1.1 INTRODUCTION

SES Solar Two, LLC (Solar Two or Applicant) is seeking approval to construct and operate the Solar Two Project and its ancillary facilities (Project). The main objective of the Project is to provide clean, renewable, solar-powered electricity to the state of California. The electricity from the Project will assist the state in meeting its objectives as mandated by the California Renewable Portfolio Standard (RPS) Program and the California Global Warming Solutions Act. The Project will also address other local mandates adopted by California's electric utilities for the provision of renewable energy.

San Diego Gas & Electric (SDG&E) selected the Project to meet its objectives under the legislative requirements of the RPS Program through a least-cost, best-fit competitive solicitation. Because the Project is one of the three projects that SDG&E selected from the solicitation, the Applicant and SDG&E entered into a 20-year Power Purchase Agreement (PPA) for the provision of renewable electricity. This PPA will help SDG&E meet both its statutory mandate to purchase at least 20 percent of its electric power from renewable resources by 2010 and its future electricity requirements. The California Public Utilities Commission approved the PPA on 1 December 2005. The Project represents approximately 44 percent of SDG&E's RPS goals. The Project will be an important deployment of large-scale renewable solar technology in a commercial energy setting. The Project will generate power using low-cost solar power generation equipment produced by an optimized, high-volume manufacturing design and infrastructure. Much of the power from the Project will be generated at peak times, when the demand for electricity is greatest.

The Applicant intends to develop an electric generating facility with a nominal capacity of 750 megawatts (MW) using concentrating solar power (see Figures 1-1 through 1-3). The Project will be constructed on an approximate 6,500-acre site located in the Imperial Valley of California. The Project Site is approximately 100 miles east of San Diego, 14 miles west of El Centro, and approximately 4 miles east of Ocotillo Wells.

The Applicant is a private enterprise that is a wholly owned subsidiary of Stirling Energy Systems, Inc. The company recently received long-term funding from a strategic partner, NTR plc (NTR). NTR is an international developer and operator of renewable energy and sustainable waste management businesses in the United States, the United Kingdom, Ireland, and Continental Europe. The unique combination of the Applicant's technical expertise and NTR's track record in developing large-scale renewable energy and infrastructure projects provides a strong platform from which to realize the Project. This partnership will allow the Applicant to develop additional solar projects in other states and internationally.

1.2 APPROVAL PROCESS

This Application for Certification (AFC) has been prepared in accordance with the current California Energy Commission (CEC) power plant siting regulations and addresses each of the specified environmental areas. This approach is designed to facilitate review by CEC staff in accordance with the California Environmental Quality Act (CEQA). It is important to note that the majority of the Project is located on public land administered by the Bureau of Land

Management California Desert District (BLM). Therefore, this document is also being submitted to the BLM to review for grant of a right-of-way grant. This dual submission is consistent with the National Environmental Policy Act of 1969 (NEPA).

This AFC was prepared using guidance from a Memorandum of Understanding developed between the CEC and the BLM (see Appendix A, Memorandum of Understanding). The Memorandum of Understanding sets out the relative roles, responsibilities, and procedures CEC and BLM staff will follow when conducting their respective environmental reviews of the Project. The Applicant will conduct the construction and operation of the Project in accordance with all applicable laws, ordinances, regulations, and standards (LORS).

This AFC is intended to provide:

- a discussion of the purpose and need for the Project,
- a detailed description of the Project,
- an assessment of the anticipated Project effects on the existing environment, and
- a discussion of the Project's compliance with applicable LORS.

As discussed above, this AFC was prepared to meet the requirements of both CEQA and elements of NEPA. Both CEQA and NEPA require the Applicant to address any potential impacts or effects resulting from the construction and operation of the Project. This AFC provides CEQA determinations of significance; however, this document does not make these conclusions for purposes of NEPA to avoid a perception of predetermination for NEPA.

1.3 PROJECT DESCRIPTION

The Project will utilize the SunCatcher technology of Stirling Energy Systems, Inc. This technology is innovative, technically proven, non-polluting, and cost-effective in large utility-scale deployment. The SunCatcher is a proprietary solar dish Stirling system that the Applicant has developed. Each SunCatcher consists of a 25-kilowatt solar power generating system. The system is designed to track the sun automatically and to focus solar energy onto a Power Conversion Unit (PCU), which generates electricity. The system consists of an approximate 38-foot high by 40-foot wide solar concentrator dish that supports an array of curved glass mirror facets (see Photographs 1-1 through 1-3). These mirrors collect and focus solar energy onto the heat exchanger of the PCU. The PCU converts the solar thermal energy into electricity. Each SunCatcher operates independently and generates grid-quality electricity. The SunCatcher currently holds the world's record for the conversion of sunlight into grid-quality electricity (31.25 percent). The technology has been in development and operating in a variety of locations, including Huntington Beach and Daggett, California. At some of these locations, the technology has been in use for more than 20 years. The Applicant has been developing and operating the technology since 1996, most recently at the National Solar Thermal Test Facility, located at Sandia National Laboratories in Albuquerque, New Mexico. See Appendix B, Solar Stirling Engine, for more information on the SunCatcher's Stirling Engine.

Construction of the Project is expected to begin in late 2009 or early 2010 and will take approximately 40 months for full Project completion. However, renewable power from the Project will come online much earlier than 40 months after the start of the Project. As groups of SunCatchers are constructed, their renewable power will immediately be supplied to the grid. After Project completion, the Project will operate approximately 3,500 hours per year and is expected to have an overall availability of approximately 99 percent.

Of the approximately 6,500 acres of land to be developed for the Project, approximately 6,140 acres will consist of BLM-administered public land and approximately 360 acres will consist of privately owned land. The Applicant intends to develop the nominal 750-MW Project in two phases. The 300-MW Phase I of the Project will consist of approximately 12,000 SunCatcher dishes. The renewable energy from Phase I will be transmitted via the 500-kilovolt (kV) Southwest Powerlink transmission line, which is currently in operation. The Project will be connected to the grid at the SDG&E Imperial Valley Substation via a 10.3-mile, 230-kV interconnection transmission line that the Applicant will construct in a corridor parallel to the existing SDG&E 500-kV Southwest Powerlink transmission line.

The 450-MW Phase II of the Project will consist of approximately 18,000 SunCatcher dishes. Transmission studies indicate that the addition of this amount of electric capacity to the grid will require the proposed 500-kV Sunrise Powerlink (or equivalent) transmission line. Therefore, the construction and operation of Phase II is contingent on the approval and development of the Sunrise Powerlink transmission line or additional transmission capacity.

The Imperial Irrigation District (IID) will provide the water supply for the Project from its Westside Main Canal. The Project will obtain raw canal water, which will be treated to provide an appropriate quality of water for SunCatcher mirror washing and to meet the standards for on-site drinking water. An important feature of the SunCatcher system is that water is only consumed for mirror washing. To comply with Environmental Protection Agency requirements and Imperial County air pollution regulations, water will be used for dust control during construction. When fully operational, the approximately 6,500-acre Project will use approximately 33 acre-feet of water per year. This amount is equivalent to the annual water consumption of approximately 33 households, based on water consumption in Southern California.

1.4 ALTERNATIVES

The Applicant evaluated a range of potential alternatives to the proposed Project. The site selection for the Project was based on a detailed evaluation of the key criteria required for a large-scale, concentrating solar power project of its type. Input was obtained on alternative locations through discussions with the CEC, the California Independent System Operator, and the BLM. The key criteria are:

- site suitability (solar resource size and grade),
- site availability (ability to lease or obtain a BLM grant of right-of-way),
- proximity to critical infrastructure (suitable transmission lines and water supply, etc.),
- suitability in relation to environmental and cultural sensitivities,

- consistency with existing jurisdictional policies, and
- the need for the Project to be economically viable by being in proximity to suitable infrastructure and having land that is available to be leased or owned at reasonable cost.

The Applicant has had several meetings with the CEC and the BLM and has performed substantial analysis to identify appropriate site locations. The criteria described above were used to evaluate the suitability of alternative sites for solar power development.

The physical attributes of the Project Site meet the key criteria required for site selection. The Project is located in an undeveloped area of Imperial County in Southern California that consists primarily of undeveloped desert. The site is generally flat and slopes to the northeast. Although the surrounding regional landscape is predominately desert, irrigated land is used for agricultural purposes a few miles to the east of the site. IID will supply water to the Project from the nearby Westside Main Canal. The site is bounded to the north by the Union Pacific railroad (which is located immediately south of Evan Hewes Highway) and to the south by Interstate 8. The eastern side of the site is located approximately 1 mile to the west of Dunaway Road. These physical boundaries are relevant in that they form barriers against the rest of the wider desert, thereby assisting in mitigating against wider impacts.

The alternatives considered included the “No Project” or “No Action” Alternative. This alternative was considered and rejected because it would not fulfill the Project objectives of helping to meet the renewable electric power requirements of the state of California.

A second engineering alternative to the Project would be to limit the capacity of the Project to a maximum of 300 MW. Under this alternative, only Phase I of the Project would be constructed. The 300-MW Alternative would consist of approximately 12,000 SunCatchers, with a net generating capacity of 300 MW occupying approximately 2,600 acres of land. The 300-MW Alternative would transmit power to the grid through the existing SDG&E Imperial Valley Substation.

The 300-MW Alternative would have ancillary features and infrastructure similar to those of the larger 750-MW Project, including a water supply pipeline, a transmission line, road access, operations facilities, and a substation. Some of these features would be smaller and potentially have less of an overall impact under the 300-MW Alternative, as the capacity of the Project would be reduced and there would be no need to accommodate additional future generation. However, because the smaller 300-MW Alternative would not supply as much renewable energy as the proposed 750-MW Project, the ability of the state of California to meet its obligations under the RPS Program would be diminished. Also, even though a smaller project would occupy less land and would require less financing to construct, the benefits of a smaller project would likely be smaller than a directly proportional size reduction because much of the infrastructure would still need to be developed. In addition, a smaller project would cost more per kilowatt of capacity, resulting in a higher cost of electricity for San Diego ratepayers. Finally, a smaller Project would not maximize the use of the solar resources available in the area.

A third engineering alternative that was considered was to construct a 900-MW Project in two phases, on approximately 7,650 acres of land. In the 900-MW Alternative, Phase I would again consist of up to approximately 12,000 SunCatchers with a net capacity of over 300 MW. However, under the 900-MW Alternative Phase II would further expand the Project up to a total size of approximately 36,000 SunCatchers with a total generating capacity of 900 MW. This

900-MW Alternative was demonstrated to have significant potential environmental impacts (specifically in relation to cultural resources in the eastern portion of the site) that precluded its selection as a viable alternative. Although an additional 450 MW can be developed without significantly impacting cultural resources, as proposed in the 750-MW Project, the 600-MW Phase II that would be required under the 900-MW Alternative would require developing further east and therefore would have the potential to impact cultural resources. The 900-MW Alternative was therefore rejected on these grounds.

Alternative locations for the Project Site were also evaluated, with an attempt to mitigate the visual impact of the Project. However, after applying the site selection criteria to the alternative locations, the Applicant concluded that the proposed Project Site was the only viable alternative. The existing industrial activity in the area, which includes a railway, a main road, and the Plaster City Gypsum Wallboard Manufacturing Facility, serves to lessen the visual impact that would otherwise occur as a result of the Project. Despite these existing industrial activities, the Project will still impact the viewshed from Interstate 8. The visual aspect of the area will inevitably be altered to that of a regional center for utility-scale solar thermal power production. As a result, a further potential impact is that the site and area may become a tourist attraction and an object of educational visitation. Appendix C, Property Owners Within 1,000 Feet of Project Site, has been provided to aid in the dissemination of information about these and other potential impacts.

In addition to the engineering alternatives that the Applicant evaluated, as described above, SDG&E considered several other renewable technology alternatives through its competitive solicitation. The SunCatcher technology was chosen due to its ability to meet SDG&E's least-cost, best-fit criteria and the other criteria of the California Public Utilities Commission.

The Applicant considered a number of alternative water supplies for the Project. Obtaining water from the local Ocotillo Wells groundwater aquifer was ruled out as a viable option, as it is for residential use only and is already in a deficit situation due to overuse and lack of recharge. The Coyote Wells groundwater aquifer is also in a deficit situation. Therefore, the Applicant will obtain the Project water supply from the IID water canals in the area. This alternative provides sufficient water volume and quality, it satisfies California water policy, and it is safe and reliable. Trucking water to the Project Site is a short-term water supply option if the main water supply source is interrupted.

1.5 TYPICAL AREAS OF ENVIRONMENTAL INTEREST

The development of this Project will have the potential for both positive and negative effects. Some of the positive effects include:

- the production of renewable power,
- minimal greenhouse gas emissions,
- minimal air emissions,
- minimal use of water and toxic and hazardous materials, and
- creation of new jobs.

The Project also helps meet local and state targets and requirements for renewable energy and state goals for reduced greenhouse gas emissions. The Applicant acknowledges that the development of a large-scale solar power Project has the potential for negative effects because of the large land disturbances associated with it. The Applicant will develop the Project so as to avoid, minimize, and/or mitigate potential effects, where feasible. The following discussion summarizes the key areas that were evaluated as part of this AFC.

1.5.1 Air Quality

Overall, the Project will have minor air emissions of regulated air pollutants and greenhouse gases, which is a significant improvement relative to the air emissions associated with fossil fuel power generation. During the construction and operation of the Project, air quality will have the potential to be impacted by construction and vehicular activity. However, these air emission effects will be temporary and will be controlled by enacting appropriate mitigation measures (e.g., soil stabilizers, water for dust control, etc.). Any potential air effects as a result of the Project construction and operation activities could be considered negligible in comparison to the wider benefits the Project will have for the state of California.

1.5.2 Biological Resources

The biological resources evaluation of the Project involved conducting extensive field and habitat surveys to characterize special-status plants and wildlife. The Project Site is a low-elevation desert area consisting primarily of Sonoran Desert creosote bush scrub vegetation. The Project Site is in a location that has a history of mining operations and claim filings dating to 1908. These activities have resulted in disturbances in various areas, and in some cases the same area has been disturbed several times. The Applicant intends that proposed mitigation measures will ensure that potential effects to sensitive species and wildlife will be considered negligible.

Given the design of the SunCatcher systems, which will stand on individual pedestals, some vegetation will need to be trimmed and removed during construction for access roads and SunCatcher foundations, though much of the vegetation will be left intact. After construction is completed, some of the cleared areas will be allowed to re-vegetate so that the long-term effect of the construction will be reduced.

1.5.3 Cultural Resources

Past and present actions within the region have already resulted in effects to cultural resources. These actions have included highway/roadway construction, commercial and residential development, and off-highway vehicle use. The development of the Project has the potential to result in direct effects to previously undisturbed cultural resources because of earth-moving activity. These potential effects will be minimized through the use of properly designed and implemented mitigation programs. Furthermore, as previously discussed in Section 1.4, Alternatives, the Applicant elected to exclude part of an adjoining area of the Project Site from consideration to avoid effects to cultural resources.

1.5.4 Land Use

Land use within the area of the Project Site is dominated by open space/public land administered by the BLM and to a lesser extent by recreational, military, and community uses, with small portions in industrial and urban uses. Past and present activities, including residential and commercial development, off-highway vehicle use, infrastructure development (highways and roads), and agricultural activities, have resulted in changes to land use in what was a relatively undeveloped region. According to Imperial County LORS, solar energy conversion is an allowable use for the Project Site. As part of this process, the BLM will require the approval of a land use amendment and the issuance of a right-of-way grant.

1.5.5 Socioeconomics

The socioeconomic environment within the study area is dominated by small urban centers (El Centro and Ocotillo) and military, recreational, and agricultural activities. It is expected that a large portion of the construction and operation workforces will come from the vicinity of the Project, with the remainder coming from neighboring areas and states. It is anticipated that the Project will be operated by approximately 160 full-time employees when fully operational. However, during construction up to 700 construction and building trades personnel will work on-site. The permanent employees associated with the operation of the Project are expected to have a significant beneficial effect on the local economy because of the new jobs created and because of the potential increase in tax revenues resulting from the economic activities of the Project's employees.

Based on discussions with local officials, the Project is not anticipated to affect local utilities or emergency services.

1.5.6 Visual Resources

Visual resources in the area of the Project Site have been affected by past and present actions, including highway/roadway construction and residential and commercial development. The viewshed of the area has already been modified with the presence of the existing transmission lines, Interstate 8, a railway line, and property fencing in the immediate vicinity of the Project. Also, the Plaster City Gypsum Wallboard Manufacturing Facility forms a dominant feature of the landscape.

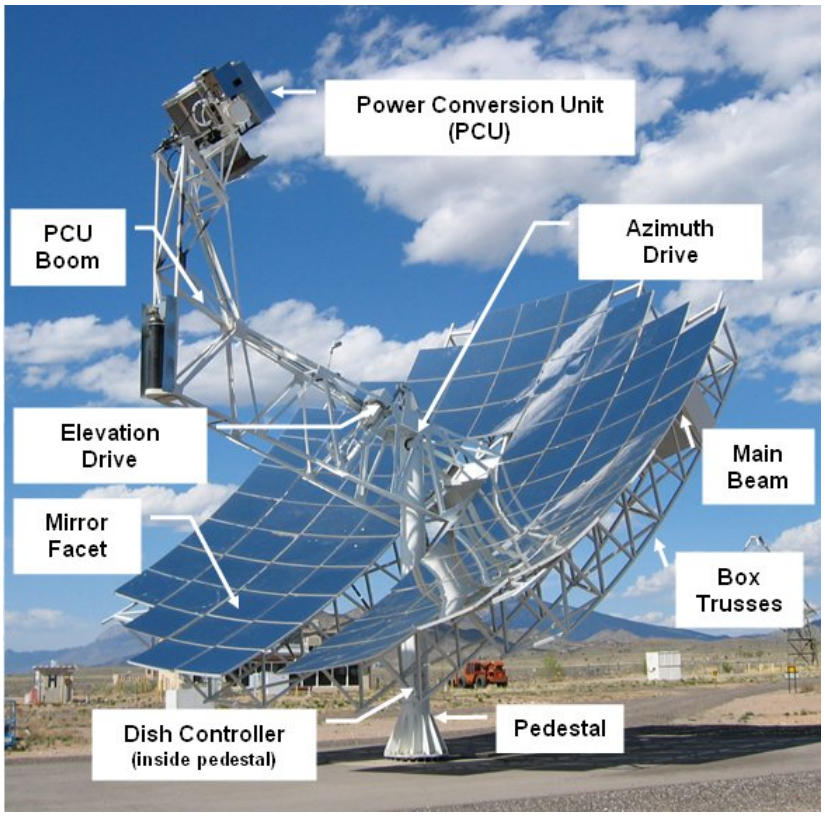
The Project would be clearly visible from Interstate 8 and would have an effect on the viewshed from the road. The form, line, and texture of the visual environment will change as a result of the Project. The visual character of this area will change from open space to a regional center for large-scale solar power production. This change will be perceived differently by different people. To some people, the Project may detract from the desert environment, but to other people the Project may be a point of positive visual interest. As one of the first large-scale projects of its kind in California, the solar technology has the potential to become a tourist attraction, drawing visitors from the energy industry, the environmental community, and government/political figures who seek direct personal experience of progressive renewable energy solutions.

1.6 SUMMARY

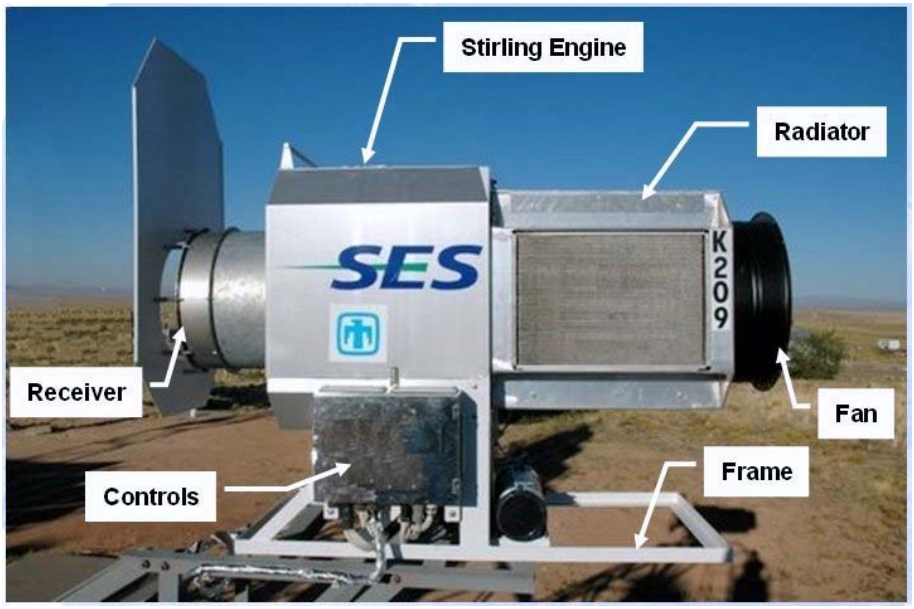
The Project will provide the state of California with large-scale, renewable, solar-powered electricity that is generated with minimal air and greenhouse gas emissions. The Project will help both the state of California and SDG&E meet the current and future requirements of the RPS Program and current and future greenhouse gas emission reduction goals. The Applicant acknowledges that the development of large-scale renewable energy Project has the potential for both positive and negative effects. As is demonstrated in this AFC, the Applicant has endeavored to minimize any potential negative effects wherever possible.

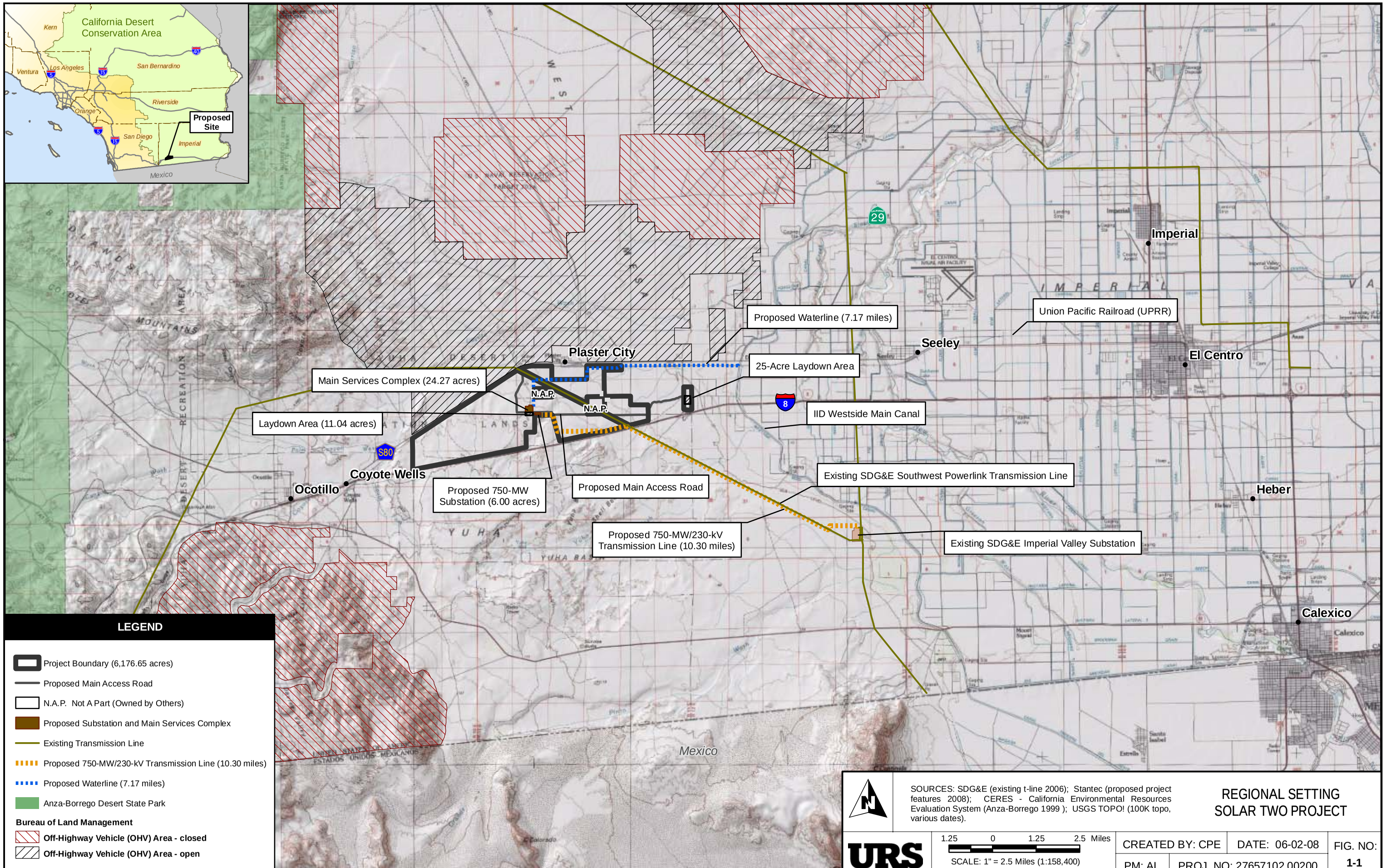
Photograph 1-1: SunCatcher in Operation

Photograph 1-2: SunCatcher System



Photograph 1-3: Power Conversion Unit





SOURCES: SDG&E (existing t-line 2006); Stantec (proposed project features 2008); CERES - California Environmental Resources Evaluation System (Anza-Borrego 1999); USGS TOPO! (100K topo, various dates).

REGIONAL SETTING
SOLAR TWO PROJECT

URS

1.25 0 1.25 2.5 Miles

SCALE: 1" = 2.5 Miles (1:158,400)
SCALE CORRECT WHEN PRINTED AT 11X17

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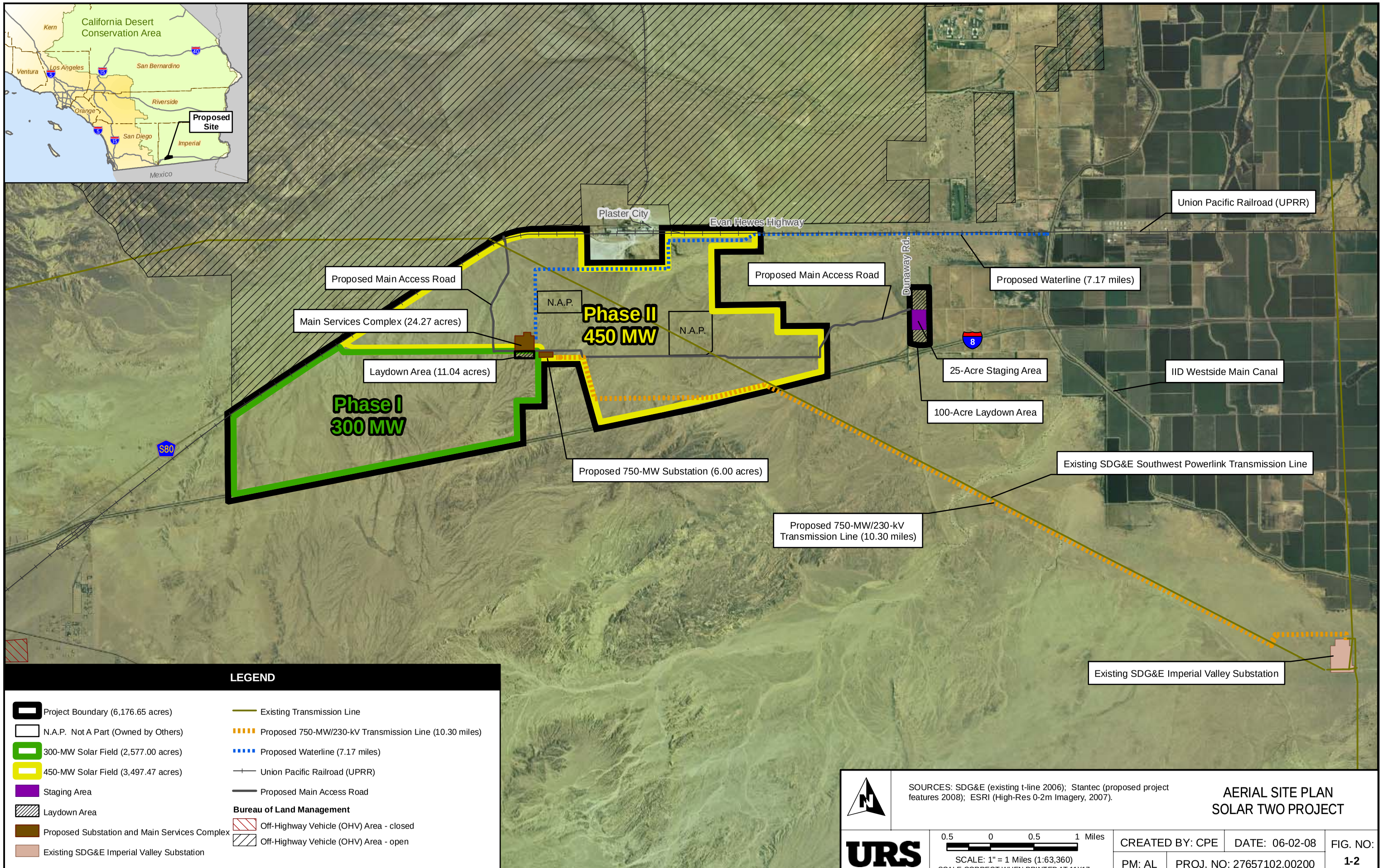

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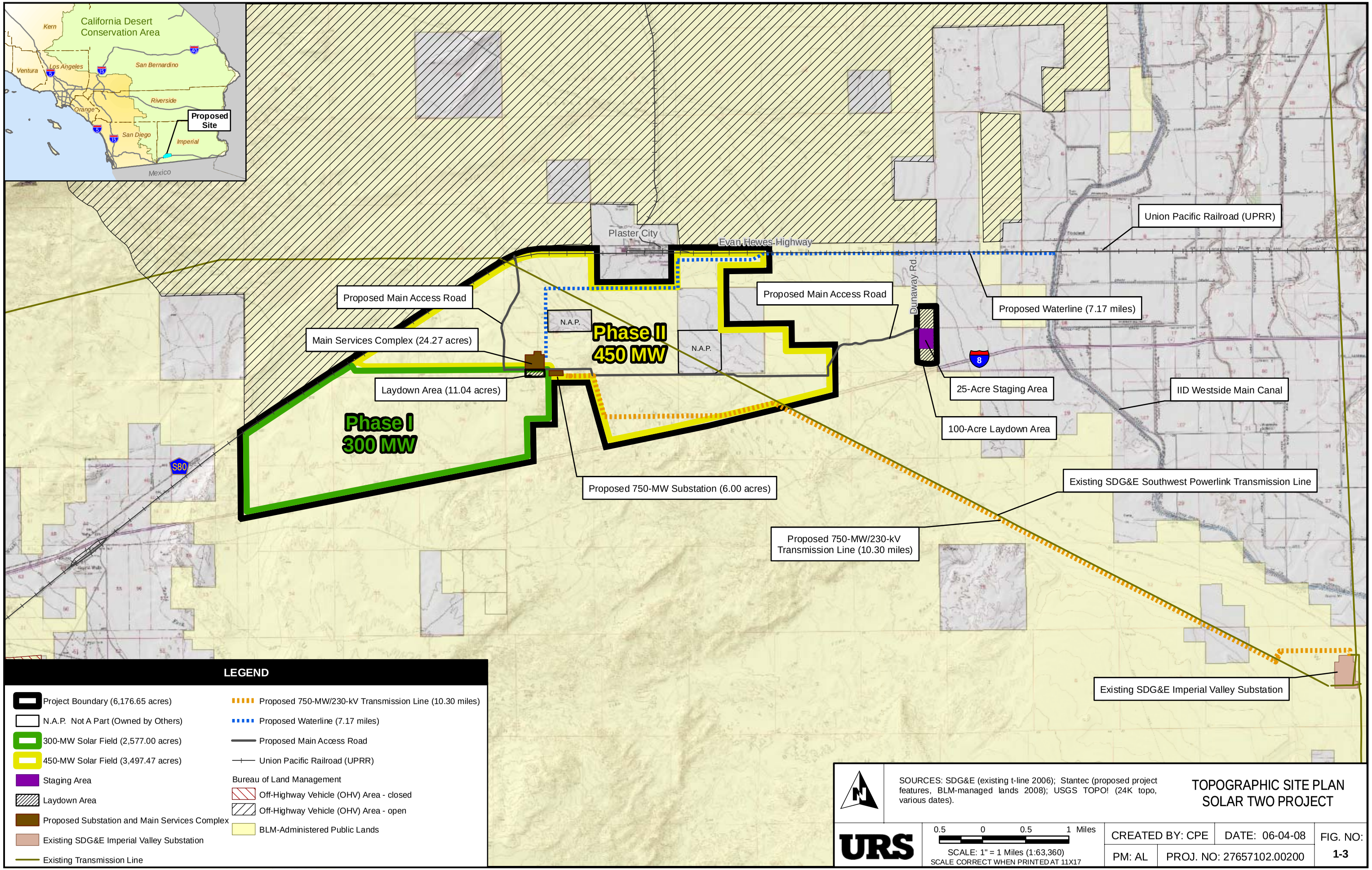

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