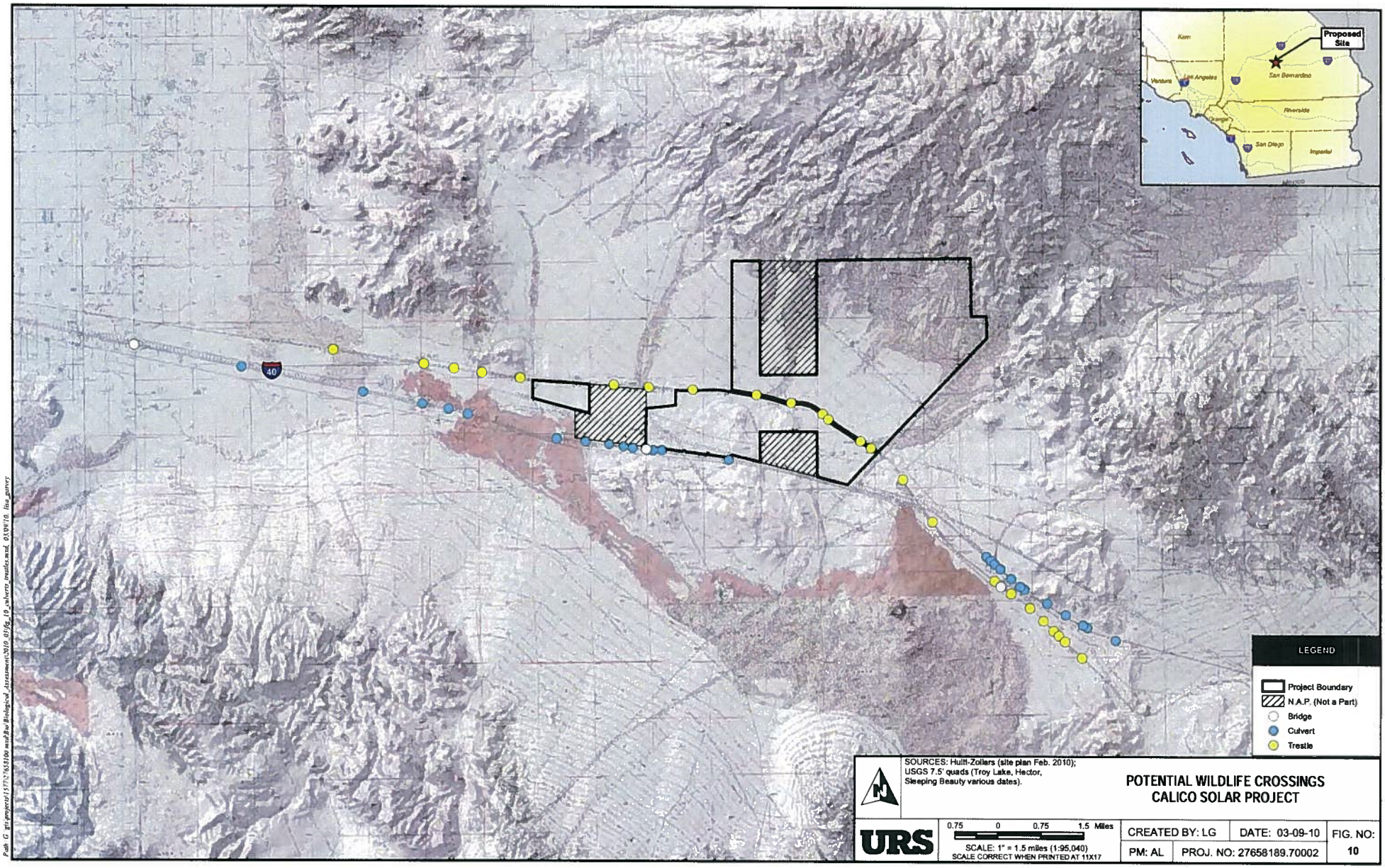

SOURCES: Hulitt-Zollars (site plan Feb. 2010); USGS 7.5' quads (Troy Lake, Hector, Sleeping Beauty various dates).

POTENTIAL WILDLIFE CROSSINGS
CALICO SOLAR PROJECT

URS

0.75 0 0.75 1.5 Miles
SCALE: 1" = 1.5 miles (1:95,040)
SCALE CORRECT WHEN PRINTED AT 11X17

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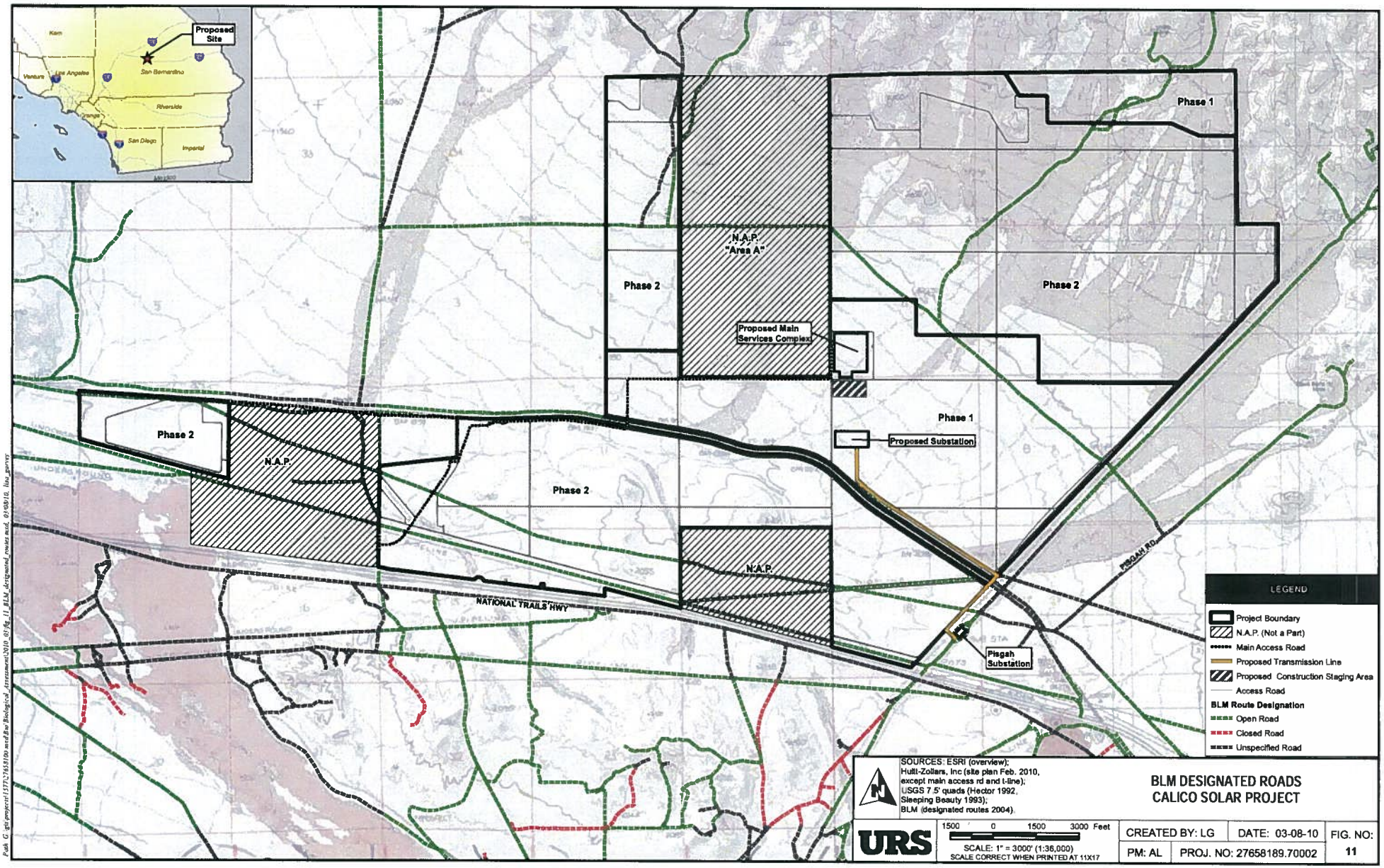
Proposed Site
Kern
Ventura
Los Angeles
San Bernardino
Riverside
Orange
San Diego
Imperial
Phase 1
Phase 2
N.A.P. "Area A"
Proposed Main Services Complex
Proposed Substation
N.A.P.
NATIONAL TRAILS HWY
PISGAH RD.
Pisgah Substation
LEGEND
Project Boundary
N.A.P. (Not a Part)
Main Access Road
Proposed Transmission Line
Proposed Construction Staging Area
Access Road
BLM Route Designation
Open Road
Closed Road
Unspecified Road
SOURCES: ESRI (overview);
Hulll-Zollars, Inc (site plan Feb. 2010,
except main access rd and t-line);
USGS 7.5' quads (Hector 1992,
Sleeping Beauty 1993);
BLM (designated routes 2004).
1500 0 1500 3000 Feet
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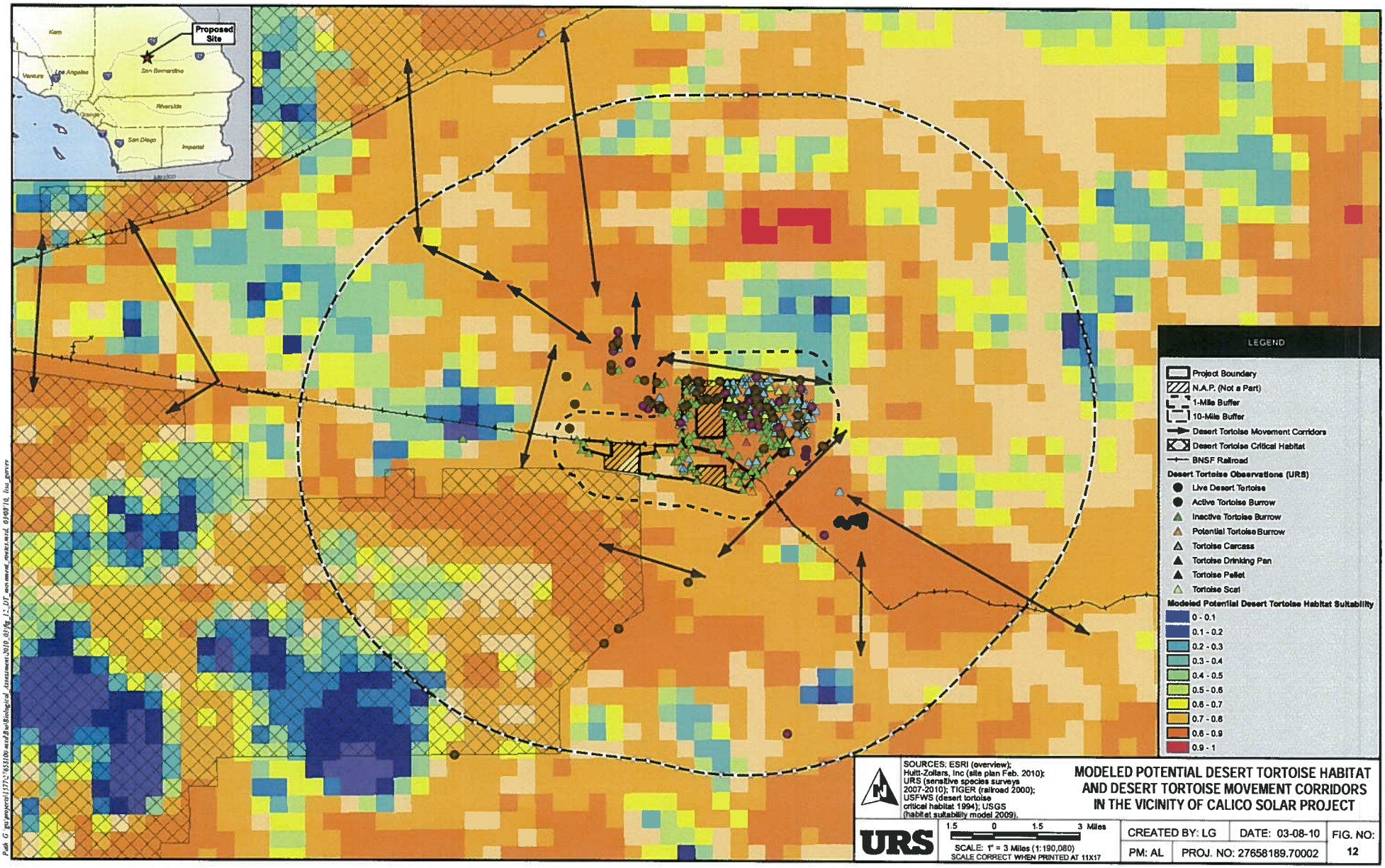
SCALE CORRECT WHEN PRINTED AT 11X17
URS
BLM DESIGNATED ROADS
CALICO SOLAR PROJECT
CREATED BY: LG
DATE: 03-08-10
FIG. NO: 11
PM: AL
PROJ. NO: 27658189.70002


Proposed Site
Kern
Ventura
Los Angeles
San Bernardino
Riverside
Orange
San Diego
Imperial
LEGEND
Project Boundary
N.A.P. (Not a Part)
1-Mile Buffer
10-Mile Buffer
Desert Tortoise Movement Corridors
Desert Tortoise Critical Habitat
BNSF Railroad
Desert Tortoise Observations (URS)
Live Desert Tortoise
Active Tortoise Burrow
Inactive Tortoise Burrow
Potential Tortoise Burrow
Tortoise Carcass
Tortoise Drinking Pan
Tortoise Pellet
Tortoise Scat
Modeled Potential Desert Tortoise Habitat Suitability
0 - 0.1
0.1 - 0.2
0.2 - 0.3
0.3 - 0.4
0.4 - 0.5
0.5 - 0.6
0.6 - 0.7
0.7 - 0.8
0.8 - 0.9
0.9 - 1
SOURCES: ESRI (overview); Hulitt-Zollars, Inc (site plan Feb. 2010); URS (sensitive species surveys 2007-2010); TIGER (railroad 2000); USFWS (desert tortoise critical habitat 1994); USGS (habitat suitability model 2009).
1.5 0 1.5 3 Miles
SCALE: 1" = 3 Miles (1:190,080)
SCALE CORRECT WHEN PRINTED AT 11X17
URS
MODELED POTENTIAL DESERT TORTOISE HABITAT AND DESERT TORTOISE MOVEMENT CORRIDORS IN THE VICINITY OF CALICO SOLAR PROJECT
CREATED BY: LG
DATE: 03-08-10
FIG. NO: 12
PM: AL
PROJ. NO: 27658189.70002

Photograph #1

March 11, 2008.

View from the hillside of the northeast corner of assessment area looking into the distance toward Interstate-40 and the Burlington Northern Santa Fe Railroad (BNSF). Note the uniformity of Mojave creosote bush scrub habitat on the lower elevations of the site.

Photograph #2

March 26, 2008.

View of the overall assessment area from Interstate-40 looking in a northerly direction. Note the interspersion of desert pavement and volcanic rock among Mojave creosote bush scrub.

Photograph #3

March 24, 2007.

Desert pavement is scattered throughout the project site. Desert pavement is the arrangement of stones left behind as infrequent rain showers slowly wash away the supporting soil, leaving behind a layer of rocks.

Photograph #4

March 28, 2008.

View of mountains to the north from the area that was designated by the Bureau of Land Management as an Area of Critical Environmental Concern (ACEC). Portions of ACEC were surveyed along with the project assessment area.

Photograph #5

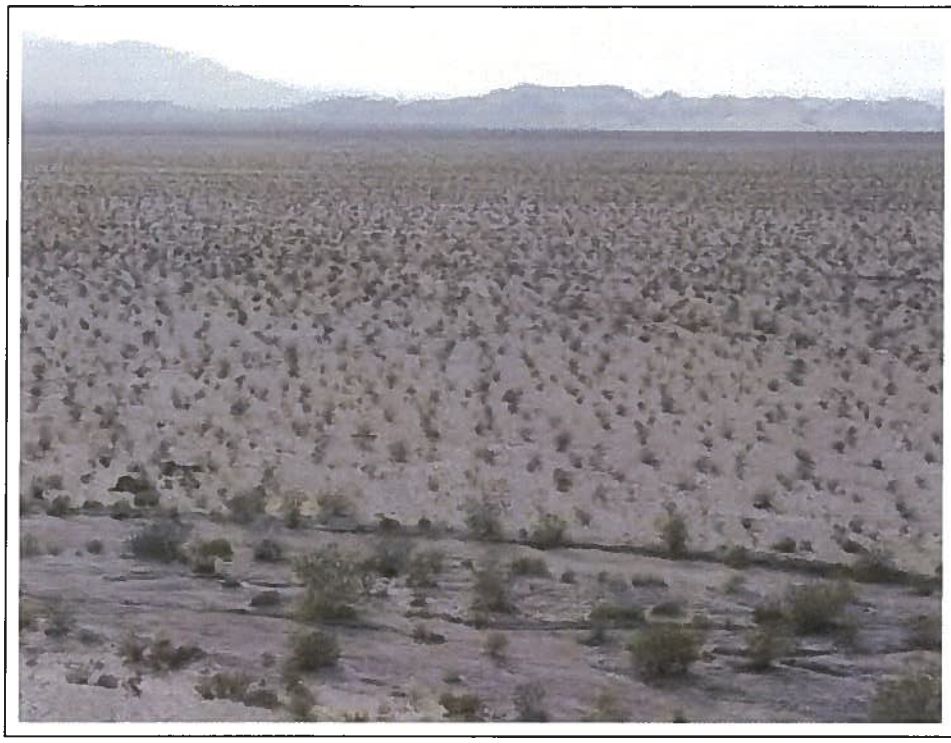
March 25, 2008.

Representative photo of desert dandelion (*Malacothrix glabrata*) found blooming in large swaths throughout Mojave creosote bush scrub found on-site.

Photograph #6

March 21, 2008.

The BNSF railroad runs through the site in an east-west direction parallel to Interstate-40. Interstate-40 runs along the southern boundary of the project site.



Photograph #7

March 27, 2008.

View of the southeast corner of assessment area looking northwest. Note the prevalence and uniform distribution of creosote bush throughout the habitat; creosote bush is a dominant species in Mojave creosote bush scrub habitat.

Photograph #8

June 3, 2008.

Westward view from the foothills in the northwest corner of the assessment area. The topography of the project site is dominated by broad, flat valleys, but also includes portions of very steep terrain as pictured here.

Photograph #9

June 3, 2008.

Sandy, almost dune-like Mojave creosote bush scrub habitat. This type of habitat was found in isolated patches of the Assessment and ACEC areas and supports Mojave fringe-toed lizard.

Photograph #10

April 3, 2008.

Partial glimpse of a desert tortoise (*Gopherus agassizii*) inside its typical half-moon shaped burrow. The light source seen in picture is provided by mirrors used by biologists to shine light inside burrows to determine presence of desert tortoise.

Photograph #11

April 3, 2008.

Desert tortoise found walking through an area of desert pavement. Note the abundance of native herbaceous plants surrounding the tortoise. Herbaceous plants are the tortoise's primary source of food.

Photograph #12

April 15, 2008.

Sand dunes in the ACEC forming along the southern face of a hill surrounded by Mojave creosote bush scrub. Windblown sand dunes with low-growing vegetation are the primary habitat type preferred by the Mojave fringe-toed lizard (*Uma scoparia*).

Photograph #13

March 31, 2008.

Desert tortoise found just as it was exiting its burrow. Presence of dirt on the shell could be indicative of fresh excavation activity.

Photograph #14

May 10, 2008.

Two desert tortoises found together. Note the long gular horn visible on the tortoise to the left; the pronounced length of the horn indicates that the tortoise is male. Also note the variation in shell color.

Photograph #15

March 20, 2008.

Desert tortoise plastron. The disarticulating scutes and carapace, and bleached (white) appearance of the shell are indicative of prolonged exposure to the elements.